DEVELOPING AN EVALUATIVE FRAMEWORK FOR INFORMATION LITERACY INTERVENTIONS

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DECLARATION

I, the undersigned, declare that the work contained in this thesis is my own original work and has not previously been submitted for academic examination towards any qualification.

SIGNATURE .....

DATE ...29/11/2001...

ABSTRACT

This study presents a theoretical evaluative framework for information literacy initiatives. The evaluative framework is based on a holistic behavioural taxonomic approach incorporating affective, cognitive, and physical domains.

In this study the behavioural taxonomic approach was applied to the evaluation of a historical information literacy initiative, the IFYE (Integrated First Year Experience), developed by the Cape Technikon in 1997, South Africa. The motivating factor behind the evaluation was to determine whether it would be suitable as an implementable initiative at other institutions in the Western Cape. This coincided with the aims of Infolit, who had invited institutions of Higher Education to submit pilot projects on information literacy in a drive to promote information literacy throughout the Western Cape. Although the IFYE initiative may not have realised its full potential, information literacy has drawn continued interest and other initiatives have since been developed.

Application of two existing taxonomies, demonstrated distinct limitations in their application and a new taxonomy was developed within the South African educational context. The new taxonomy was applied to the theoretical evaluation of an innovative e-learning information literacy initiative developed by the Cape Technikon in 2000, which has been accepted by Infolit for wider implementation throughout the Western Cape. The final section of the study presents recommendations based on the evaluation of the e-learning initiative, information literacy initiatives in general, and structural changes to the developed taxonomy. Areas for further research are also discussed.

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CLARIFICATION OF TERMS

Advantaged and Disadvantaged Students

The terms used take cognisance of the effect of apartheid education on learners and that not all learners entering higher education are homogenous or equal. In the context of information literacy the effect of apartheid education is a result of denied and deprived resources, for example, libraries and computer facilities (Sayed & De Jager, 1997:8).

It is assumed that because of the historical educational background and economic differences between population groups that disadvantaged students include mainly black students (Coetzee, 1997). The writer does, however, caution against uncritical use of the terms as they are used as umbrella terms and realises that not every student who is black is disadvantaged.

Critical Cross-Field Education and Training Outcomes

This is the term agreed upon by the members of the National Qualification Framework, used to represent the following terms: generic (or core) skills or competencies, abilities, capabilities, and essential outcomes.

Seven critical outcomes have been identified for learners in Higher Education. The fourth critical outcome describes the contemporary concept of information literacy; learners are required to be able to "collect, analyse, organise and critically evaluate information" (SAQA, 1997: 7).

Evaluation is defined as the gathering of information using a variety of sources in a structured manner in order to arrive at a judgement regarding the effectiveness or successful implementation of a new educational strategy (Parsons, 1997).

Information Literacy refers to the ability of learners to access, use and evaluate information from different sources, to enhance learning, solve problems and generate new knowledge (Sayed & Karelse, 1997: 27).

National Qualification Framework

In South Africa, a National Qualification Framework has been established to facilitate the democratic transformation of the national education and training system (SAQA, 1997:6).

"The standards are housed within a qualifications framework designed to promote lifelong learning, integrate education and training, recognise learning gained outside of formal institutions and allow for flexible, portable credits and qualifications" (SAQA, 1997:3).

Outcomes

"These are the result of learning processes and refer to knowledge, skills, attitudes and values within particular contexts. Learners should be able to demonstrate that they understand and can apply the desired outcomes within a certain context" (South Africa. Department of Education, 1997a: 32).

Outcomes Based Education

Outcomes Based Education represents the new paradigm in education. It focuses on the result of the teaching process rather than on the process. The current paradigm in Education focuses on the "when and how" students learn something, whereas the OBE paradigm focuses on "what and whether" in fact the student has learnt.

According to Spady (1994: 1-2), this format of education focuses on the result and the action that the student is able to perform at the end of the learning process. Once a clear picture of the outcome – or the action, has been formed, then only should the focus shift towards what is required to achieve this action or outcome, namely to organise the curriculum, instruction method, and assessment to ensure that learning takes place.

He identified two keys to having an outcomes based system:

- developing a clear set of learning outcomes around which all of the system's components can be focused
- establishing the conditions and opportunities within the system that enable and encourage all students to achieve those essential outcomes (Spady 1994:1-2).

South African Qualifications Authority

The task of implementing the transformation process has been transferred to the South African Qualification Authority. The latter will oversee the generation of standards of which critical outcomes form a fundamental part.

"Furthermore it ensures the enhancement of the quality of education and training, the acceleration of redress of past unfair discrimination in education training ..., thereby contributing to the full personal development of each learner" (SAQA, 1997: 6).

Unit Standards

The purpose of a Unit Standard is to provide:

- an assessor's document
- a learner's guide
- an educator's guide for the preparation of learning material (SAQA, 1997:8)

Within the new educational framework, a Unit Standard should provide a complete learning package for both learner and facilitator, complete with critical outcome and assessment criteria that are measurable and tangible, each of which are accredited at the successful completion of each Unit Standard.

LIST OF ACRONYMS

American Library Association	ALA
Association of College and Research Libraries	ACRL
Cape Libraries Co-operative Project	CALICO
Integrated First Year Experience	IFYE
National Qualification Framework	NQF
South African Qualification Authority	SAQA

CHAPTER 1

FRAMING THE STUDY

1.1 Introduction

At the media launch of the National Plan for Higher Education on Monday 5 March 2001, the Minister of Education, Professor Kader Asmal, quoted from president Thabo Mbeki's State of the Nation address at the opening of the 2001 Parliament session (South Africa. Department of Education, 2001). In this address, the state president stated that both universities and technikons are expected to play a leading role in contributing to the development of an information society in South Africa.

There are two major challenges facing Higher Education in South Africa:

(i) Transformation

The democratisation of tertiary education is now in its seventh year and has enabled today's student body to become a multicultural population, one that more accurately represents South Africa's diverse cultures. However, it must be remembered that South Africa faces a unique situation in light of past political agendas and racial discrimination, and learners entering higher education are not a homogenous group. The majority of learners entering tertiary education lack the necessary study skills to cope with the demands of Higher Education. According to the National Commission on Higher Education (South Africa, 1996a: 1) these deficiencies in the educational system are a result of "vast disparities between historically black and historically white institutions in terms of facilities".

In 1995 the Department of Education responded to the challenge by establishing the National Qualification Framework (hereafter referred to as the NQF) to facilitate the democratic transformation of the national education and training system (SAQA, 1997: 6). The NQF was put forward as a mechanism to achieve the educational objectives of transformation and contribution to the development of lifelong learners. The task of implementing the transformation process has been entrusted to the South African Qualification Authority (hereafter referred to as SAQA). The latter oversees the generation of standards, the design of which is primarily aimed at promoting lifelong

learning (SAQA, 1997: 3). Seven critical cross-field outcomes have subsequently been identified for learners in Higher Education. For registration, all seven critical cross-field outcomes have to be incorporated appropriately into the proposed qualification, before it will be considered by SAQA.

(ii) The Changing Nature of Society

In the 21st century the world has been described as a global village as a result of the increase in flow of goods, services, capital, information, and knowledge across national and international borders. This permeation of trade barriers has led to greater competition amongst providers forcing higher levels of productivity and efficiency, which in turn encourages the development of technology to provide more goods of better quality at a cheaper cost. This rapid pace of technological advance brought about by globalisation has resulted in both skilled and semi-skilled workers having to engage in lifelong learning if they want to maintain the pace of their competitors and remain at the cutting edge of technological development (Western Cape. Provincial Administration, 2000: 2-4). Failure to engage in lifelong learning would result in potential loss of a competitive edge, loss of business, and on a collective scale - economic decline.

Responding to this changing nature of society requires preparing multi-skilled learners that are able "to think critically and creatively, to pose and solve problems ... to become independent and lifelong learners" (Mehl, 1997: 16). The need to develop and provide effective support services for learners has become critical, especially if the government's vision of higher education making a major contribution to the delivery of skilled and socially committed professionals and intellectuals is ever to become a reality.

Furthermore, the African National Congress Education Department reported in its policy framework for education and training that: "Information is of fundamental importance to the process of social and economic development. The quality of life of individuals, communities and nations is increasingly determined by their capacity to absorb, act on and use information. Information resources, skills and literacy are therefore essential elements of lifelong learning" (African National Congress Education Department, 1995: 83).

This is highly significant in particular as the fourth critical outcome listed by SAQA requires learners to be able to "**collect, analyse, organise and critically evaluate information**" (SAQA, 1997: 7). The aim of information literacy as accepted for this study is towards encouraging lifelong learning, which coincides directly with the first criteria named in the aim of SAQA and the NQF (SAQA, 1997: 3). Information literacy has thus become an integral skill in today's changing nature of society.

In 1997, the Cape Technikon responded to this need by designing a study skills programme for first-year learners called the "Integrated First Year Experience" (hereafter referred to as IFYE). The IFYE aligns with the paradigm shift in higher education towards student-centred learning and outcomes-based education, resulting in independent, lifelong learners. Information literacy forms part of the IFYE programme. The information literacy Module is aimed at helping learners become information-literate so that they may ultimately become contributing members in an information society. Today's learners are required to become lifelong learners and functional members of an information society.

Since 1997, an updated information literacy initiative has been developed at the Cape Technikon, in line with the contemporary e-learning initiative of contributing to an information society. The e-learning initiative focuses on using internet-based learning as a means of encouraging self-directed learning, thereby increasing access to knowledge and facilitating learners becoming lifelong learners (French et al, 1999: 10).

The importance of information literacy as a fundamental skill amongst learners in the 21st century has been acknowledged and documented on an international scale (Association of College and Research Libraries, 2000), a national scale (via SAQA policy documents), and a provincial scale (Sayed & Karelse, 1997). What is conspicuous in most programmes, however, is the absence of a tight theoretical framework on which the intervention is based.

1.2 Purpose of the Study

The primary purpose of this study is to develop and validate a theoretical evaluative model for information literacy and to demonstrate its usefulness as an evaluative framework that could be applied to any information literacy initiative.

The secondary purpose is to evaluate whether the Cape Technikon's pilot information literacy initiatives could be considered for implementation at other institutions.

The model was based on the theoretical work of Nahl-Jakobovits and Jakobovits (1987: 204-214) who developed a classification of library skills and errors. Within this behavioural taxonomic approach exist three domains – affective, cognitive, and psychomotor. There are three levels that may be attained within each domain – orientation, interaction, and internalisation. The aims of the IFYE Module were analysed into the taxonomy, for the purpose of identifying barriers to successful implementation.

However, this initial evaluation also identified the limitations of applying an evaluative model restricted only to library skills and errors, to an initiative aimed at the much broader concept of information literacy. Thus, an evaluative model incorporating information literacy was sought. Correspondence was entered into with Diane Nahl-Jakobovits, author of the taxonomy (who had since developed an updated taxonomy) incorporating the concept of information literacy. The aims of the information literacy programme were analysed into this updated taxonomy. The application of these two taxonomies demonstrated that each had distinct limitations in their application. A new taxonomy was therefore developed taking the specific needs of learners in a South African context into consideration. This evaluative model was developed from a synthesis of the practical application of the previous taxonomies and the results of the evaluations.

The opportunity to evaluate the e-learning information literacy initiative was crucial to the study, as this enabled the generic applicability of the theoretical evaluative framework to be determined. Based on this successful validation of the evaluative framework the determination of the effectiveness of a prospective e-learning information literacy initiative was undertaken. Both initiatives were designed and implemented at the Cape Technikon.

The success of these two interventions needed to be evaluated to determine the adequacy of the interventions and their application. The importance of the study was the development of an evaluative model and its application to existing interventions.

1.3 Background to the Study

In 1995, a five-year research project CALICO (Cape Libraries Co-operative project) was established under the auspices of the Adamastor trust, which works to promote collaboration amongst the five institutions of Higher Education, around the Western Cape. The function of CALICO was aimed at creating a single library system amongst the three universities and the two technikons in the Western Cape. Within the framework of CALICO, Infolit (Information Literacy) was established with the aim of focusing on the aspect of education and training of information literacy, taking into consideration the specific needs of learners in the Western Cape (Underwood, 2000).

In 1999 Infolit was recognized as an independent project, and the Adamastor Trust has pledged to continue its support until at least the end of 2002. This further underscores the importance of information literacy as a key contributor towards lifelong learning (Underwood, 2001).

At the Cape Technikon, one of the first information literacy initiatives was the "Integrated First Year Experience Programme" (which was discussed earlier). Although the IFYE initiative may not have realised its potential for institution-wide implementation since its introduction in 1997, information literacy has drawn continued interest and other initiatives have since been developed. Janine Lockhart, from the Department of Library Services, developed an e-learning information literacy initiative aimed at helping learners develop and improve their information literacy skills. This intervention was designed as part of the Cape Technikon's e-learning initiative.

The information gathered from the evaluation of these two initiatives is intended to demonstrate the usefulness and generic applicability of the theoretical framework of the evaluative model developed in this study.

1.4 Research methodology

In 1997, the IFYE information literacy initiative required an evaluation before it could be considered by Infolit for wider application at other institutions. At the time, the initiative had already been developed and partly implemented. In 2001, similar constraints were experienced during the evaluation. Subsequently, the action research method was selected as it was found to be the most appropriate research method under the given circumstances. Action research is well illustrated by a comment made in 1972 by Halsey:

"action research is a small scale intervention in the functioning of the real world and a close examination of the effects of such intervention" (Cohen & Manion, 1994: 186).

Furthermore, the action research method was applied for the purpose of this study since tangible features identified by Cohen and Manion (1994: 186) aligned with the characteristics of the study:

(i) **action research is situational** – it is concerned with diagnosing a problem *(adequacy of a theoretical framework)* in a specific context *(first-year learners at the Cape Technikon)* and attempting to solve *(predict areas of weakness in the intervention design)* it in that context *(information literacy interventions at the Cape Technikon)*

(ii) **it is collaborative** – researchers and practitioners *(facilitators who implemented the interventions)* work together *(feedback was required from facilitators on the ease of implementation of the initiatives)* on the project *(evaluation)*

(iii) **it is participatory** – team members themselves take part directly or indirectly in implementing the research *(the writer herself was directly involved in implementing the initiatives)*

(iv) **it is self-evaluative** – modifications are continuously evaluated within the ongoing situation *(the IFYE initiative in 1997 and the modified e-learning initiative developed in 2001)*, the ultimate objective being to improve *(by recommendations)* practice *(teaching and learning of information literacy)* in some way or other.

Cognisance was taken of the criticism that the action research method may be situational and specific and that there is little or no control over independent variables. However, unlike the true scientific method, action research takes into account and accepts the fact that educational research is set in the real world, one which does not equal a laboratory setting where the researcher has the ability to exercise control over variables which may affect the validity of the study. In an educational setting, the researcher has little or no control over what is to happen and to whom it is to happen (Tuckman, 1994: 5).

Although the primary purpose of the study is to evaluate from a theoretical perspective the adequacy of the information literacy initiatives described, thereby demonstrating the value of the theoretical model as an evaluative tool, the cross-validation of the recommendations required the use of student and staff surveys. The survey was used as a data collection method. "Typically surveys gather data at a particular point in time with the intention of describing the nature of existing conditions ...or determining the relationship that exists between specific events" (Cohen & Manion, 1994: 83). The survey method involves one or more of the following data gathering techniques: structured interviews, self-completion interview, standardised tests of attainment of performance, and attitude scales. Of the four techniques listed above, three were used in the study.

There was no need to apply any sampling techniques as all facilitators who responded to the survey were included in the population. Randomness in this study was impractical due to the limited number of participants.

To achieve both the first and secondary purpose of this research project, a summative evaluation format was used to determine whether the aims of the information literacy Module had been met.

The research conducted in this study includes the methodologies of literature review, consultation with various stakeholders using both qualitative and quantitative methods, as well as the application of developed measuring tools through the evaluation of two information literacy initiatives. A variety of data collection methods were used: questionnaires, interviews, personal observation and a continuous review of relevant documentation.

The study consists of seven chapters:

The first chapter provides an overview by discussing the purpose of the study, outlining the background and explaining the methodology chosen. The second chapter presents a comprehensive literature review of the history and development of the concept of information literacy.

The third chapter offers the contextualisation of an evaluation design. Different approaches to measuring information literacy are discussed and the taxonomic approach as an evaluation method is introduced. In chapter four, the evaluative framework is applied to the IFYE information literacy Module. A cross-validation of the taxonomic approach as an evaluative framework is presented by analysing the qualitative and quantitative data collected after the implementation of the Module.

On the basis of the findings of chapter four, modifications to the evaluative framework are made and a new taxonomy is developed in chapter five and put forward as an evaluative framework. In chapter six the new taxonomy is applied to a contemporary information literacy initiative which uses e-learning as its medium of delivery. In chapter seven, based on the findings of chapter six, conclusions are drawn, recommendations are made, and areas for future research are identified.

1.5 Hypotheses

Although not experimental in design, the study nevertheless lends itself to the exploration of a number of hypotheses. These are essentially qualitative in nature and cover the main aims of the study:

(i) Used **formatively**, the taxonomic approach will predict from **a theoretical point of view**, to what extent an intervention that has not yet been applied will succeed in achieving the goals of information literacy.

(ii) Identifying **potential weaknesses** and programme strengths, will provide the potential for further development of the initiative to eliminate such weaknesses **prior to the implementation** of the initiative.

(iii) Evaluating information literacy initiatives **summatively** using the taxonomic approach will determine to what extent an intervention that has been applied has succeeded in achieving the goals of information literacy from **a theoretical point of view.**

(iv) Identifying **actual weaknesses** and programme strengths, will provide the potential for further development of the initiative to eliminate such weaknesses for **future implementations.**

1.6 Delineation

(i) The evaluation of information literacy interventions is restricted to first-year learners at the Cape Technikon. The population for the first evaluative study comprises exclusively of first-year learners exposed to the IFYE information literacy intervention.

(ii) In the evaluation of the information literacy Module of the IFYE programme, the research is limited to those facilitators of the IFYE programme who responded to a survey and who were prepared to participate in the evaluation.

(iii) The evaluation of the e-learning initiative was performed using the pilot version made available to the evaluator in June 2001.

(iv) The evaluation covered all areas of the taxonomies, identifying which areas were identified by each of the **two** interventions, where there were omissions, and making recommendations as to how they could be improved in the light of the analysis.

CHAPTER 2

THE HISTORY AND DEVELOPMENT OF INFORMATION LITERACY

2.1 The Information Explosion

The information explosion is best summed up by Ford (1997: 16):

"In the past three decades, more words have been churned out than in the past five millenniums ... it would take a reader eight hours a day for five months to consume just one days' output of technical data"

"Age of information" and "information society" are terms often used to describe today's society. This is because there has never been so much information available in the history of mankind as there is today (Curzon, 1995: 8; Lenox & Walker, 1993: 31, Marchionini, 1999: 17). According to statistics provided by the "Sunday Times, Life" magazine (Ford, 1997: 16) more than 1 000 books are published daily and more than 20 million words of technical data are recorded.

The information explosion in the second half of this century was accelerated by the development and increasing use of technology, particularly the role played by computers. Apart from being able to store vast amounts of information, computers allow for so much more information to be accessible to users. Database systems and the Internet increasingly store information electronically that used to be available in traditional print form only. Information technology can be applied to almost any situation and it is this generic usefulness in society that has made it so pervasive.

An analogy gives an indication of the short time span in which this exponential growth rate of information has occurred. As early as 1981 McGarry used a clock to compare the amount of information available during the period of the past 30 000 years. He uses a twenty-four hour time frame where one hour equates to 1 200 years, and five minutes represents 100 years. Figure 1 illustrates the information explosion based on the work of McGarry (1981: 74).

Figure 2.1: The Information Explosion

Starting at 12 o'clock midnight the **Palaeolithic Art** period falls between 10:00am and 2:00pm.

At 8:00pm the period of **Cuneiform writing & Egyptian hieroglyphics** begins.

9:00pm - **Code of Hammurabi**

10:00pm - **Athenian & Greek civilisation**

10:30pm - **Judaeo-Christian** culture in Europe

11:33pm - **Invention of Printing**

11:48pm - **Industrial Revolution**

11:55pm - **Communications Revolution**

Figure 2.1 graphically shows how the communications revolution has taken place in the last five minutes, with the development of the computer taking place in the last minute (equivalent to twenty years) and the micro-computer in the last seconds. And it is not about to end here. According to Marchionini (1999: 17): "our human limitation of 86,400 seconds in our day is clearly fixed, and our limited bandwidths for reading (200-300 words per minute), speaking/listening (120 words per minute), visual recognition (50-300 milliseconds), and cognitive cycling (70-100 milliseconds) have not changed dramatically in the course of recorded history. On the other hand, Moore's Law (computing power doubles every 18 months) continues to apply ..."

So extreme is the communications and information revolution that counter-effects have even been identified – information anxiety and technophobia (McCade & Warmkessel, 2001) and strategies to help combat these problems have been developed. Books are being published on how to cope with "information overload" - a physical condition identified by psychologists. The symptoms of "information fatigue syndrome" include: "forgetfulness, headaches and computer rage - literally hitting the PC" (Ford, 1997: 16).

Because of these pressures created by increasing volumes of information it is clear that information-handling skills are becoming ever more pertinent. Marchionini (1999: 17) even questions whether the skills of filtering available information may not have become more critical than the accessing skills.

2.2 Information Literacy in Response to the Information Age

The traditional definition of the term "literacy" implies the ability to read and write. In an information age merely being "literate" is necessary but no longer sufficient. According to Breivik and Gee (1989: 13):

"Information literacy is a survival skill in the information age ..."

To be a functional member of society requires more complex skills such as being able to manipulate (access, understand, use) the vast amounts of information that one is confronted with. As is evident from the time-chart in Figure 2.1, the rapid development of communication and information technology has enabled an increasing amount of information to become accessible to society in the form of the electronic and communication media (telephones, radio, television, and computers) in addition to the traditional printed media (books, magazines and journals) (Lenox & Walker, 1993: 31; Evans, 1994: 36-37, Rafferty, 1999: 22). The result has been that society is being bombarded with information on a daily basis.

Since the 1970s the idea of a new and more applicable form of literacy, "information literacy", in response to the changing needs of society, became important enough to encourage efforts towards defining it. Behrens (1994: 310-317) offers a historical overview of how the concept of information literacy has evolved.

1970s

In the 1970s Zurkowski (in Behrens, 1994: 310) was the first to conceptualise the term information literacy: "people trained in the application of information resources to their work can be called information-literate. They have learned techniques and skills for utilising the wide range of information tools as well as primary sources in moulding information-solutions to their problems". His definition focused on being able to ***use*** information tools to solve problems ***in a work situation.*** Burchinal, (in Behrens, 1994: 310) in his 1976 definition, took into account the vast amount of information available: "To be information-literate requires a new set of skills. These include how to locate and use information needed for problem-solving and decision making efficiently and effectively." His definition took cognisance of the following:

(a) that a new set of skills was required
(b) the application of these skills was not restricted to the work place
(c) locating and using information had to be efficient and effective.

Also in 1976, a further aspect of "information literacy" was explored by R. Owens who suggested "the application of information resources to the process of decision making to fulfil civic responsibilities" (Owens, in Behrens, 1994: 310). Thus already in the 1970's the definition of information literacy had moved beyond the boundaries of a work environment to include a public and social aspect.

1980s

The 1980s saw an exponential growth rate in information technology through the use of computers. This era brought about a whole new aspect of "information literacy" namely computer literacy, which involves understanding how the computer operates and being able to use it (Breivik & Gee, 1989: 11; Rafferty, 1999: 23; Association of College & Research Libraries, 2000). The importance of computer literacy as an information accessing skill was recognised; at the same time it was also realised that computer literacy could not replace information literacy and that although necessary, it was not in itself sufficient. In 1985 the following characteristics of "information literacy" were identified:

- an integrated set of skills (research strategy, evaluation) and knowledge of tools and resources
- distinct but relevant to literacy and computer literacy
- not only knowledge of resources
- not library dependent
- information finding (also understanding and evaluating)

(Behrens, 1994: 312).

The characteristics identified above give an important indication of how the concept of "information literacy" extends beyond the boundaries of other forms of literacy. Information literacy integrates library literacy (the ability to use the resources in the library) and computer literacy (the ability to access information electronically). Recognising that information was not only limited to the resources available in the library was an important development in the concept of information literacy.

The most important development during this time, however, was the realisation that simply being able to access information was not enough to constitute being "information-literate". The question was raised: how to process all the information once it has been collected? More complex cognitive skills, such as being able to understand and evaluate accessed information for relevance, were being identified and considered part of the information literacy process.

The most important shift in the concept of information literacy from the 1970s to the 1980s was that in the 1970s it was recognised that new skills were needed, but it was only in the 1980s that these skills and requirements were clearly identified:

- new information technologies have to be taken into consideration with regard to the manner in which they can assist information handling, and the skills which are required for their use
- particular attitudes, such as the awareness of a need for information, a willingness to locate and use information, the appreciation of the value of information, and the accurate application of the information, are required
- higher order critical thinking skills such as understanding and evaluating information are necessary; mere location of information is insufficient
- although libraries are regarded as major repositories of information sources, they should not be seen as the only sources
- information literacy is a prerequisite for active, responsible citizenship
- the goal of information literacy is the attainment of lifelong skills which enable the person to be an independent learner in all spheres of life

(Behrens, 1994: 316).

From the requirements identified above, the following specific skills have been emphasised, as they are used throughout this study as those required of an information-literate person:

- ✓ **knowing when there is a need for information**
- ✓ **identifying the information needed in order to address a problem**
- ✓ **evaluating the located information**
- ✓ **organizing the information**
- ✓ **using the information effectively to address the problem.**

1990s

The focus in the early 1990s had been on the universal literacy/illiteracy problem. To mark the start of a decade of illiteracy awareness, 1990 had been declared the "International Literacy Year" by the United Nations General Assembly. With the increasing focus on information literacy, however, the question whether the term 'literacy' – the ability to read and write - was still applicable in today's information society, a point which had already been touched upon in the 1980s, came to a head. Behrens (1994: 318) illustrates literacy as "an evolving concept, its meaning dependent on the social and individual requirements of a specific society.... [Literacy] has to be considered in its cultural, social, economic, and political contexts, its definition should take into consideration the expanding needs of society."

This awareness of a new type of literacy resulted in the formation of the National Forum on Information Literacy whose purpose it is to keep information literacy as an active issue. Strategic plans were implemented for the development of skills required for information literacy.

Thus in the 1990s, the focus had shifted from the conceptualisation of information literacy, to education for specific and measurable information literacy skills. The response of the higher educational sector to information literacy is dealt with in detail in

the following two sections of the study. The summary is restricted to the response of Higher Education, in line with the focus of this study.

2.3 Higher Education's Response to the Information Age

In order to secure an information-literate society, the responsibility of teaching the required skills has become that of the Higher Education. In an attempt to prepare learners successfully for their prospective careers, facilitators in Higher Education now find themselves at the forefront of information literacy education.

"Ultimately information-literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organised, how to find information, and how to use information in such a way that others can learn from them" (Bruce, 1999).

Thus, information literacy had emerged as the literacy required in order to survive in the "information age". To keep updated with the latest developments is crucial not only in business, but is mirrored in all aspects of life - social, political and economic. Without information literacy, the opportunity to meet and enhance personal or business needs is greatly reduced. In the final report of the American Library Association (ALA) Presidential Committee on Information Literacy, it is stated that information literacy may even impact on the democratic way of life and the nation's ability to compete internationally. To illustrate the negative effect that a lack of information literacy may have on a society the report cites a survey of the library use in China, which was performed in 1990. The survey indicated that "83% of current users felt it was difficult to obtain key information". The same survey stated that 40% of research projects in modern physics in China are replicated projects already completed by others abroad"(Fang & Callison, 1990: 95).

2.3.1 The traditional role of Higher Education

(i) Library Literacy:

The traditional role of higher education was to teach learners library literacy, in the format of library tours or bibliographic instruction courses during orientation. This method focused on effective use of the *library*, not of the *information* to which the library provides access (Behrens, 1993: 124).

During a traditional library orientation session, learners are physically led through the library and shown where each of the various resources may be found: for example, the reference section, the open shelves, shortloan section, periodicals section, audio-visual department, and photocopying and studying and facilities. Video presentations or demonstrations may be used to show learners how to physically find an information source within the library. Learners may even be required to perform an exercise or answer a series of questions to encourage them to use the library.

(ii) Computer Literacy

Information technology has been a major contributing factor to the increase in information available and has permanently changed the information searching process in several ways:

- increased volume of information available to individuals
- altered cost-benefit trade offs in time and effort required to solve information problems
- increased variability of formats and management techniques for information resources
- changed the physical actions that users take during information seeking
- influenced how resources are allocated and distributed
- broadened the ways information is organised and represented
- stimulated the creation of new information processing tools

- increased the level and type of interactivity
- changed how we view information seeking and our expectations about results and,
- augmented the strategies and tactics used

(Marchionini, 1995: 163-174).

Information technology has been used in the library setting to store vast amounts of information in the form of computerised catalogue systems and CD-ROMs. An increasing amount of information in journals, for example, is not available in traditional print form but is only available electronically. Whereas learners did not need computer skills to access information in the past, they now have to learn how to use the new technology - they have to acquire computer literacy skills to be able to access information (Sonntag & Ohr, 1996: 332; Sayed & De Jager, 1997: 61; ACRL, 2000). The ability to use information technology to access information in the library and beyond is thus a fundamental of information literacy.

However, teaching learners the skills to access information in an information society is necessary, but not sufficient. Higher order cognitive skills, such as critical thinking, were recognised as essential to information literacy (Breivik & Gee, 1989: 28; Lenox & Walker, 1993: 314; Behrens, 1994: 316; Sonntag & Ohr, 1996: 331; Sayed & De Jager, 1997: 6). This aspect of information literacy is particularly important when considering the overload of information available. As the amount of information available increases, so the ability to select and evaluate what is relevant becomes more significant.

(iii) Academic Literacy

At this point another form of literacy, "academic literacy" must be considered as an integral part of "information literacy", contributing towards the teaching of critical thinking skills. Academic literacy is defined as the ability to read and write within an academic context in order to function efficiently and effectively. Aspects included are critical thinking skills such as the ability to critique and argue; the ability to manipulate the conventions of academic writing and language; and, an understanding of the course content (Leibowitz, 1995: 34; Coetzee, 1997). Academic writing skills include

understanding the proper conventions of referencing and the importance of acknowledging sources and ideas. Academic literacy is encouraged through the use of assignments and projects which "are exercises in critical thinking aimed at allowing [the student] to develop the skills of analysis and synthesis" (University of Cape Town, School of Librarianship, 1997). Academic literacy, although a valuable contribution towards encouraging critical thinking, is only a stepping stone towards achieving information literacy. Academic literacy is limited to the academic environment whereas information literacy calls for a move beyond any of the traditional forms of literacy, namely library-, computer-, and academic literacy.

With all these challenges, it appears highly desirable that Higher Education co-ordinate its teaching efforts to encourage learners to become information-literate rather than treating library-, computer-, and academic literacy as separate entities as was done in the past. The trend of the 1990s has been towards the inculcation of information literacy and this proposes a restructuring of the learning process to encourage the creation of life-long information consumers. Information literacy needs to be taught as a life skill, thus encouraging learners to become independent, self-directed, life-long learners. This implies that a paradigm shift in educational programmes is probably desirable to fulfil the requirements of information literacy (Lenox & Walker, 1993: 316; Behrens, 1994: 316; Sayed & De Jager, 1997: 7, ACRL, 2000).

2.3.2 Higher Education's New Role in the 'Information Age'

So far, the importance of being able to access information through the use of library literacy and computer literacy has been discussed. The need for critical thinking skills encouraged in higher education through academic literacy and needed for the evaluation and selection of relevant information has been touched upon. The question that remains is how the information, once accessed and selected, is used. The requirements of information literacy quoted in the previous section refer to the ability of an information-literate person to use information to solve a problem or make a decision. This requires the application of critical thinking skills but takes these skills one step further - the idea of using information to create knowledge.

The difference between information and knowledge is well illustrated by a comment made in 1982 by Hade:

"Knowledge is orderly and cumulative ... information tends to drive out knowledge. Being passive, information is 'easier' than knowledge. Yet being merely 'informed' is to be at the mercy of the senders of messages. One may be informed, but the thinking was done by others ... in an information society, information is slavery to the thoughts of others; knowledge is power and freedom to do one's own thinking" (Lenox & Walker, 1993: 8).

Thus, the ultimate skill of an information-literate person is to be able to use information to create knowledge.

2.4 Restructuring the Learning Process

The response of higher education in general has been to accept that a restructuring of the learning process to include information literacy is crucial (Lenox & Walker, 1993: 316; Behrens, 1994: 318; Sonntag & Ohr, 1996: 332, Rafferty, 1999: 24).

The challenge facing higher education at present is to create a learning environment which encourages a culture of knowledge and learning as opposed to a culture which requires no more than a transfer of information from one source to another (active participation as opposed to rote learning). The new educational paradigm which is called for is one which encourages active participation on behalf of the learners and which activates critical thinking, continuous use of information resources, and the creation of knowledge (Breivik & Gee, 1989: 28; Sonntag & Ohr, 1996: 332; Sayed & De Jager, 1997: 7). Teaching and encouraging these skills in Higher Education will lay the foundations for information-literate-citizens who will be able to navigate their way through the information age and in all aspects of life.

This paradigm shift required in education is well illustrated in Table 2.1, which presents a comparison of the "old" and "new" approach to education (South Africa. Department of Education, 1997a: 6-7):

Table 2.1: A Comparison of the "Old" and "New" Approach to Education

Old	New
"Passive learners	Active learners
Exam driven	Learners are assessed on an ongoing basis
Rote-learning	Critical thinking, reasoning, reflection and action
Syllabus is content-based and broken down into subjects	An integration of knowledge; learning relevant and connected to real life situations
Textbook/worksheet-bound and teacher centered	Learner-centered, teacher acts as facilitator, teacher constantly uses group-work and teamwork to consolidate the new approach
Sees syllabus as rigid and non-negotiable	Learning programs seen as guides that allow teachers to be innovative and creative in designing programs
Teachers responsible for learning; motivation dependent on the personality of teacher	Learners take responsibility for their learning; pupils motivated by constant feedback and affirmation of their worth
Emphasis on what teacher hopes to achieve	Emphasis on outcomes – what the learner becomes and understands
Content placed into rigid time frames	Flexible time-frames allow learners to work at their own pace
Curriculum development process not open to public comment	Comment and input from industry is encouraged"

Young and Harmony (1999: 45) have described three main approaches to information literacy instruction:

Non-integrated instruction: these are stand-alone or one-off classes provided for learners. In this approach the facilitator does not participate in the design of the content, nor does the librarian have any involvement in the course design or assessment.

Course-integrated instruction: should have at least three of the following four characteristics:

- the teaching faculty actively participates in the content design, instruction and assessment
- the instruction is curriculum based
- learners are required to participate
- learners receive credit or grades for participation.

Full-credit information literacy subject: this is a separate subject in which the syllabus is designed around the teaching of information literacy.

The initial response to proposals such as these was to offer courses specifically aimed at teaching learners information literacy (non-integrated instruction), but increasingly recommendations are being made to integrate these efforts into the course content rather than offering separate generic courses. The reason stated (see, for example, Behrens, 1993: 127; Sonntag & Ohr, 1996: 333; Fisch, 1999) is that when information literacy is integrated into a specific subject content, learners can relate to it so much better as it falls directly into their field of interest and it becomes a more realistic experience, directly related to a true information need.

Course-integrated instruction still requires the use of traditional library instruction, but moves beyond library literacy towards information literacy. The importance of the academic library in the teaching of information literacy should not be underestimated in the light of the more complex needs required for information literacy. The library is still an essential component of teaching information literacy, as are computer and academic literacy. The teaching of information literacy is thus an amalgamation of various skills, which cannot be taught in a once-off approach.

By allowing learners to participate actively in the learning process through, for example, assignments, critical thinking skills are encouraged rather than rote learning. Learners become more interested and are intrinsically motivated to find answers to questions, thus becoming increasingly information-literate.

2.5 International Responses to promote Information Literacy:

The international response of higher education has varied from recognising that a paradigm shift in the approach to learning is required to the development and use of course integrated instruction in the form of entire study-skill packages which aim to teach learners the necessary skills required of successful learners.

Features of some specific programs illustrate these various approaches:

2.5.1 An Initiative in the United Kingdom

(i) "Getting Ready to Study":

This pilot project by the University of Huddersfield has identified various study skills including information retrieval. An important aspect of this project is the co-ordinated efforts amongst the various departments, including the Schools, Library Services, and Computing Services (Hart, 1996/7).

2.5.2 Initiatives in the United States

(i) Information Literacy Competency Standards for Higher Education

The Association of College & Research Libraries (hereafter referred to as ACRL) in the United States has set up a task force to ensure the promotion of information literacy according to set standards amongst learners in higher education. The aim of these standards is to provide a framework for measuring and assessing learners' levels of information literacy. Five standards have been identified. The standards include performance indicators and expected outcomes, allowing both the facilitator and learner to be able to select and assess the level of competency required, and reached for information literacy.

To illustrate the value of these, the first standard has been included in its complete form, including all performance indicators and outcomes. Please refer to Appendix A for the complete list of Performance Indicators, and Outcomes.

Standard One:

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

Performance indicators:

1. the information-literate student defines and articulates the need for information.

Outcomes include:

1. Confers with instructors and participates in class discussions, peer workgroups, and electronic discussions to identify a research topic, or other information need
2. Develops a thesis statement and formulates questions based on the information need
3. Explores general information sources to increases familiarity with the topic
4. Defines or modifies the information need to achieve a manageable focus
5. Identifies key concepts and terms that describe the information need
6. Recognises that existing information can be combined with original thought, experimentation, and/or analysis to produce new information.

Standard Two:

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

Standard Three:

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

Standard Four:

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

Standard Five:

The information-literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally." (ACRL, 2000)

The progression of skills being acquired align directly with those identified earlier as those required of an information-literate person: the **need** for information, the ability to **access** information, the ability to **evaluate** information for relevance, **use** information for a **specific purpose**, and finally **apply** and use information in a **social, economic** and **legal** context.

These standards give the learners greater control over the learning experience, as they are made aware of what is expected of them and at what levels of competency they are expected to be able to perform.

Facilitators, too, may benefit from this approach, as different disciplines may require different levels of information literacy. Alternatively, different areas of the information literacy competencies required may be of more importance to some disciplines than to others. By using the standards set up by the ACRL, the facilitator may tailor the information literacy needs according to both their needs and the needs of their learners, without compromising the universal standard set by the ACRL.

(ii) "Information Competency Plan"

The Californian Community College Board has identified that information literacy education should be a prerequisite for the completion of any Higher Education certificate/degree. The Board recommends that information literacy become recognised as an accredited outcome across all disciplines in Higher Education (Breivik, 1998: 9-11).

2.5.3 Initiatives In Australia:

(i) "Guidelines to Learning":

The University of Australia has responded by endorsing guidelines, which although it "make[s] no attempt to define the exact nature and range of these skills" aims to teach learners how "to acquire the skills required to learn, and to continue through life to learn, from a variety of sources and experiences" (Cooper, 1997: 1).

(ii) The "Information Sources Unit":

This is one dimension of the Learning Skills Unit at the University of Tasmania. Their aim is to move away from the traditional 'add-on' approach of teaching *information skills* (how to use the library and information technology required to access information). A systematic approach which incorporates the more complex nature of *information literacy* is proposed by integrating information literacy across the academic curriculum. This approach is based on the view that higher education consists of a "series of information problems which the learners has to solve ... whether making notes; preparing assignments; participating in or presenting tutorials ... they constantly have to define problems; seek, locate and select relevant information; analyse, evaluate and organise information; and endeavour to present it in appropriate ways" (Waters, 1997: 2). According to this systematic approach there are six areas of skills which can help in the information problem-solving process, summarised in figure 2.2:

Figure 2.2: The Six Steps Involved in the Information Problem Solving Process

Step 1:	**"Task Definition"** (understanding what is being asked)
Step 2:	**"Information Seeking Strategies"** (deciding on the most appropriate information sources to be used)
Step 3:	**"Location and access"** (locating and extracting relevant information) This step involves various information retrieval skills: -"library skills (use of catalogues, bibliographies, reference sources) -book skills (use of indexes, contents pages) -Internet skills (use of appropriate directories, search engines) -database searching skills"
Step 4:	**"Use of information"** (selecting, prioritising and understanding the information)
Step 5:	**"Synthesis"** (involves critical analysis, sorting information to form a logical structure)
Step 6:	**"Evaluation"** (reflection on whether the question has been answered, whether the problem has been solved).

(Waters, 1997: 3)

Skills are assessed using an information retrieval task and learners may select any given assignment on which to report their information problem-solving process. According to Waters (1997: 4) this approach allows learners to break the information problem-solving task into "smaller, more manageable tasks" and allows them to move forwards and backwards within the steps according to their needs and abilities.

(iii) Curriculum Based Information Literacy Skills for First Year Undergraduate Learners:

At the University of Wollongong a curriculum-based information literacy skills program is being implemented to provide learners with the opportunity to learn the skills necessary for information literacy. The programme is multi-faceted, consisting of the following aspects (Wright & McGurk, 1999: 136-137):

Library survival skills

This aspect of the programme is presented in the format of a PowerPoint presentation, and it outlines the library services and facilities provided by the university. Learners are required to answer questions based on the presentation, which they may complete at their own pace.

Self-paced workbook

This workbook covers the same information included in the library survival presentation. Learners are required to complete the workbook at their own pace.

Lunchtime and Saturday Workshops

These are generic classes, which may cover basic information searching procedures to more complex procedures depending on the level required by learners.

"One off" tutorial or lecture slots

These sessions are negotiated with facilitators on request and usually cover prescribed topics.

Subject Integrated Lecture or Tutorial

These sessions are integrated into a specific subject content area, and are arranged with the facilitator. The success rate for this approach depends on how closely the subject librarian and subject facilitator co-ordinate their efforts to ensure that the specified objectives are reached.

(iv) Griffith University Information Literacy Blueprint

This blueprint was developed by Christine Bruce (1994: 10) who identified the following strategies for information literacy education:

- integrating an information literacy component into curriculum, articulated through a course or groups of courses,
- integrating an information literacy component into one or more selected subjects only,

- introducing special subjects at one or more levels of a course dedicated to aspects of information literacy,
- special cross- or intra-faculty workshops for research and teaching staff providing updates on information literacy, tools, systems and technologies and information through literacy education.
- Extracurricular opportunities for learners provided by facilities, learning support counsellors or the division of information services,
- Continuing education subjects or workshops for graduates and/or members of the wider community.

The programmes reviewed above indicate a progression in the approach of higher education to include information literacy:

- from simply *recognising* that a change in educational approach is required
- to the *identification of skills* required
- to the presentation of a *complete subject integrated educational programme* geared towards information literacy,
- to a *nation-wide framework of competency standards*, equipped with measurable outcomes and performance indicators, which are in line with the latest paradigm in Higher Education.

Of the approaches reviewed above, it would seem that the latter two approaches appear to be the most representative of what education of information literacy skills should encompass. Of interest is, in particular, the approach used by the Griffith University, the Griffith University Information Literacy Blueprint. Their unique use of cross-faculty workshops for research and teaching staff, and a focus on "continuing education" offers a fresh perspective. The aspect of providing and maintaining a support infrastructure for information literacy appears to provide a particularly strong argument for the success of any such intervention. Beyond providing ongoing support for all of those involved with the intervention, the ultimate outcome of information literacy is its application as a lifelong skill, which should be encouraged on a continuous basis.

2.6 A South African Information Literacy Initiative

The programmes discussed above all share a common goal: to create independent life-long learners equipped with the skills to function in an information age. Their programmes are tailored to accommodate the specific needs of their learners using the resources and materials available to them.

The **context** in which information literacy is taught is an important consideration and the needs of learners in South Africa need to be taken into consideration as well as the available resources (Sayed & De Jager, 1997: 8). For this reason it is probably not feasible to adopt a programme aimed at developing information literacy designed in another country. To develop an information literacy programme in South Africa requires that unique factors, which may influence the teaching of information literacy in this context be taken into consideration.

In the Western Cape, South Africa, information literacy is an aspect of a five-year research project, CALICO (Cape Libraries Co-operative), currently being undertaken which aims at creating a single library system amongst the three universities and the two Technikons in the Western Cape. The participating tertiary institutions include the Cape Technikon, Peninsula Technikon, University of Cape Town, University of Stellenbosch, and the University of the Western Cape.

"*CALICO is part of a larger Adamastor Trust initiative of the five tertiary institutions in the Western Cape, intended to enhance the capacity of the Western Cape tertiary institutions to achieve their educational objectives. CALICO was established in 1992 with the objective to stimulate economic development and the promotion of information literacy through services that would enhance the provision of information to all who need it...*" *(Cape Technikon: Library Services, 2001).*

Within the framework of CALICO, Infolit was developed as an independent project with the aim of focusing on the education of information literacy in the Western Cape, taking into consideration the specific needs of learners in this area.

Infolit was launched in 1995 based on a strategic plan, which is detailed below:

1. initially targeting tertiary institutions to transform approaches to teaching and learning with an extension into secondary and primary schools and the broader community
2. investigating the level of information literacy in the region through undertaking an audit and needs analysis so that intelligent interventions are made in programme development and so that best practice is identified and spread across the entire region
3. the generation of competitive pilot projects which promote information literacy and demonstrate success in deepening learning
4. identifying ways of measuring outcomes of these programmes so that investment is made in techniques that best promote information literacy
5. finding ways of integrating these pilots into full courses and curricula so that the improved approaches to learning become streamlined
6. raising levels of awareness of information literacy in the region through demonstrating successes of local and international models
7. growing greater collaboration between academics and information workers (including information technologists) so that they may complement each other in the design of programmes which teach learners about a knowledge base at the same time as imparting to them generic life skills which they could use in other courses and in civic life
8. developing human resource capacity most especially of information workers to ensure that they are able to assume a dynamic role in the development of an information literacy framework

(Karelse, 1996).

The project identified a number of factors that needed to be considered in the South African context (Sayed & Karelse, 1997: 12-13). These were:

"Prior learning experience"

Learners entering higher education are not a homogenous group. In South Africa there are deficiencies in the educational system as a result of the past apartheid system. The National Commission on Higher Education (South Africa, 1996a: 1) states:

"The present system perpetuates an inequitable distribution of access and opportunity for learners and staff along axes of race, gender, class and geographic discrimination ... there are also vast disparities between historically black and historically white institutions in terms of facilities."

The result has been that learners from historically disadvantaged educational institutions have not had sufficient access to information facilities and information technologies compared to historically white educational institutions where the information resources and technology available are comparable to First World countries (Hodge & Miller, 1996: 41).

"Contextually specific teaching and learning"

The uneven distribution of funds for educational resources and the effect that this has had on teaching and learning must be considered. For many learners the language of instruction in higher education is not in their mother tongue and as a result of their prior schooling, they possess only rudimentary English skills. For learners in South Africa to become information-literate they must have sufficient command of the English language to be able to understand and interpret the information available as most of the information, particularly that which is available electronically (the Internet, databases), is in English.

The effect that the under-resourcing of historically black educational institutions has had on the quality of teaching should also be considered. Before teaching information literacy, the teaching faculty must be taught the necessary skills before they can be expected to convey these skills to their learners (Curzon, 1995: 13).

"Affective issues"

One of the skills of an information-literate person (first identified in the 1980s definition) is the awareness of an information need. In South Africa the effect of the apartheid system on learners' prior learning experience has resulted in learners, particularly from historically disadvantaged institutions, often not being aware of how important and useful information can be, and consequently, being unaware of what an information source is: for example, newspapers, films, videos, telephone, and even experiences from other people. To become information-literate requires learners to understand how information is useful and ultimately essential to them in the information age and to be "confident and motivated to explore the world of information" (Sayed & Karelse, 1997: 13). Affective dimensions are an essential aspect of acquiring information-handling skills. With such an overload of information available it is critical not to become overwhelmed and despondent. Understanding that there is an excess of information available and to go ahead strategically with a search is an important component of information literacy.

"Access skills"

With the widespread use of information technology in today's society, learners need to be computer literate to be able to access information sources both in the library and outside.

The role of information technology in the South African context is particularly important as it may be used to bridge the gap not just between historically advantaged and disadvantaged educational institutions, but also between literacy and illiteracy in the broader community. As mentioned previously, basic literacy - the ability to read and write - is necessary but no longer sufficient in today's information age. To focus purely on basic literacy is simply not a functional option in the 1990s. Information technology (hereafter referred to as IT) is a vital tool that is available to help bridge the gap between being completely illiterate (lacking basic literacy) and gaining some form of information literacy, instead of just being taught reading and writing skills. (South Africa. Department of Education, 1996b: 74; Hodge & Miller, 1996: 54). This method proposes the use of information technology to teach basic literacy, incorporating computer and information accessing skills at the same time. This approach takes

cognisance of the fact that computer literacy is a means of accessing information without which one is excluded from the information age.

"... [Well] resourced libraries and state of the art information technology is pivotal for the effective functioning of the South African education system in the information age and as part of the global community" (South Africa. Department of Education, 1996b: 73).

This is the recommendation by the government in order to restructure under-resourced libraries (via information technology) in general throughout South Africa, but particularly in historically disadvantaged educational institutions. Further recommendations towards the integration of an information technology infrastructure into South African academic libraries include:

- promotion of a co-operative approach to the sharing of resources and expertise
- identification and provision of minimal resource levels
- redress for the development of IT and library capacity

(South Africa. Department of Education, 1996b: 74).

"Use and Evaluation"

Learners need to be able to evaluate and select relevant information from the vast amount of information available and use it to solve an immediate and specific information need. In a tertiary education environment this would manifest itself in the form of an assignment, project and/or class discussion/ debate.

However, now that access to information has been made easier through information technology, vast amounts of information await the unprepared information user. As mentioned at the beginning of this chapter, it is this exponential growth rate of accessible information that gave rise to the term "information explosion". Search results from electronic media may yield hundreds, even thousands, of possible choices. It is here, that the learners are required to evaluate which information is relevant to their specific task, and make choices in order to narrow down their search for particular information. Once learners have evaluated which information is most relevant, the next challenge facing them is to "use" or apply this material in order to successfully complete their required task.

In order for the learner to be able to evaluate and use the information that they have accessed, presumes that the imbalances of prior learning, contextually specific teaching and learning, affective issues, and access skills, have been addressed.

"Higher order cognitive skills"

In order to complete the previous tasks of accessing information, evaluating information for relevance, and finally using or applying the information to a specific task, complex cognitive skills are required. In Bloom's taxonomy (Bloom, 1973), perhaps the best-known basis for ordering cognitive skills, "application" and "evaluation", although on different levels of the taxonomy, are classified as higher order cognitive skills.

In terms of information literacy, the application of critical thinking skills is used to create new knowledge. However, in order for learners in South Africa to be given a realistic opportunity to attain such levels of information literacy, requires that those factors discussed previously be addressed adequately.

"Student centered learning"

The transformation of the educational system in South Africa includes the paradigm shift which is evidenced in the international move towards creating self-directed lifelong learners who have the necessary information literacy skills to navigate their way through an information age in all aspects of life - social, political and economic.

In South Africa, a National Qualification Framework was established in 1995 to facilitate the democratic transformation of the national education and training system (SAQA, 1997: 6). The task of implementing the transformation process was transferred to the South African Qualification Authority. The latter oversees the generation of standards of which critical outcomes form a fundamental part.

"Furthermore it ensures the enhancement of the quality of education and training, the acceleration of redress of past unfair discrimination in education training ..., thereby contributing to the full personal development of each learner ... " (SAQA, 1997: 6).

Seven critical cross-field outcomes have been identified for learners in Higher Education by SAQA. The fourth critical outcome, here listed, describes the contemporary concept of information literacy; learners are required to be able to "**collect, analyse, organize and critically evaluate information**" (SAQA, 1997: 7).

Thus it appears evident that South Africa as a nation is proactively responding to the needs of its learners in order to become comparable in its education and training, to the rest of the world.

2.7 Addressing Information Literacy at the Cape Technikon – A Historical Intervention

In an effort to increase the level of information literacy amongst learners, many intervention programmes have been initiated in higher education.

It is against this international and local background that the next section focuses on an information literacy intervention developed by the Cape Technikon for their first-year learners.

(i) The Philosophy behind the Integrated First Year Experience Programme

Learners entering tertiary education often lack the necessary study skills to cope with the demands of higher education. The reasons identified by the Cape Technikon Teaching and Learning Centre (1996/7) are:

- learners in higher education are expected to take responsibility for their 'earning
- many learners have to adjust to the new environment and freedom experienced when moving away from home
- more recently, the democratisation of tertiary education has resulted in increased numbers of learners. Many learners represent the first generation within their families who have been given the opportunity of tertiary education.

In 1997, the Cape Technikon responded to this need by designing a study skills programme for first-year learners called the "Integrated First Year Experience" (hereafter referred to as IFYE). IFYE aligns with the paradigm shift in higher education towards student-centred learning and outcomes-based education, resulting in independent, lifelong learners.

The aim of the IFYE programme is to integrate the teaching of study skills into the first year subject content. Facilitators are encouraged to integrate the content of each Module into their specific subject content on the basis that learners can relate better to a topic when it is relevant to their specific interests and immediate needs.

It is course-integrated, as the teaching of the study skills becomes the responsibility of the teacher who has the subject-specific knowledge to adapt the resources-based activities to relevant subject content.

The programme includes the following study skills: Academic writing, Information Literacy/Retrieval, Approaches to learning in higher education, Time Management, Expected Work Load Requirements, and Note-Taking.

Although each Module was developed as a separate unit within the IFYE programme, the writer drew parallels connecting each of these Modules to the Information Literacy Module. Ultimately, by using the IFYE programme in its entirety, each Module contributes towards the facilitation of information literacy. The interpretation is presented below:

Academic Writing	- supports academic literacy
Information Literacy/ Retrieval	- supports library & information literacy
Approaches to learning in higher education	- supports the notion of life-long Learning
Time Management	- information handling skills

Expected Work Load Requirements	- information handling skills
Note-Taking	- encourages critical thinking skills such as being able to evaluate and select relevant information.

(ii) The Information Literacy Module

The information literacy Module needs to be understood against the background of the Infolit project described earlier. In order to promote levels of information literacy throughout the Western Cape, it was necessary that Infolit first investigate and determine the state of information literacy amongst learners. A Needs Assessment Study, which encompassed all five tertiary institutions in the Western Cape was initiated in 1996. Furthermore, Infolit identified that the development of pilot information literacy projects across the five tertiary institutions should be encouraged in order to develop successful models which could then be adopted by all (Sayed, 1998: xiv).

The Cape Technikon's pilot initiative offered to Infolit was the information literacy Module of the Integrated First Year Experience Programme. And although the IFYE programme is a completely separate initiative from Infolit, these two initiatives intersect at the information literacy Module. The philosophy of Infolit and the IFYE information literacy Module appear the same, namely to create independent, life-long, and socially responsible, information users. Through the development of an evaluative framework and the subsequent application of its methodology to the IFYE information literacy Module in an attempt to validate the evaluative framework, it will be determined whether the aims of these two initiatives do in fact coincide.

Although only the information literacy Module (hereafter referred to as the Module) of the programme has been evaluated, it is worth noting that the other skills, although considered as separate in the IFYE programme, all contribute towards the acquisition of information literacy. A copy of the Module is provided in Appendix B.

The Module aims to contribute to the development of information-literate learners by providing a library based information retrieval task. An integrated approach is used in that the subject-specific facilitators discuss the Module with their learners. Learners can relate better to the topic of the assignment as it is more relevant to their interests and needs. The choice of topic is left up to the facilitator, thereby integrating the teaching of information literacy into the subject-specific content.

The assignment format encourages the learners to participate actively in the learning process. The Module is structured in such a way that facilitators have the freedom to adapt the Module to their subject content and context.

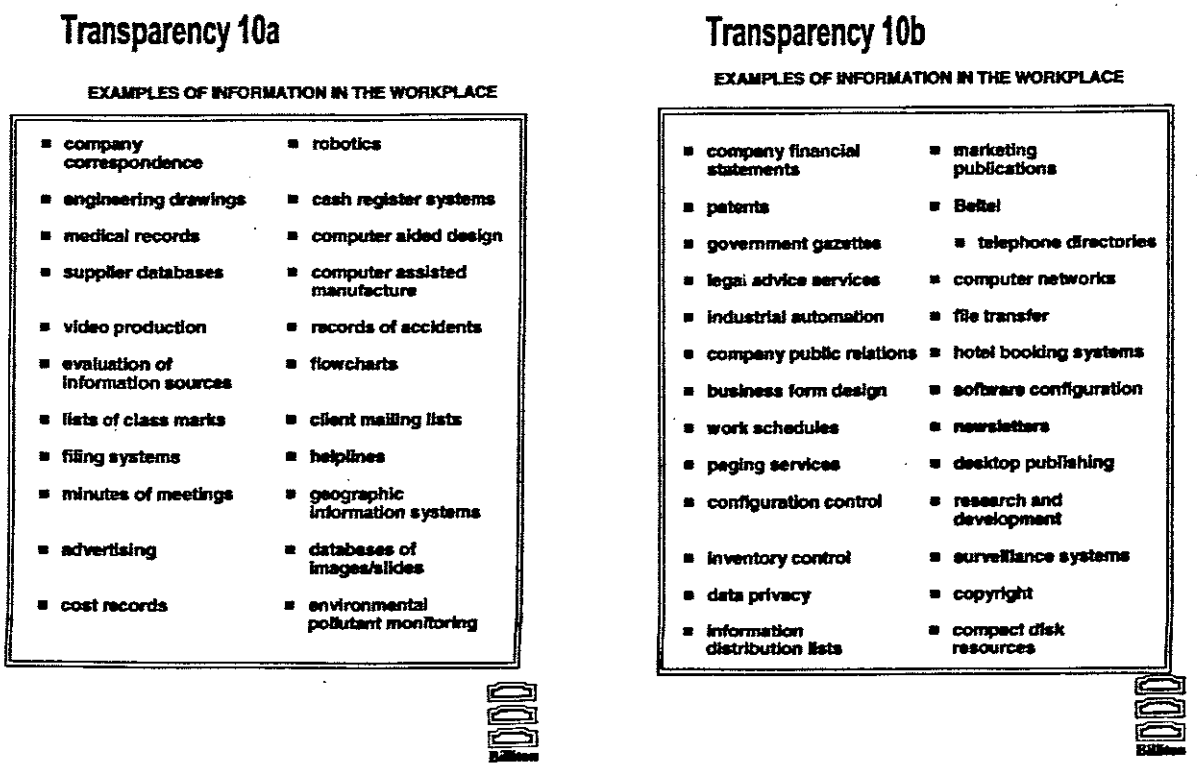
The specific aims of the Module are:

1. To expose learners to the basic ways in which information can be useful to them now, and to indicate how important it is in their ultimate careers
2. To overcome the initial fear and bewilderment that learners experience in having to use information and the library, and help them form a positive attitude to information use
3. To bring all first-year learners to a functionally sufficient level of information literacy, particularly those learners from a disadvantaged educational background where they were not adequately exposed to basic information/library use and retrieval techniques
4. To create a realistic opportunity for learners to experience first-hand the essential information problems and solutions in the academic context
5. To convey to learners an understanding of the facilities of a modern tertiary academic library.

The Module provides a framework, which includes various aids to help the facilitator achieve these aims. To achieve the first aim of the Module, a set of eleven **transparencies** is provided to help the facilitator sketch a background of information trends. The transparencies are an aid to the facilitator to help learners realise and understand the importance of becoming information-literate.

Transparencies 2 to 6 give a graphic representation of information trends over the past years. Transparency 7 illustrates the paradigm shift in education. Transparencies 8-10 give the learner an indication of the role of information in the workplace; learners realise how they are daily information consumers. Transparency 10 is illustrated below in figure 2.3, which shows examples of how learners will be confronted with information in the workplace.

Figure 2.3: IFYE Module Transparencies 10a and b



The next section of the Module addresses the remaining four aims of the information literacy Module. An assignment plan, in the form of a handout, is provided for learners which guides them through the various stages of using the information resources in the library. Features of this format:

- illustrate to learners the limitations of using only prescribed notes and/ or textbooks
- confront learners with having to use multiple resource types relevant to first-year study (lending books, reference books, video, resources on shortloan)
- force them to think about the processes of:
  - using an academic library's basic services
  - searching for potentially useful resources and
  - choosing the most appropriate information
- allows them to convert the information into own knowledge
- inculcates the essential methodology in information retrieval and use

(Cape Technikon. Teaching and Learning Centre: IFYE Information Literacy Module, 1996: 2-3).

A summary of the various search steps is provided in the form of Transparency 1 and it is suggested that the learners receive a copy as a handout. A library map, which should be handed out to the learners, is included in the Module. In addition, the facilitator is encouraged to discuss an example of a subject-related topic with the learners and the various search steps involved. It is suggested that the assignment be in the form of a short essay or a set of questions.

The IFYE information literacy Module was written by Adriaan Coetzee, the director of library services at the Cape Technikon. The initiative was developed during the course of 1996 and staff training was undertaken in the format of workshops in November of 1996. The workshops were presented by the author of the Module.

The full implementation of the intervention was initiated in January 1997. It was the fact that the IFYE information literacy Module was being put forward as a part of Infolit, that required a thorough evaluation before it could be considered for implementation at other institutions.

2.8 Towards a Definition of "Information Literacy"

Taking the above factors that influence information literacy in the South African context into consideration, a definition of information literacy for use in South Africa was developed by Infolit, which has been adopted for the purpose of this study:

"Information literacy refers to the ability of learners to access, use and evaluate information from different sources, in order to enhance learning, solve problems and generate new knowledge"

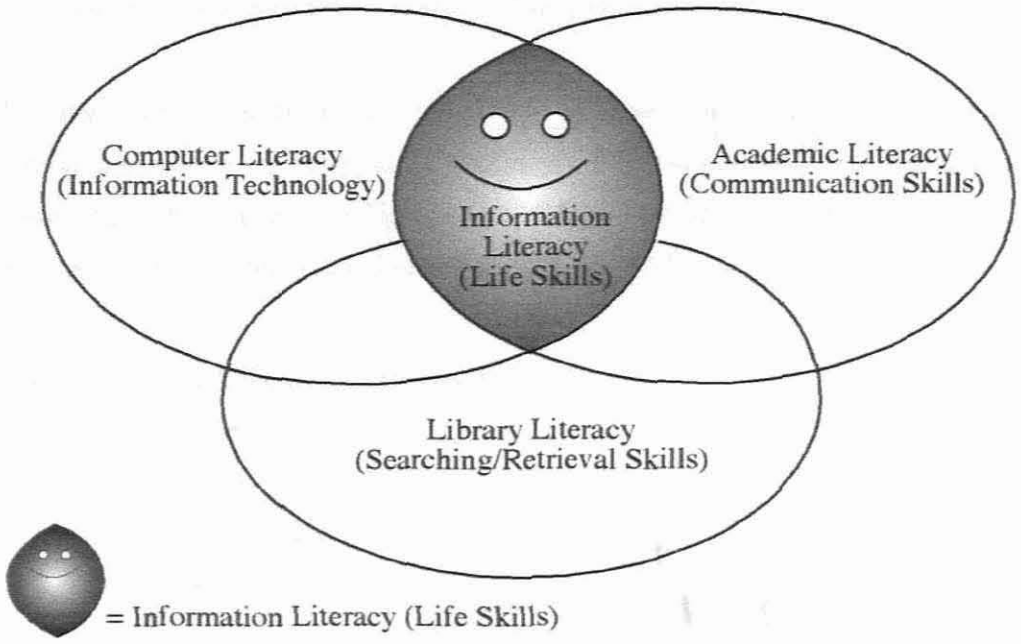
(Sayed & Karelse, 1997: 13).

While in agreement with the above operational definition, the writer feels that a short summary of how the definition should be interpreted for this specific study needs to be added:

- Before learners can access information, they need to be aware of ***a need for information,*** thus an understanding of the importance of information in today's information society should be the first step towards becoming information-literate. Only once learners are aware of their information need can they start planning a research strategy for accessing information (making time to go to the library; understanding the library system; and deciding which information resources to use)
- The next skill that is required is how to operate information technology (computers, on-line catalogue systems, the Internet) in order to *access* information
- Once the information has been accessed, critical thinking skills (such as *analysis* and *evaluation* of relevant material) are essential ***higher order cognitive skills*** that are required before learners can start to use the information
- Use of information is understood by the writer as the *application* of information to generate new knowledge; thus learners ***use*** the information only once they have analysed and evaluated it for its relevance. The writer's interpretation of the definition, as it stands above, therefore differs slightly with regard to the order of the skills required for becoming information-literate.

By way of clarification, the writer offers a diagrammatic representation of the concept of "information literacy", illustrated in figure 2.4:

Figure 2.4: The Concept of Information Literacy: A Diagrammatic Representation



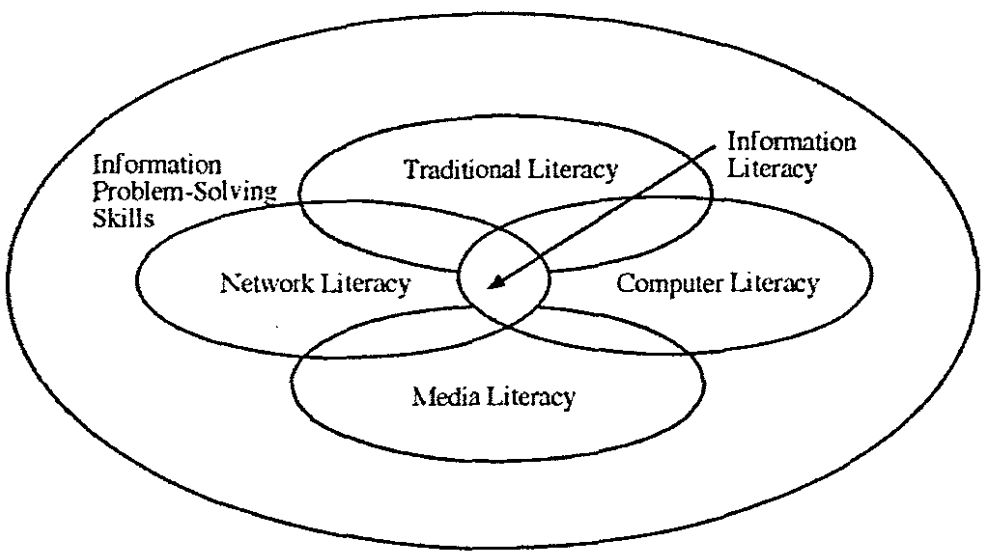
The figure above is characterised by the following features:

- when learners enter higher education, basic literacy skills (the ability to read and write) are assumed
- in higher education these basic skills are developed further to encourage academic literacy (skills necessary to become functional in an academic environment)
- these skills include:
  - the ability to use the library (library literacy)
  - the ability to access information through use of information technology (computer literacy)
  - higher order cognitive skills such as critical thinking (analysis and evaluation) and ultimately the application (use) of information to create own knowledge, to solve a problem or make a decision
- the development of these skills is encouraged through a student-centred, resource-based teaching approach which presumes the co-operation of the library staff, teaching faculty, and administration to ensure continuous support across the academic curriculum

- learners are thus equipped with skills that will be useful to them not only in their academic careers (study skills), but which extend beyond the boundaries of higher education and into their professional civic lives (life skills).

Although the above model was developed independently, the writer is aware that a similar conceptual model exists, "McClure's Information Literacy Typology". This model, too, shows a relationship between various interpretations of literacy and the new form of literacy – information literacy (Loertscher & Woolls, 1999: 89).

Figure 2.5: McClure's Information Literacy Typology



In the typology above, the focus lies on using information literacy in order to solve a problem. It appears then, that becoming information-literate involves essentially acquiring a set of problem-solving skills that may be applied to any information need.

To conclude this chapter, it should be said that the similarity of models between local and international concepts of information literacy and the ideas on information literacy, be it the concept, or the definition, underlines the fact that Higher Education in South Africa is moving in line with international trends.
The next chapter investigates various methods of evaluating information literacy interventions and contextualises the evaluative method used for this study.

CHAPTER 3

CONTEXTUALISING THE INFORMATION LITERACY EVALUATION

3.1 Introduction

The motivating factor behind the evaluation of the IFYE information literacy Module was that the Integrated First Year Experience had been launched in January 1997 and with Infolit's promotion of information literacy across the Western Cape, the information literacy Module required an evaluation to determine whether it would be suitable as an implementable intervention at the other institutions in the Western Cape. Thus, the aim was to not only evaluate the learners, but also the programme.

A review of the literature indicated that the majority of information literacy intervention programmes have a tendency to evaluate the ability of their learners in terms of the success of the information literacy programme, generally by means of an information retrieval task (Saracevic & Kantor, 1988: 61-176; Su, 1992: 503-516; Smithson, 1994: 205-221; Nahl-Jakobovits & Jakobovits, 1990: 448-462). These studies focused on the evaluation of the **learners**, a very important aspect of any educational intervention. However, the focus of this study is on developing an evaluative framework in order to also determine the theoretical adequacy of the information literacy **programme** from an educational perspective. The evaluation of learners should be incorporated automatically in any educationally comprehensive intervention. Thus, this study encompasses a two-fold evaluative framework:

- the first is concerned with the evaluation of **learners**, yet
- the main focus of the study is the evaluation of the **programme**.

3.2 Approaches to Evaluating Information Literacy

Of the information literacy programmes utilised in higher education, the use of an information retrieval task - using information sources available in the academic library - appeared to be the popular method of evaluation. A review of the literature on evaluation methods of library use/information retrieval revealed a focus on the use of electronic information technologies, databases such as, for example DIALOG, to measure search behaviour and competence. The information retrieved by the searchers was then compared to the amount of relevant information available (Saracevic & Kantor, 1988: 161-176; Su, 1992: 503-516; Smithson, 1994: 205-221; Nahl-Jakobovits & Jakobovits, 1990: 448-462).

An example of an evaluation of an information literacy programme for first-year learners, using an information retrieval task is reviewed below:

At the Ohio State University, the "impact of library instruction on [freshman] student learning and attitudes has been regularly evaluated" (Tiefel, 1989: 249). The programme uses a 'one hour credited course', which incorporates an 'in class', presentation by a librarian for all first-year learners followed by a library assignment. Learners' skills and attitudes are measured using a pre/post test evaluation. The old assignment used was in the form of a short answer format, the newer format requires learners to function on a higher cognitive level in that they are required to "select ... , ... research ... and write a brief analysis on a topic" (Tiefel, 1989: 252). The evaluation was used to help improve the programme so that the aims of the programme "to teach both skills and concepts to ensure applicability and transferability of those concepts and skills to other information needs, i.e., to prepare learners for lifelong learning" (Tiefel, 1989: 250) would be met. A further aim of the evaluation was to show that the use of a credited library assignment can have a significant effect on first-year learners' knowledge about the library, their basic library skills, and their attitude towards the library. The limitation on the level of library skills acquired due to the time limit of the one-hour presentation is mentioned as well as the fact that the programme thus only provides learners with basic skills, which need to be developed further. These recommendations underline the fact that library skills, when encouraged and developed throughout learners' academic careers, may be transferred beyond the boundaries of higher education

to their professional and civic lives as well, thus contributing ultimately towards information literacy.

The possibility of using a similar evaluation model to evaluate the learners was considered. There were certain similarities between the two interventions:

- The focus of the Module is on encouraging learners to use the academic library, thereby contributing to the acquisition and practice of skills required for information literacy.
- The Module used an information retrieval task, which actively encourages learners to make use of the various different information resources available in the library.

However, at the time that the IFYE Module was implemented for the first time in 1997, and an evaluation was consequently necessitated by Infolit, access to electronic media at the Cape Technikon was not comparable to that of first world countries. At the same time access to a CD-ROM database was limited to one access terminal and to post graduate learners only, and was thus not included in the assignment plan of the IFYE Module. Consequently, this evaluation method was not deemed a suitable option for this study.

3.3 A Taxonomic Approach To Library User Education

The evaluation was finally set against the background of the work completed by Nahl-Jakobovits and Jakobovits. They developed a system for library user education based on a behavioural taxonomic approach, which is best summed up by Nahl and James (1997: 8) in their description:

"The act of searching as an external psychomotor activity is directed by its cognitive aspect, and driven by its affective, ... remove the affective process in searching and there is left no need or purpose, ... remove the cognitive aspect and there is left no strategy or plan, ... remove the psychomotor and there is left no performance or execution."

This approach was derived from Bloom's "Taxonomy of Educational Objectives" (1973). The taxonomy classifies human behaviour into three domains, adapted from the ancient Hebrew and Greek civilisations according to which the human body is made up of three parts, the soul (affective), the mind (cognitive), and body (psychomotor):

- the ***affective*** domain (will), which describes changes in interest, motivation, attitude and feelings
- the ***cognitive*** domain (understanding), deals with intellectual abilities and skills
- the ***psychomotor*** domain (actions), which includes physical behaviour such as movements, sensations, perceptions and speech.

(Nahl-Jakobovits & Jakobovits, 1987: 204-213)

In Bloom's taxonomy these three domains are often ordered with the cognitive domain placed first, followed by the affective and psychomotor domains. There are various levels in each of the domains. The cognitive domain, for example, consists of six levels, which are hierarchically structured from simple to complex:

Knowledge	: requires the recollection of information, dates, events, places and major ideas
Comprehension	: requires understanding information, and grasping its meaning
Application	: requires the use of information, methods, concepts, and theories in new situations, and solving problems using required skills or knowledge
Analysis	: requires seeing patterns and the organisation of parts
Synthesis	: requires the ability to predict and draw conclusions
Evaluation	: requires the ability to compare and discriminate between ideas, verify value of evidence, make choices based on reasoned argument, and assess value of theories and presentations. (Bloom, 1956)

For learners to be successful in the highest cognitive level – evaluation – they are required to have successfully acquired the cognitive skills of the previous levels in order to reach the final stage.

The use of educational objectives in the context of an evaluation is referred to as the "Behavioural Objectives (or Goal- Based) Approach" (House 1980: 26-7). By writing the goals of the educational programme in terms of learners' behaviours prior to the implementation of the programme, the task of the evaluator is to determine whether those learners who have been exposed to the programme are exhibiting these identified behavioural objectives. The methodology used to measure learners' behaviour was by quantifying the outcome variables: for example, using test achievements. According to House (1980: 27), Bloom applied this approach in his evaluation of different subject matters.

3.4 The Taxonomy of Library Skills and Errors

Nahl-Jakobovits and Jakobovits who consequently developed the "Taxonomy of Library Skills and Errors" applied a taxonomic approach to library use, which, although based on Bloom's "Taxonomy of Educational Objectives", is markedly distinct in various ways:

1. Within the taxonomy there are only three levels of progression of library skills arranged from basic to complex. These were adapted from the work by Nigel Ford (1979: 247 - 60) who proposed three styles of learning of library users: "dependence (level 1), independence (level 2), and interdependence (level 3)". From this the following three levels were developed: orientation (level 1), interaction (level 2), and internalisation (level 3). Thus, for each of the three domains there are three levels of library skills to be mastered.

2. Bloom's taxonomy emphasises the cognitive domain with the justification that, in order to achieve higher order skills in any domain, cognitive ability across all three domains is required. In the "Taxonomy of Library Skills and Errors" the three domains are ordered differently with the affective domain placed first in the taxonomy, followed by the cognitive and psychomotor domains. The justification for this is that the affective domain is the primary motivator and therefore affective skills are an essential step towards the acquisition of library literacy skills and ultimately information literacy skills (Nahl, 1997). As library literacy skills become increasingly more complex due to the rapid development of information accessing technology, so

the cognitive and psychomotor skills required become increasingly complex. Without adequate affective skills (will and motivation), cognitive and psychomotor skills cannot be acquired due to "frustration, technophobia, and a learned aversion to libraries" (Nahl-Jakobovits & Jakobovits, 1990: 460).

3. Previously the focus had been on teaching library users those cognitive skills required to become library- (and ultimately information-) literate. However, it was left up to the potential information user to practice the newly acquired skills and it was observed that even though learners were being taught cognitive library skills, they were not becoming library literate. The reasons for this were identified as affective factors:

    - technophobia (avoidance and fear of information systems)
    - information-seeking resistance (people avoid or procrastinate searching, or else quit too soon)
    - library anxiety and confusion (inability to adjust or cope)
    - low self-confidence as a searcher ("I can't learn this")

    (Nahl & James, 1997: 7).

4. Similar to Bloom's taxonomy the three domains of behaviour are recognised as distinct from one another. However, they are considered to be integrated horizontally across all levels (indicated in the table below by each level having only one title). Thus the taxonomy of Library Skills and Errors should be interpreted both vertically (more complex skills are dependent on the acquisition of simpler skills) and horizontally (stressing the interdependence of the three domains).

The vertical progression of library skills from simple to complex and the simultaneous interdependence of the three domains across the three levels of progression are represented in Table 3.1 below:

Table 3.1: Taxonomy of Library Skills and Errors

	Affective Domain	**Cognitive Domain**	**Psychomotor Domain**
Level 3 Internalizing the library	A3 *Affective Internalization* Demonstrating support for the library perspective on society and self.	C3 *Cognitive Internalization* Acquiring personal and subjective intuition of a scholarly discipline.	P3 *Psychomotor Internalization* Performing cumulative searches in one's field and promoting the library in one's life.
Level 2 Interacting with the library	A2 *Affective Interaction* Demonstrating continuous striving and value preferences favourable to the library and its system.	C2 *Cognitive Interaction* Acquiring objective knowledge of search sequences, their analysis and synthesis.	P2 *Psychomotor Interaction* Negotiating search queries and performing a single, one-time search that meets a current information need.
Level 1 Orienting to the library	A1 *Affective Orientation* Demonstrating willingness to practice library tasks and maintaining selective attention.	C1 *Cognitive Orientation* Acquiring representative knowledge and comprehending library-relevant distinctions.	P1 *Psychomotor Orientation* Performing physical operations (hands-on experiences, browsing and walking around).

(Nahl-Jacobovits & Jacobovits, 1990: 449).

The value of such a taxonomy is that it allows for the development of library instruction programmes around the nine categories using instructional objectives that can then be evaluated against the skills determined for each category. Specific user skills are identified and errors pin-pointed that can then be addressed accordingly, be it in the affective-, cognitive- or psychomotor domain.

Used to evaluate the programme the taxonomy is useful in that all nine categories should be addressed by the programme aims and activities. An analysis of these into the taxonomy should reveal any potential shortcomings in the intervention, and more specifically, at which level and in which domain of the taxonomy. These shortcomings can consequently be corrected for future implementations.

When the taxonomy is applied to evaluate the learners to determine how much they have learnt from the programme, it may also be seen to be of value. Once the learner activity has been determined with which learners' progress will be measured, the extent to which this progress is evaluated within the programme, will be determined with help from the taxonomy. The taxonomy provides clear guidelines for each level and domain identified within the taxonomy, which allows for easy identification of whether these skills have been reached or not.

To illustrate the value of the taxonomic approach as an evaluative framework, an analysis of the aims of the IFYE Module into the Taxonomy of Library Skills and Errors and an extensive discussion of the results, is presented in the following chapter. This follows after a detailed explanation of each individual domain of the taxonomy, presented below.

Nahl-Jakobovits and Jakobovits (1987: 205-212) identified library-user skills and errors for each of the nine categories. The comprehensive nature of this taxonomic approach is illustrated by elaborating on the skills and errors that Nahl-Jakobovits and Jakobovits proposed:

Level One: Orientation

At this first level the library user must familiarise him/herself with the library environment. The potential user needs to have the right frame of mind before showing a willingness to spend time and effort on library orientation. During this initial stage they lack any knowledge of how to access information and although they begin to learn relevant terminology, they are not library users yet.

Table 3.2: Level One - Orientation

	Affective Domain	Cognitive Domain	Psychomotor Domain
Level 3 Internalizing the library			
Level 2 Interacting with the library			
Level 1 Orienting to the library	A1 *Affective Orientation* Demonstrating willingness to practice library tasks and maintaining selective attention.	C1 *Cognitive Orientation* Acquiring representative knowledge and comprehending library-relevant distinctions.	P1 *Psychomotor Orientation* Performing physical operations (hands-on experiences, browsing and walking around).

A1- Affective Orientation:

It is during this stage that learners must overcome their initial fear of using the library; they need to be prepared to adjust to the rules and ways along which the library is run, termed "Library adjustment" by Nahl-Jakobovits and Jakobovits (1987: 208). The failure by learners to respond to this need is called "Library maladjustment."

Library Adjustment:

- the library user is prepared to spend time learning the library orientation map
- accepts a librarians suggestion or instruction

vs.

Library Maladjustment:

- user feels ashamed to be seen re-using the library
- would rather be elsewhere."

C1- Cognitive Orientation:

In the cognitive domain learners need to learn the relevant terminology to be able to distinguish between various aspects of the library that they will need when they want to perform a search. Their knowledge at this stage is termed "representative knowledge", as learners are not expected to perform a search yet. Skills and errors identified at this level are:

Library Map and Glossary:

- [learners] can distinguish between books and magazines, current and bound periodicals, regular shelved books and reference books

vs.

Library Ignorance:

- [learners] remember little of what is being shown
- cannot distinguish between various sources
- ultimately do not understand the library set-up.

P1- Psychomotor Orientation:

This category is characterised by learners' physical and visual movements such as browsing around in the library, familiarising themselves with the location of various sources and the functioning of these. Skills and errors identified for this level are:

Library Exploitation and Efficiency:

- [student] walks around the library
- asks the librarian a question
- pushes buttons, takes books from the shelf, follows instructions for using the on-line catalogue

vs.

Library Avoidance and Inefficiency":

- [student] does not plan in time for using the library
- records incorrect information

- looks up the writer under the first name instead of the last name.

Level Two: Interaction

For learners to become functional at this level they must accept and understand the way in which information in the library is organised and be able to utilise various information tools to fulfil an information need, thus interacting with the library.

Table 3.3: Level Two - Interaction

	Affective Domain	Cognitive Domain	Psychomotor Domain
Level 3 Internalizing the library			
Level 2 Interacting with the library	A2 Affective Interaction Demonstrating continuous striving and value preferences favourable to the library and its system.	C2 *Cognitive Interaction* Acquiring objective knowledge of search sequences, their analysis and synthesis.	P2 *Psychomotor Interaction* Negotiating search queries and performing a single, one-time search that meets a current information need.
Level 1 Orienting to the library			

A2- Affective Interaction:

This level requires learners to be motivated enough to perform a search in the library to satisfy an information need. It differs from level A1 in that while a student may be prepared to attend a library orientation session, greater intrinsic motivation is required to interact with the library whilst performing an actual search.
Skills and errors identified for this level are:

Library Proficiency

- selects correct subject headings
- writes down synonyms for a subject
- expresses appreciation to librarian for help received

vs.

Library Ineptitude

- underestimates the time a search requires
- gives up a search prematurely and leaves the library without any references
- comes to the library without clothes warm enough for an air conditioned library.

Level Three: Internalisation

This level of the taxonomy most closely matches the characteristics of information literacy. Users at this level use the library on a continuous basis to fulfil information needs in all aspects of their life, thus becoming daily, life-long information consumers.

Table 3.4: Level Three - Internalisation

	Affective Domain	Cognitive Domain	Psychomotor Domain
Level 3 Internalizing the library	A3 *Affective Internalization* Demonstrating support for the library perspective on society and self.	C3 *Cognitive Internalization* Acquiring personal and subjective intuition of a scholarly discipline.	P3 *Psychomotor Internalization* Performing cumulative searches in one's field and promoting the library in one's life.
Level 2 Interacting with the library			
Level 1 Orienting to the library			

A3: Affective Internalisation:

Research by Nahl-Jakobovits and Jakobovits (1987: 206) indicates that many library users (including learners, faculty and the public) do not progress to this last and highest level. The reason stated is a "lack of affective commitment to the idea of the library". Skills and errors identified for this level are:

Library Conscience and Morality

- accepts the idea that a library book is publicly owned
- feels awe at all that books symbolise in the history of civilisation
- feels confidant that library resources can improve the quality of life

vs.

Library Negligence

- hostility towards libraries, books and users themselves as searchers
- user dissociates themself from libraries
- does not care about the other patrons and does not mind making a noise.

C3: Cognitive Internalisation

Here the "objective knowledge" experienced in C2 is developed further to "personal knowledge". This form of knowledge develops from a personal interest in a particular subject or field. Skills and errors are identified as follows:

Disciplinary Connection

- user understands how search tools facilitate finding information
- senses that some of the titles retrieved might be 'false drops'
- can see the how a new tool can aid in keeping abreast of new developments

vs.

Lacking in Disciplinary Connection:

- holds incorrect assumptions about particular subject heading content
- fails to see the importance of accurate referencing
- user does not understand how citation works.

P3- Psychomotor Internalisation:

According to the taxonomy this domain is the ultimate achievement towards "learning the library and integrating it into one's life". Skills and errors identified are:

Life-long Library Use

- expresses a desire to read books encountered while searching
- refrains from marking up a book
- serendipitously discovers a reference needed for another purpose

vs.

Library Disuse

- user is upset in the process of using the library
- presses books flat on the photocopying machine
- marks up books.

During the literature review and the search for an evaluative model for information literacy interventions, the potential of the Taxonomy of Library Skills and Errors, was recognised and consequently applied to the evaluation of the IFYE information literacy Module. However, although not synonymous with the concept of information literacy, library literacy does form a vital component of the concept of information literacy, and it was felt that the skills acquired at the third level of the taxonomy - *"internalisation"*, strongly contributed towards the concept and skills required of an information-literate person. The skills *"demonstrating support for the library perspective on society and self"* (A3) and *"lifelong library use versus disuse"* (P3) indicate the use of the library in all aspects of life, thus making it a life skill. For users to acquire the level of skills required for level three, those higher order cognitive skills identified previously as being required for information literacy (critical thinking skills, evaluation and application of information to create new knowledge) need to be have been practised in a steadily progressive manner.

It is suggested that these higher order cognitive skills, although not stated explicitly, are implied and that the application of the Taxonomy of Library Skills and Errors could be extended for purposes of evaluating an information literacy programme (as distinct from a library skills programme), to include information literacy skills as reflected by level three of this taxonomy.

As a result of utilising the Taxonomy of Library Skills and Errors (as will be described in Chapter 4), the writer entered into correspondence with Diane Nahl-Jakobovits, author of the Taxonomy of Library Skills and Errors, who provided a version of a more recent taxonomy, called the Taxonomy of Behavioural Objectives for Information Literacy, which had been developed from the first one. From the success of the application of the Taxonomy of Library Skills and Errors to information literacy, the value of the second taxonomy was immediately recognised. Consequently, this second taxonomy was used for a subsequent evaluation of the IFYE Module in order to demonstrate its value as an evaluation framework and to compare this evaluation with the first, undertaken using the Taxonomy of Library Skills and Errors.

3.5 The Taxonomy of Behavioural Objectives for Information Literacy

In 1993, Nahl-Jakobovits and Jakobovits (1993: 79) developed a "Taxonomy for Behavioural Objectives for Information Literacy" based on the same structure of the earlier "Taxonomy of Library Skills and Errors". This taxonomy was extended beyond the boundaries of library use to include the current broader concept of information literacy. What was interesting was the comparison that was made between the two taxonomies. The original analysis of the aims of the IFYE Module had been undertaken using the Taxonomy of Library Skills and Errors. However, with the development of the updated and contextually more applicable Taxonomy with Behavioural Objectives for Information Literacy, the analysis was repeated using the new taxonomy.

Table 3.5: Taxonomy of Behavioural Objectives for Information Literacy

	Affective	Cognitive	Sensorimotor
Level 1 (Orientation) Critical Thinking Objective: Information evaluation	A1 Becoming sensitive to the need to evaluate information	C1 Evaluating the source of the information according to appropriate standards	S1 Coping in an information society and engaging in learning activities
Level2 (Interaction) Using Information Retrieval Knowledge Objective: Information use	A2 Having the perception of an information need and feeling the excitement of being an independent searcher	C2 Formulating the questions and planning a search strategy	S2 Recognizing the information provided as suitable to the need and experiencing a sense of well being
Level3 (Internalizat ion) Learning to Learn Objective: Information success	A3 Attaining the feeling of personal empowerment	C3 Evaluating the information content and being enlightened by it	S3 Facilitating one's life through lifelong information seeking and enjoying its rich benefits

The writer is in agreement with the use of behavioural objectives used for the measurement of skills and it is for this reason that the evaluation was based on the taxonomic approach. However, the writer was not successful in finding a conceptual link explained by Nahl-Jakobovits and Jakobovits of how the two taxonomies are concurrent.

In order to explore more fully the conceptual basis for the Taxonomy for Behavioural Objectives for Information Literacy an analysis was undertaken which compared the taxonomy with the definition of information literacy, accepted in the previous chapter. This yielded the following findings:

1. The definition of information literacy accepted for this research is "... *the ability of learners to access, evaluate and use information from different sources*". According to the taxonomy, level 1 requires "critical thinking skills (information evaluation)", followed by "information retrieval knowledge (information use)" and finally "learning how to learn (information success)" (Nahl-Jakobovits & Jakobovits, 1993: 79). However,

according to the accepted definition of information literacy, without the skills necessary to access and retrieve information, there will be no information available that could be evaluated. Access and information retrieval skills are required before higher order cognitive skills (such as critical thinking and evaluation) can be achieved.

2. "Information use" as an instructional objective is associated with information retrieval (level 2) in the taxonomy, which does not coincide with the definition. "Information use" (the ability to apply the relevant information to create new knowledge), should be considered to be the most complex cognitive skill required for information literacy and should thus be placed at level 3 and not on the same level as "information retrieval".

The skills required for library literacy do not appear to be consistent with the behavioural objectives required for information literacy as set out in the Taxonomy of Behavioural Objectives for Information Literacy. Rather than being alarmed at this difference, it perhaps underlines what has been mentioned previously, namely that library literacy and information literacy are not synonymous and may and should not be used interchangeably. Library literacy should rather be viewed as one critical component of the concept of information literacy.

3.6 Conclusion:

This chapter has discussed two possible evaluative frameworks that appear to be more suitable than the traditional information retrieval task, for the evaluation of information literacy interventions, particularly in the context of higher education in South Africa. What has emerged from the discussion of these two taxonomies is the relative difficulty of moving from the concept of library literacy to the more comprehensive concept of information literacy.

As will be shown in the next chapter, the analysis of the aims of the Module into the Taxonomy for Behavioural Objectives for Information Literacy was considerably more difficult than into the Skills and Errors Taxonomy. This alone may be a valuable indication to the evaluation process and is dealt with more extensively in the following chapter, where the aims of the IFYE Module are analysed into both the Taxonomy of Library Skills and Errors and the Taxonomy of Behavioural Objectives for Information Literacy.

CHAPTER 4

APPLYING THE EVALUATIVE FRAMEWORK TO THE IFYE INFORMATION LITERACY MODULE

4.1 Introduction

As part of Infolit's drive to promote information literacy throughout the Western Cape, institutions of Higher Education in the Western Cape were invited to submit information literacy pilot projects. The Cape Technikon's pilot initiative proposed the information literacy Module of the Integrated First Year Experience Programme. However, in order to be put forward under the auspices of Infolit, the information literacy Module of the IFYE programme needed an evaluation before it could be considered for implementation at other institutions.

The structure of this evaluation was based on the Taxonomy of Library Skills and Errors (Nahl-Jakobovits & Jakobovits, 1990) – hereafter referred to as the S&E Taxonomy. The evaluation of learners' information literacy using the taxonomic approach is holistic in that the learners' affective, cognitive and sensory-motor skill domains are taken into consideration.

The theoretical validity of the evaluation model has already been established in the previous chapter. The objective of this chapter is to test the above evaluative model for predictive validity. Can the success of the information literacy intervention be predicted on the basis of the taxonomic evaluation? Feedback from learners was gathered by means of questionnaires and interviews were conducted with facilitators involved with the Module for purpose of cross validation. Thus the theoretical predictions from the analysis will be tested against the perceptions of learners and facilitators exposed to the information literacy Module.

In the taxonomic evaluation, the analysis of the Module aims is restricted to those areas within the Taxonomy that are addressed by the information literacy Module of the IFYE-programme. This section of the study discusses those areas within the Taxonomy that are accounted for by the Module aims.

A further important aspect, which needs to be examined, is whether each aim (and the attendant activity on which it is based) is adequate in achieving the corresponding identified taxonomic skill. Potential strengths or weaknesses in the Module, which have been identified by the analysis, will be discussed in the next section, which deals more extensively with the results. Areas within the taxonomy not covered by the Module will be noted for possible inclusion in future applications of the Module.

To conclude the chapter, the value of the more recently developed Taxonomy of Behavioural Objectives for Information Literacy (hereafter referred to as the BO Taxonomy) as an evaluative framework is investigated.

4.2 Analysis of the IFYE Information Literacy Module Aims into the Taxonomy of Library Skills and Errors

Aim 1. "To expose learners to the basic ways in which information **can be useful to them now** and to indicate how important it is in their **ultimate careers**."

Table 4.1: Analysis of Aim 1 of the Module into the Taxonomy of Library Skills and Errors

	Affective Domain	Cognitive Domain	Psychomotor Domain
Level 3 Internalizing the library	A3	C3	P3
Level 2 Interacting with the library	A2 *Affective Interaction:* Demonstrating continuous striving and value preferences favourable to the library and its system (positive library attitude vs. library resistance)	C2	P2
Level 1 Orienting to the library	A1	C1	P1

A2: The taxonomic skills identified by Aim 1 are a positive library attitude vs. library resistance (A2). The Module accommodates this skill by presenting learners with a motivational lecture as to why information is important to them now and later in their careers.

Aim 2. "To **overcome the initial fear** and bewilderment that learners experience in having to use information and the library and help them form a **positive attitude** to information use."

Table 4.2: Analysis of Aim 2 into the Taxonomy of Library Skills and Errors

	Affective Domain	Cognitive Domain	Psychomotor Domain
Level 3 Internalizing the library	A3	C3	P3
Level 2 Interacting with the library	A2 *Affective Interaction* Demonstrating continuous striving and value preferences favourable to the library and its system (positive library attitudes vs. library resistance).	C2	P2
Level 1 Orienting to the library	A1	C1	P1

A2: The taxonomic skill identified by Aim 2 is a positive library attitude vs. library resistance (A2). Here the focus is on "the initial fear"; positive attitude although mentioned, is not highlighted in the aim. However, it has already been implied in the first aim (prerequisite for sections highlighted in Aim 1). Nahl-Jakobovits and Jakobovits (1987: 209) describe the affective taxonomic skill in the interactive level as:

"... the user's willingness to follow self- instructions out of a desire to acquire library proficiency, they have the desire to adopt the thought process of librarians ... with this new found purpose they are likely to overcome the inner forces of doubt, disbelief ....."

As in Aim 1, the Module accommodates this skill by presenting learners with the motivational lecture as to why information is important to them and how it can help them become better learners.

Aim 3. "To bring all first-year learners to a **functionally sufficient level of information literacy**, particularly those learners from a disadvantaged educational background where they were not adequately exposed to basic information/ library use and retrieval techniques."

Table 4.3: Analysis of Aim 3 into the Taxonomy of Library Skills and Errors

	Affective Domain	**Cognitive Domain**	**Psychomotor Domain**
Level 3 Internalizing the library	A3	C3	P3
Level 2 Interacting with the library	A2 *Affective Interaction* Demonstrating continuous striving and value preferences favourable to the library and its system (positive library attitudes vs. library resistance).	C2 *Cognitive Interaction* Acquiring objective knowledge of search sequences, their analysis and synthesis (library search protocol vs. idiosyncratic search protocol).	P2 *Psychomotor Interaction* Negotiating search queries and performing a single, one-time search that meets a current information need (library proficiency vs. library ineptitude).
Level 1 Orienting to the library	A1	C1	P1

The taxonomic skills identified by Aim 3 are again a positive library attitude vs. library resistance (A2), library search protocol vs. idiosyncratic search protocol (C2), and library proficiency vs. library ineptitude (P2).

A2: For learners to be information-literate they need to have a positive library attitude. It has already been identified that the skills required to reach a positive library attitude (A2) are accommodated by means of the classroom presentation.

C2: The assignment plan guides learners through the various steps of a one-time library search.

P2: Here again, the assignment that the learners have to complete together with the accompanying instructions, provides learners with the opportunity to perform a search according to the criteria mentioned in **P2**.

Library search protocol (vs. idiosyncratic search protocol) and library proficiency (vs. library ineptitude) are the taxonomic skills required for C2 and P2 respectively. Both these skills are thoroughly accommodated by the 'assignment plan', which accompanies the assignment. This comprises of a range of questions, which guides learners through their information searching protocol.

Aim 4. "To create a realistic opportunity for learners **to experience first hand the essential information problems and solutions** in the academic context."

Table 4.4: Analysis of Aim 4 into the Taxonomy of Library Skills and Errors

	Affective Domain	Cognitive Domain	Psychomotor Domain
Level 3 Internalizing the library	A3	C3	P3
Level 2 Interacting with the library	A2	C2 *Cognitive Interaction* Acquiring objective knowledge of search sequences, their analysis and synthesis (library search protocol vs. idiosyncratic search protocol).	P2 *Psychomotor Interaction* Negotiating search queries and performing a single, one-time search that meets a current information need (library proficiency vs. library ineptitude).
Level 1 Orienting to the library	A1 *Affective Orientation* Demonstrating willingness to practice library tasks and maintaining selective attention (library adjustment vs. library maladjustment).	C1	P1

A1: "Affective orientation is a willingness, through compliance or obedience, to carry out the librarian's direct instructions, affective interaction..., a student may be willing to carry out tasks assigned in an introductory library course, but may have a negative attitude toward libraries and may be unwilling to conduct a search for some personal need" (Nahl-Jakobovits & Jakobovits, 1987: 209).

C2: The assignment plan guides learners through the various steps of a one-time library search. This is not on a C1 level as "C1 is representative knowing, cognitive interaction is an objective knowing that comes only from the experience of carrying out a hands-on search in response to an actual information need" (Nahl-Jakobovits & Jakobovits, 1987: 210). As in Aim 3, the information retrieval task together with the integrated assignment plan, accommodates the taxonomic skills required for C2 (library search protocol vs. idiosyncratic search protocol), and P2 library proficiency vs. library ineptitude) identified in the analysis.

P2: Use of the assignment helps to achieve this aim. This aim of the Module is covered by an attendant activity, which does contain a distinct evaluative aspect, as the subject-specific facilitator is responsible for marking the "information retrieval task" based assignment.

Aim 5. "To convey to learners an understanding of the **facilities** of a modern tertiary academic library."

Table 4.5: Analysis of Aim 5 into the Taxonomy of Library Skills and Errors

	Affective Domain	Cognitive Domain	Psychomotor Domain
Level 3 Internalizing the library	A3	C3	P3
Level 2 Interacting with the library	A2	C2	P2
Level 1 Orienting to the library	A1	C1 *Cognitive Orientation* Acquiring representative knowledge and comprehending library-relevant distinctions (library map and glossary vs. library ignorance).	P1 *Psychomotor Orientation* Performing physical operations (hands-on experiences, browsing and walking around) – (library efficiency vs. library avoidance).

C1: In the cognitive domain of the orientation level, learners are expected to be able to tell the difference between the various information sources of the library (for example, shortloan, reference section, open shelves, and periodicals). The Module provides learners with a floor plan of the library. Facilitators are encouraged to include the various different information sources in their information retrieval task to encourage learners to find out about these.

P1: The definition of "library orientation" in this context, is assumed to include an orientation in the psychomotor domain, where learners are given a tour of the library and its various resources by a librarian and an orientation session on how to use the computerised catalogue system. This definition corresponds with the one presented by Nahl-Jakobovits and Jakobovits (1987: 205): "... locations of the various resources, procedures, and new vocabulary (P1)".

4.3 Results of the Taxonomic Evaluation using the Taxonomy of Library Skills and Errors

4.3.1 Areas within the Taxonomy of Library Skills and Errors accounted for by the Module

The results of the analysis have been summarised into the following table:

Table 4.6: Summary of the Analysis of the IFYE Module aims into the Taxonomy of Library Skills and Errors

	Affective Domain	Cognitive Domain	Psychomotor Domain
Level 3 Internalizing the library	A3 *Affective Internalization* Demonstrating support for the library perspective on society and self.	C3 *Cognitive Internalization* Acquiring personal and subjective intuition of a scholarly discipline.	P3 *Psychomotor Internalization* Performing cumulative searches in one's field and promoting the library in one's life.
Level 2 Interacting with the library	A2 *Affective Interaction* Demonstrating continuous striving and value preferences favorable to the library and its system.	C2 *Cognitive Interaction* Acquiring objective knowledge of search sequences, their analysis and synthesis.	P2 *Psychomotor Interaction* Negotiating search queries and performing a single, one-time search that meets a current information need.
Level 1 Orienting to the library	A1 *Affective Orientation* Demonstrating willingness to practice library tasks and maintaining selective attention.	C1 *Cognitive Orientation* Acquiring representative knowledge and comprehending library-relevant distinctions.	P1 *Psychomotor Orientation* Performing physical operations (hands-on experiences, browsing and walking around).

It appears evident from the table above, that the emphasis of the Module is on encouraging orientation and interaction with the library.

(i) Level 1 – Orientation

According to the taxonomic design learners must be able to function sufficiently on Level 1 before they are able to progress to the next level. In other words, learners first need to have some form of orientation to the library, and this should encompass all three domains, before they are able to start interacting with it successfully.

A1: According to this taxonomic domain, learners orienting themselves to the library or "library adjustment" – A1- (vs. library maladjustment) require that learners are prepared to "spend time learning the library orientation map". In the IFYE Module, however, no attempt is made to ascertain the extent to which learners' orientation has been adequate or thorough. The provision of a map is a necessary but insufficient attempt to ensure that this has taken place. The Module thus **fails** to ensure that learners have received an adequate library orientation.

C1: Library map and glossary (vs. library ignorance)

In the cognitive domain of the orientation level, no attempt is made to ascertain the extent to which learners have understood the difference between the various information sources of the library (for example, shortloan, reference section, open shelves, and periodicals). The provision of a library map and mention of these sources without a sufficient explanation is a necessary but insufficient attempt to ensure that this has taken place. This may therefore be considered a **weakness** of the Module.

P1: Library efficiency (vs. library avoidance and inefficiency)

From the above analysis, learners participating in the Module are expected in all three domains to interact with the library. Orientation to the library (Level1), although implied in the Module aims, is not explicitly stated as a prerequisite. There does not seem to be enough emphasis on the importance of learners attending a library orientation session prior to being engaged in the information retrieval task of the Module. It may thus come across as though the learners are expected to interact (Level 2) with the library and its facilities without sufficient orientation (Level 1). This may therefore be considered a **weakness** of the Module.

(ii) Level 2 – Interaction

Most of the aims of the Module address the requirements for learners to be competent library users on Level 2 (interacting with the library):

A2: The taxonomic skill identified by Aim 1,2 and 3 is a positive library attitude vs. library resistance (A2). The Module accommodates this skill by presenting learners with the motivational lecture as to why information is important to them and how it can help them become better learners now and how information may benefit them in their careers. The effectiveness of the lecture presentation is dependent on the facilitator's knowledge and attitude on information literacy. In addition to the subjective nature of the presentation, no parallel learner activity is integrated into the Module to evaluate the extent to which aims 1, 2 and 3 have been achieved. Consequently, this may be identified as a **weakness** within the Module.

C2: Library search protocol (vs. idiosyncratic search protocol) is the taxonomic skill required for cognitive interaction (C2). This skill is thoroughly accommodated by the 'assignment plan', which accompanies the information retrieval task. This includes a range of questions, which guide learners through their information search. Learners are encouraged to hand in their assignment plan, together with a brief questionnaire about the ease of the steps involved in the library search protocol. However, the success of the cognitive interaction (C2) relies on learners adhering to the assignment plan, facilitators insisting that learners handing it in and using the attached questionnaire. Based on the adherence to the requirements to fulfil C2, this may therefore be considered a **strength** of the Module.

P2: Library proficiency (vs. library ineptitude) is the taxonomic skill required on the psychomotor level of interaction. The Module accommodates this taxonomic domain comprehensively using a subject-specific information retrieval task. Facilitators evaluate the integrated assignment, from which an improvement in the level of skill of the learner should be observable. Further detailed discussion on this aspect of the analysis involving direct feedback from

both learners and facilitators involved with the Module will be discussed later in this chapter. This may therefore be considered a **strength** of the Module.

4.3.2 Areas within the Taxonomy of Library Skills and Errors not accounted for by the Module:

(i) **Level 3 – Internalisation**

P3: Although **P3** was initially identified in the analysis of Aim 1 as a domain within the taxonomy, the writer was sceptical that such a high order psychomotor skill (Level 3, "internalising the library") may be promoted by a single lecture presentation on the importance of lifelong information use. Furthermore, the process of internalisation – using the library on a continuous basis to fulfil information needs in all aspects of life - is an attitude, aptitude and/or behaviour, that may not be achieved through a single lecture presentation followed by a single information retrieval task. Consequently, the omission of this level within the Taxonomy was identified as an area of **weakness** during the evaluation.

4.3.3 Summary of Results According to Potential Strengths and Weaknesses

In the table below the potential strengths and weaknesses of the Module in terms of the Taxonomy are illustrated. The table shows that, compared to the original aims of the Module, the predicted success of the Module in terms of learners acquiring those library skills intended, will predictably only be in the interactive level of the cognitive and psychomotor domain (Level 2).

Table 4.7: Analysis of the Module into the Taxonomy according to Potential Strengths and Potential Weaknesses

	Affective Domain	**Cognitive Domain**	**Psychomotor Domain**
Level 3 Internalizing the library	A3 *Affective Internalization* Demonstrating support for the library perspective on society and self.	C3 *Cognitive Internalization* Acquiring personal and subjective intuition of a scholarly discipline.	P3 *Psychomotor Internalization* Performing cumulative searches in one's field and promoting the library in one's life.
Level 2 Interacting with the library	A2 *Affective Interaction* Demonstrating continuous striving and value preferences favorable to the library and its system.	C2 *Cognitive Interaction* Acquiring objective knowledge of search sequences, their analysis and synthesis.	P2 *Psychomotor Interaction* Negotiating search queries and performing a single, one-time search that meets a current information need.
Level 1 Orienting to the library	A1 *Affective Orientation* Demonstrating willingness to practice library tasks and maintaining selective attention.	C1 *Cognitive Orientation* Acquiring representative knowledge and comprehending library-relevant distinctions.	P1 *Psychomotor Orientation* Performing physical operations (hands-on experiences, browsing and walking around).

Note: Heavy shading indicates potential strengths, regular shading indicates domains within the Taxonomy identified as potential weaknesses, and absence of shading indicates areas not addressed by the Module.

However, the taxonomic design stipulates that the first level of skills identified by the taxonomy be met first, before learners are able to successfully progress to the second level. Consequently, it appears as though one fundamental oversight in the design of the Module was the assumption that learners were already familiar with the library (Level 1 – orientation). From the analysis it appears evident that no provision was made for basic

library orientation for learners prior to the commencement of the implementation of the Module. This is borne out by Table 7, which illustrates that the potential weaknesses of the Module in terms of the Taxonomy lie in all three domains of the first level – orientation.

Furthermore, the analysis of the Module aims into the taxonomy identified that the affective domain in particular appeared to predominate. Library adjustment (A1) and a positive library attitude (A2) were the skills required to achieve success in the affective domain identified by all five aims of the Module.

4.3.4 Conclusion

What the evaluation using the Taxonomy of Skills and Errors demonstrated was that such an approach was very illuminating in terms of an evaluative framework. In its current format the Taxonomy of Library Skills and Errors may be used to help evaluate information literacy programmes by providing a graphical overview of an intervention (the physical analysis of the aims and activities into the taxonomy). **Potential** strengths and weaknesses may be identified and isolated, allowing programme developers to react and solve specific problems more effectively before implementation of the intervention. Furthermore it provides an educationally structured framework which may serve to guide educators and programme developers through developing information literacy interventions that maximise the potential learning experience.

4.4 Cross-Validation of the Evaluative Framework using the Taxonomy of Library Skills and Errors

The comparative needs analysis of information literacy of learners in Higher Education in the Western Cape which was performed by Infolit, was followed by the information literacy pilot project. Its launch amongst the five institutions of Higher Education in the Western Cape, initiated the required evaluation process of the IFYE information literacy Module. The purpose of this evaluation was to determine whether the pilot project put forward to Infolit by the Cape Technikon would be suitable for wider implementation amongst other institutions. Consequently, the data collected for the Infolit evaluation, although a separate initiative in the field of information literacy, provided a parallel source of information, which could be used to confirm the findings of the theoretical evaluation used for this study.

In addition, feedback from both the facilitators and learners was used as a further independent point of validation for the evaluation (House, 1980: 85).

4.4.1 Interviews with Facilitators

In February of 1997 a survey was sent to all facilitators who had attended an educational workshop on the IFYE programme, and to all departments in possession of an IFYE training manual. Of the surveys sent out, 54 were returned. The survey contained a table with a list of the different IFYE programme Modules. For each of the six Modules, facilitators were asked to indicate which of the four statements listed below was the most appropriate to them by filling in the corresponding number:

1. I have used the Module.
2. I will be using the Module before June.
3. I will be using the Module after June.
4. I will not be using the Module.

Being able to predict when a facilitator was planning to implement the Module allowed for more effective planning of interviews with facilitators and distribution of questionnaires to learners. Of the 54 returned surveys, 50 facilitators recorded a response to the information literacy Module. The results from the survey are recorded in table.

Table 4.8: Results from IFYE Survey

	Frequency
I have used the module	4
I will be using the module before June.	13
I will be using the module after June.	4
I will not be using the module.	16
"0"	7
"9"	6
*	9

Note 1: "0" shows that nothing was indicated

Note 2: "9" indicates that although the IFYE information literacy was not being used, some form of library literacy/orientation was being implemented

*Note 3: * indicates the number of facilitators who had attended the training session for the information literacy Module.*

The data revealed that 21 facilitators would be suitable for the study. These included all facilitators who had or were planning to implement the Module before June 1997.

Those facilitators who participated in the information literacy programme were interviewed to collect information on their opinion on the value of the interventions. Special attention was given to the following areas:

- the idea of teaching information literacy as an academic vs. librarian
- method of implementation of the intervention
- ease of implementation
- facilitators' perception of learners' benefit

The interview was piloted in March 1997 using the protocol included in Appendix C. No changes to the interview protocol were suggested. Facilitators were asked to share their views on and experiences with the concept of information literacy and the IFYE information literacy Module.

Four facilitators who had used the Module and who were willing to be interviewed were interviewed during the month of April 1997. In an attempt to reduce the threat to credibility by personal bias and thus maintain validity, the interviews were tape-recorded and direct quotations are used when necessary.

4.4.2 Learner Questionnaire

Information from learners was gathered by means of a questionnaire. Learners' feedback regarding their attitude towards the library, their use of library services and the contribution that the information literacy intervention had added towards the enhancement of their learning experience was gathered.

Those learners exposed to the information literacy Module of the Integrated First Year Experience Programme across all disciplines at the Cape Technikon were asked to complete the questionnaire.

The questionnaire was developed for the independent evaluation of the IFYE Module under the auspices of Infolit to serve their needs analysis for information literacy levels amongst learners at the five different institutions of Higher Education in the Western Cape. However, it was evident that some of the data obtained could be used for the purpose of cross-validation. Consequently, questions based on the theoretical framework provided by the Taxonomy of Library Skills and Errors for the affective domain, were included in the questionnaire. The questions were restricted to the affective domain as any feedback involving the cognitive and physical domain would have involved observation and evaluation of learners performing an information retrieval task by specially trained personnel. This exceeded the scope of the study. Validity was maintained by using accepted data collection procedures (House, 1980: 90). For the full range of questions please refer to Appendix D.

Section one of the questionnaire was modelled on the Infolit needs analysis survey (Infolit, 1997) with the aim of comparing information literacy levels between the two samples. Information about the learner gathered in this section of the questionnaire included: gender, race, academic performance, first language, and whether learners had attended a library orientation session before. However, because of the disappointing number of facilitators who used the Module and the subsequent small sample, it was not possible to make any statistically meaningful comparisons (Parsons & Häberle, 1997: 31).

Section two of the questionnaire explored how often learners use the library. Frequency scales were used to measure how often learners used each of the library's various services, for example:

Place a tick [✓] in the most appropriate box.
1 = once per week or more often
2 = once per month or more often
3 = once per semester or more often
4 = never or hardly ever

	Your rating			
"Used the shortloan/reserve collection in the library to find required readings."	1	2	3	4

Section three was used to measure learners' attitudes towards the academic library. In the questionnaire learners were presented with statements about the library gathered from previous library attitude surveys (Nahl & Jakobovits, 1989). Learners were be asked to agree/disagree with these statements, for example:

Please underline the statement that most closely represents your opinion.

"I need to improve my library research skills" *Agree/ Disagree.*

The original attitude survey was based on the Taxonomy of Library Skills and Errors and included 39 attitude statements about the academic library and its use. Learners' attitudes on all three levels of affective domain of the taxonomy were addressed in this survey developed by Nahl and Jakobovits (Nahl & Jakobovits, 1989). However, after

analysing the Module aims into the taxonomy, it was found that the Module's focus was on the first two levels of the taxonomy – *A1*, orientation (Level 1) and *A2*, interaction (Level 2). In an effort to reduce the length of the questionnaire, it was decided to reduce the number of attitude statements from 39 to 27. Level 3 (A3) questions were reduced from 13 to 9, Level 2 (A2) questions from 13 to 9 and Level 1 (A1) questions from 11 to 9. The original attitude statements were developed overseas (Hawaii), and in order to make them more accessible to our learners in South Africa, some of the wording was changed to make the statements more applicable to the South African context.

In **section four**, Likert scales were utilised to help measure learners rating of the information literacy intervention. Learners were asked to rate how much they had learnt from each of the sections of the Module, the introductory lecture on the importance of being information-literate in today's society, the usefulness of the transparencies, and how useful each of the steps of the assignment plan had been in helping the learner complete the assignment. For example:

Please place a tick [✓] in the box that most closely represents your opinion.

How much did you learn from:	**Learnt extremely little**	**Learnt a little**	**Learnt a bit**	**Learnt a lot**
The lecture on information literacy				

Learners were then asked to rate the level of ease/difficulty of the assignment using a Likert scale.

Please place a tick [✓] in the box that most closely represents your opinion.

How easy/difficult was it to:	**Very easy**	**Easy**	**Manageable**	**Very difficult**
... follow and understand the instructions in the assignment plan				

At the end of the questionnaire, open-ended questions inviting learners to add their own comments encouraged any important aspects that may not have been covered in the previous sections, to be addressed.

Once the questionnaire had been piloted and the recommended changes had been made, they were distributed and the data recorded on a spreadsheet.

4.4.3 Discussion of the Results obtained from the Learner Questionnaire

Section one: Characteristics of the Sample

Table 4.9: Breakdown of the sample by school and subject

School	Subject	Number
Mechanical and Process Engineering	Optical Dispensing 1	24*
Education	Library and Information Science 1	17
Life Science	English Communication 1	25
Management	English Communication 1	20
Management	Public Management 1	42
Management	Tourism and Development 1	19*
Mechanical and Process Engineering	Organic Chemistry 1	17
Mechanical and Process Engineering	Visual Optics 1	19*
Mechanical and Process Engineering	Organic Chemistry 1	29*
TOTAL		212

**Indicates this group were exposed to the information literacy Module in some form.*

The final sample of first-year learners consisted of only **212 learners.**

Table 4.10: Breakdown by gender and race

Race	Gender		Total
	Female	**Male**	
Black	41	29	70
White	57	29	86
Coloured	33	18	51
Total	131	76	207

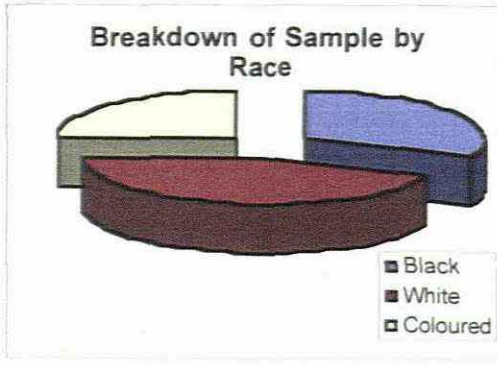
Note 1: The total of 207 excluded 5 learners who did not complete question 3.2.

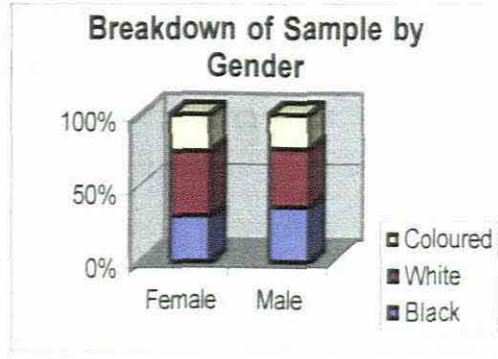
Note 2: There were no Indian learners in the sample.

Note 3: The racial designation Black, White, Coloured, Indian was used in the questionnaire for ease of interpretation, and this terminology has been transferred for the purpose of analysis. While the term African is preferred, it was not introduced to avoid confusion (Parsons & Häberle, 1997: 36).

Because of South Africa's long history of racial discrimination, it is necessary to establish to which racial group a respondent belongs in order to determine their degree of disadvantage, which in turn would affect particular aspects, such as library familiarity, library use and library confidence. In addition, learners from disadvantaged racial groups are generally disproportionately represented in cohorts of failing learners, so specific programmes aimed at reversing the effects of discriminatory practices may need to be implemented. The identification of such learners is thus an important part of any research into general levels of learner performance or learner confidence in the South African context.

Figure 4.1: Breakdown by Race and Gender





The racial breakdown of the sample shows that relative to the national demographic representation, black learners are under represented in the sample, while white learners are over represented. Furthermore, when considering the analysis of self-reported academic performance (question 1.3), a greater number of white learners indicated that they anticipate an "*above average*" performance, compared to the black learners (Parsons & Häberle, 1997: 37). White learners appear to be more confident in their academic skills than black learners upon entering Higher Education. These results are supported by the earlier findings of chapter two, where "prior learning experience" in South Africa is a factor and learners are not a homogenous group due to deficiencies in the past educational apartheid system, according to the National Commission on Higher Education (South Africa, 1996a: 1).

Using the learner questionnaires as a method of cross-validation revealed interesting information in that considerably fewer black learners attended the library orientation session than did white learners. The theoretical analysis using the taxonomic evaluation had predicted that Aim 4 of the Module aimed at "[creating] a realistic opportunity for learners to experience first hand the essential information problems and solutions in the academic context", **failed to ensure that learners actually received an adequate library orientation.** This prediction is confirmed by the data obtained by the questionnaire. What the taxonomic evaluation could not predict was that considerably fewer black learners had attended the orientation sessions. The failure of black learners to participate in orientation sessions could partly be contributed to by factors including late registration and their subsequent absence at orientation week, which takes place concurrent to registration.

Section two: Comparison with Infolit Needs Assessment Survey

Section two of the questionnaire contained a selection of questions derived from the Infolit needs analysis survey (Infolit, 1997) asking learners about how often they use the various information sources available to them in the library. The objective was to compare the levels of information literacy reached by learners using the Module with those represented in the Needs Survey of 1997, forming an additional external control group.

However, due to the small sample size caused by the small number of facilitators implementing the Module, and the disciplines not matching with those of the original survey, comparisons with the Infolit survey were not possible. This was a disappointing aspect of the evaluation because the questions selected had the potential to explore differences in information usage, which might have reflected benefits directly from exposure to the Information Literacy Module.

Section Three: The results obtained from section three were used for the purposes of establishing learners' prior attitudes towards library use and are not relevant to the present study. Readers who wish to obtain the results of this section are referred to Parsons and Häberle (1997).

Section Four: Learners' rating of the information literacy programme

Of the 207 learners who completed the questionnaire only 80 indicated that they had been exposed to the Information Literacy Module and only 47 of these indicated that they had completed the assignment. Using a four-point Likert scale these learners were asked to rate each aspect of the Module. The results are indicated in Tables 4.11 to 4.13.

(i) Learners' Evaluation of the Information Literacy Lecture and Transparencies

Table 4.11 : Students' evaluation of the Information Literacy lecture and transparencies

How much did you learn:	Learnt extremely little	Learnt a little	Learnt a bit	Learnt a lot
from the lecture on information literacy	7	17	41	13
... from the transparencies used in the lecture on information literacy	9	16	43	12

Note 1: Figures represent frequency counts.

Note 2: Row totals (80) vary due to missing data.

Using the Taxonomy of Library of Skills and Errors as an evaluative framework revealed that the lecture presentation contributed towards encouraging the interactive affective domain – Level 2 (A2). Module aims 1-3 *([how] information can be useful to them now ... form a positive attitude .... [bring learners to a] functionally sufficient level of information literacy*) were found to contribute towards achieving the library skills required for A2, which is a *positive library attitude.*

In the analysis, A2 was identified as a weakness of the Module because no parallel learner activity evaluating whether the affective aspects of aims 1-3 had been achieved had been integrated into the Module. The interviews with facilitators revealed that their own understanding of the concept of information literacy ranged from simply being able to "*use information*", to "*knowing what information is, how to find it and use it*". This response confirms comments made during the analysis that the lecture presentation used in the Module is subjective in nature, thus making an objective analysis of data difficult. The interviews further confirm the **subjective nature of the implementation,** an aspect identified during the theoretical analysis.

The recommended selected use of the 10 transparencies for the lecture presentation varied from the use of no transparencies, using one transparency, to using all of 10 transparencies. The data in table 4.11 reflects that the implementation of the lecture presentation varied in nature making any comparison difficult.

The majority of learners did not indicate that they learned a lot, while an almost equal number indicated that they felt they had learnt a little (with the majority selecting the "safest" option – "learnt a bit"). This supports the prediction made in the theoretical evaluation using the taxonomies that the lecture presented a significant weakness in the design of the intervention. The reason for this was that there was no evaluation of the degree to which learners had benefited from the lecture and the transparencies. In the interviews with lecturers this weakness was further confirmed by the subjective nature of the presentation which depended on the lecturer's understanding of information literacy and the manner in which they used the transparencies. This thus explains why the confidence in learners' achieving outcomes relating to A2 was low and why **the lecture presentation was identified as a weakness of the Module.**

(ii) Learners' Evaluation of their Learning during the Assignment

Table 4.12: Students' evaluation of their learning during the assignment

How much did you learn:	Learnt extremely little	Learnt a little	Learnt a bit	Learnt a lot
... about identifying keywords during the assignment	3	11	22	11
... about using the prescribed textbook/ course notes as information resources during the assignment.	3	10	19	15
... about refining and finding further keywords	8	14	17	8
... about using computerised catalogue system (OPAC)	6	12	18	11
... about identifying resources (books, journals, videos)	3	11	19	12
... about finding and selecting the information sources	3	8	26	10
... about following new leads	5	13	20	9
... about doing your bibliography	3	7	15	23

Note 1: Figures represent frequency counts.
Note 2: Row totals (47) vary due to missing data.

In the analysis of the Module aims into the Taxonomy of Library Skills and Errors, aims 3 and 4 of the Module contributed towards achieving the library skills required for interactive psychomotor domain – Level 2– *library proficiency* (P2). P2 was identified as a strength of the Module. An information retrieval task in the form of an assignment was integrated into the Module to ensure that the aspects identified by aims 3 (*achieve a functional level of information literacy*) and 4 (*experience first-hand the information problems and solutions in the academic context*) were being achieved.

Feedback from interviews revealed that of the four facilitators interviewed, three integrated a subject-specific information retrieval task. Only one facilitator recommended that the learners should utilise the skills learnt from the Module in assignments in other subjects.

Although the number of respondents to the questionnaire was very small, and the conclusions reached may not be viewed with any statistical confidence, the results presented in the table 4.12 suggest that of the learners exposed to an information retrieval

task, most felt that it was beneficial in terms of identifying resources, learning how to find and select information sources, and how to write a bibliography. These findings substantiate the results of the taxonomic evaluation in that **the assignment was identified as a strength.**

(iii) Learners' Evaluation of the Assignment Plan

Table 4.13 : Students' evaluation of the Assignment Plan

How easy/ difficult was it to:	Very easy	Easy	Manageable	Very difficult
...follow and understand the instructions in the assignment plan.	9	15	20	3
...identify the keywords.	11	15	18	3
...use the prescribed textbook/course notes as information resources.	8	13	24	2
...refine and find further keywords.	3	8	32	4
...use the computerised catalogue system (OPAC).	6	8	22	11
...identify resources and select the best information.	7	9	28	3
...follow new leads.	5	12	30	
...do your bibliography.	13	13	18	3

Note 1: Figures represent frequency counts.
Note 2: Row totals (47) vary due to missing data.

The analysis of the Module aims into the Taxonomy of Library Skills and Errors revealed that the use of the assignment plan contributed towards achieving the library skill required for C2 – the cognitive interactive domain – *library search protocol.* Aims 3 and 4 of the Module contribute towards achieving C2 *(to bring all first-year learners to a functionally sufficient level of information literacy ... to experience first hand the essential information problems and solutions in the academic context).* As mentioned previously, the success of the cognitive interaction relies on facilitators adhering to the recommended implementation of the assignment plan in conjunction with the information retrieval task and insisting that learners hand it in upon completion of their assignment. Based on the adherence to these requirements, the assignment plan (C2) was identified as a strength of the Module.

Despite the very small number of respondents, table 4.13 appears to support the analysis findings that **the assignment plan should be considered a strength of the Module.** In terms of learners' responses, most aspects covered by the assignment plan appeared to be manageable to easy, with the exception of the OPAC system.

Interviews with facilitators appear to further support the subjective nature of the method of implementation in that the strength of the assignment plan is based on the adherence to the requirements stated above. Staff member F3 did not use the assignment plan directly as recommended in the Module, as she felt that the language was too complicated for first-year learners. Her comment was that the assignment plan was, however, very useful as a guide to the facilitator to help explain transparency 1 (summary of the assignment plan) to learners. Her learners completed an information retrieval task, following the shortened version of the assignment plan offered on transparency 1, which she provided as a handout to learners. Staff member F1 encouraged learners to use the assignment plan, but did not insist they hand it in upon completion of the assignment.

4.4.4 Conclusion

This feedback from both learners and facilitators confirms earlier observations during the theoretical analysis that the method of implementing the Module is very subjective in nature and the success of the Module is heavily reliant on many variables, such as for example:

(i) the success of the lecture presentation(A2) is dependent on the:
- facilitator's knowledge and attitude towards information literacy

(ii) assignment plan (C2) is considered a strength only when:
- it is completed by learners
- handed in by learners

(iii) the assignment (P2) is considered a strength of the Module based on the requirement that:
- facilitators make use of the information retrieval task

This section has combined qualitative and quantitative methods for the purpose of cross validation to test the evaluative model of the Taxonomy of Library Skills and Errors for predictive validity. Within the limited areas that the staff interviews and student questionnaire examined that corresponded directly with aspects identified by the theoretical evaluation of the Module aims and activities, support was obtained for the findings of the theoretical analysis.

One limitation, which the Taxonomy of Library Skills and Errors has, however, is that it is restricted to library use and consequently, the application of the second taxonomy which was identified during this evaluation process, will be investigated. The next section conducts a similar evaluation using the newer, more applicable Taxonomy of Behavioural Objectives for Information Literacy.

4.5 Analysis of the IFYE Information Literacy Module Aims and Activities into the Taxonomy of Behavioural Objectives for Information Literacy

The same procedure for analysis was repeated as for the Taxonomy of Library Skills and Errors. Each aim of the Module was analysed into the Taxonomy of Behavioural Objectives for Information Literacy. In order to compare the two taxonomies and to avoid repetition it was decided to focus exclusively on those areas within the taxonomies where the two analyses differed from one another, and why these differences arose.

The extent to which one of the taxonomies may be more suited to the evaluative purpose in terms of the analysis will be discussed more extensively in the following chapter.

Aim 1: To expose learners to the basic ways in which information can be useful to them now and indicate how important it is in their ultimate careers

Table 4.14: Analysis of Aim 1 into the Taxonomy of Behavioural Objectives for Information Literacy

	Affective	Cognitive	Sensorimotor
Level 1 (Orientation) Critical Thinking Objective: Information evaluation	A1 Becoming sensitive to the need to evaluate information	C1	S1
Level 2 (Interaction) Using Information Retrieval Knowledge Objective: Information use	A2 Having the perception of an information need and feeling the excitement of being an independent searcher	C2	S2
Level 3 (Internalization)	A3	C3	S3

A1: The Module may accommodate this behavioural objective to a limited extent by the lecture presentation on why information is important to learners and how it may help them become better learners now and benefit them in their careers. Transparencies 2 and 5 of the Module presentation refer to information trends and the increase in volume of

information available – this may be interpreted as an indirect reference to the need to evaluate information.

A2: The analysis revealed that both taxonomies identified the domain of affective interaction (A2) as relevant for Aim 1. The use of a subject integrated information retrieval task encourages an information need and consequently the partial fulfilment of the behavioural objective identified in the BO Taxonomy as A2. Through interaction with information, learners are encouraged to "use" information in order to complete their assignment successfully.

Aim 2: To **overcome the initial fear** and bewilderment that learners experience in having to use information and the library and help them form a **positive attitude** to information use.

Table 4.15: Analysis of Aim 2 into the Taxonomy of Behavioural Objectives for Information Literacy

	Affective	**Cognitive**	**Sensorimotor**
Level 1 (Orientation) Critical Thinking Objective: Information evaluation	A1	C1	S1 Coping in an information society and engaging in learning activities
Level 2 (Interaction) Using Information Retrieval Knowledge **Objective: Information use**	A2 Having the perception of an information need and feeling the excitement of being an independent searcher	C2	S2
Level 3 (Internalization) Learning to Learn **Objective: Information success**	A3	C3	S3

S1: The behavioural objective identified is S1 (*coping in an information society and engaging in learning activities*). The Module encourages this through the subject-integrated assignment where learners are encouraged to engage in a learning activity, which involves information retrieval.

A2: The requirements for this behavioural objective are reached through the use of the information retrieval task which provides learners *with the perception of an information need.* The objective precludes *a feeling of excitement of being an independent searcher*, which has been equated to *the positive attitude towards information use* mentioned in Aim 2.

Aim 3: To bring all first-year learners to a **functionally sufficient level of information literacy**, particularly those learners from a **disadvantaged educational background** where they were not sufficiently exposed to basic information/library use and retrieval techniques.

Table 4.16: Analysis of Aim 3 into the Taxonomy of Behavioural Objectives for Information Literacy

	Affective	Cognitive	Sensorimotor
Level 1 (Orientation) Critical Thinking **Objective: Information evaluation**	A1	C1	S1 Coping in an information society and engaging in learning activities
Level 2 (Interaction) Using Information Retrieval Knowledge **Objective: Information use**	A2	C2 Formulating the questions and planning a search strategy	S2
Level 3 (Internalization) Learning to Learn **Objective: Information success**	A3	C3	S3

S1: The word "coping" in the taxonomic domain of S1 is equated to the phrase of "functionally sufficient" in Aim 3. The information retrieval task of the Module engages learners in the learning activity.

C2: The assignment plan of the Module which accompanies the information retrieval task, guides learners through the planning of the search strategy. Both taxonomies used during the evaluation identified this domain as relevant for Aim 3.

Aim 4: To create a realistic opportunity for learners to **experience first hand the essential information problems and solutions** in the academic context.

Table 4.17: Analysis of Aim 4 into the Taxonomy of Behavioural Objectives for Information Literacy

	Affective	Cognitive	Sensorimotor
Level 1 (Orientation) Critical Thinking **Objective: Information evaluation**	A1	C1	S1 Coping in an information society and engaging in learning activities
Level 2 (Interaction) Using Information Retrieval Knowledge **Objective: Information use**	A2	C2 Formulating the questions and planning a search strategy	S2
Level 3 (Internalization) Learning to Learn **Objective: Information success**	A3	C3	S3

C2: Both taxonomies identified this domain as being relevant for the achievement of Aim 4. The library skill of "library search protocol" of the S&E Taxonomy and the behavioural objective in C2, both focus on information use, even though the former concentrates on encouraging objective learning and the latter on subjective knowledge.

S1: Again, the Module accommodates this behavioural objective by engaging learners in learning activities through an information retrieval task.

Aim 5: To convey to learners an understanding of the facilities of a modern tertiary academic library.

Table 4.18: Analysis of Aim 5 into the Taxonomy of Behavioural Objectives for Information Literacy

	Affective	Cognitive	Sensorimotor
Level 1 (Orientation) Critical Thinking **Objective: Information evaluation**	A1	C1	S1 Coping in an information society and engaging in learning activities
Level 2 (Interaction) Using Information Retrieval Knowledge **Objective: Information use**	A2	C2	S2
Level 3 (Internalization) Learning to Learn **Objective: Information success**	A3	C3	S3

S1: Through the information retrieval task, learners are encouraged to utilise the various information sources provided by a tertiary academic library.

4.6 Results of the Taxonomic Evaluation using the Taxonomy of Behavioural Objectives for Information Literacy

4.6.1 Areas within the Taxonomy of Behavioural Objectives for Information Literacy that are accounted for by the Information Literacy Module Aims

The results of the analysis have been summarised into the following table:

Table 4.19: Summary of the Analysis of the IFYE Module into the Taxonomy of Behavioural Objectives for Information Literacy

	Affective	Cognitive	Sensorimotor
Level 1 (Orientation) Critical Thinking **Objective: Information evaluation**	A1 Becoming sensitive to the need to evaluate information	C1 Evaluating the source of the information according to appropriate standards	S1 Coping in an information society and engaging in learning activities
Level 2 (Interaction) Using Information Retrieval Knowledge **Objective: Information use**	A2 Having the perception of an information need and feeling the excitement of being an independent searcher	C2 Formulating the questions and planning a search strategy	S2 Recognizing the information provided as suitable to the need and experiencing a sense of well being
Level 3 (Internalization) Learning to Learn **Objective: Information success**	A3 Attaining the feeling of personal empowerment	C3 Evaluating the information content and being enlightened by it	S3 Facilitating one's life through lifelong information seeking and enjoying its rich benefits

The graphic presentation of the analysis in the table above registers a fragmented version of Nahl's Taxonomy of Behavioural Objectives for Information Literacy. There are only incomplete levels in the taxonomy. There is no logical flow, neither along the horizontal plane from one domain to the next, nor along the vertical progression of the taxonomic approach.

(i) **Level 1 – Orientation**

In line with the vertical progression of the taxonomic approach, learners are required to achieve competency on Level 1 – **Orientation** - critical thinking with the objective of information evaluation, before being able to successfully progress to the second level.

However, it appears that there is a discrepancy in the interpretation of the term "orientation" between the two taxonomies. According to this behavioural objective learners at an orientation level are already expected to function on an evaluation level, without sufficient 'orientation' to the basic concepts of information and information literacy. Although not included in the BO Taxonomy, a basic orientation as found in the S&E Taxonomy although not stated explicitly, is assumed.

A1: The analysis identified this behavioural objective as possibly being implied by Aim 1, even if the initial interpretation came in a little obliquely. Further examination reveals that since the effectiveness of the presentation is dependent on the facilitators' knowledge of information literacy and no explicit reference is made to the importance of the specific need to evaluate information in the Module guidelines to facilitators, this aspect is identified as a **weakness** within the Module. Furthermore, no parallel learner activity has been integrated to evaluate the extent to which this aspect of Aim 1 has been achieved.

S1: The behavioural objective in this domain requires learners to engage in learning activities and to cope in an information society. The Module incorporates this behavioural objective comprehensively through the use of a subject integrated information retrieval task. The subject-specific assignment is evaluated by the facilitator. Consequently these aspects of the Module aims 2-5, identified by the analysis, are therefore considered a **strength**.

(ii) **Level 2 – Interaction**

Compared to the analysis of the Module aims into the Taxonomy of Library Skills and Errors, the above analysis shows that interaction (**Level 2**) – ***using information retrieval knowledge with the objective of 'information use'*** is encouraged in the affective and cognitive domain. The holistic approach of Nahl's Taxonomy's aims at encompassing all three domains. The absence of one domain in the horizontal plane indicates that a successful progression to the next vertical level will be compromised.

A2: The Module uses a subject-integrated assignment to provide learners with the *perception of an information need.* The success of the affective interaction (A2) in the BO taxonomy depends on facilitators adhering to the recommended method of implementation of the Module, which is the use of an information retrieval task which learners have to hand in for assessment, thus providing the perception of an information need. The second aspect of the behavioural objective A2 requires that learners feel excited at being independent searchers; no parallel learner activity exists in the Module to measure the extent to which this has occurred. This may be considered a weakness of the Module. However, the latter part of the behavioural objective is not explicitly part of the Module aims and the extent to which this affects the analysis is thus limited. Based exclusively on the former aspect of the behavioural objective and the adherence of facilitators to requirements of the Module guidelines of using an information retrieval task, this aspect may be considered as a **strength** of the Module.

C2: This behavioural objective is thoroughly accommodated by the assignment plan, which accompanies the information retrieval task. The behavioural objective in the BO Taxonomy encourages learners to perform the cognitive task of formulating questions and carrying out the action of planning a search strategy, thereby constructing their own knowledge. Based on the condition that facilitators adhere to the requirements of the Module and the assignment plan is completed by learners and is handed in upon completion of the task, this may be considered a **strength** of the Module.

4.6.2 Areas within the Taxonomy of Behavioural Objectives for Information Literacy not accounted for by the Information Literacy Module:

(i) Level 1 – Orientation

C1: The Module does not incorporate this behavioural objective. However, Aim 4 of the Module accommodates the behavioural objective required to achieve - C2. Based on the taxonomic design, learners need to have successfully accomplished Level 1 before progressing to the behavioural objectives required for Level 2. Consequently the absence of this basic orientation level has been identified as a **weakness** of the Module.

(ii) Level 2 - Interaction

S2: The Module does not cover this aspect of recognising relevant information, an important aspect of the concept of information literacy. The assignment plan guides learners through a library search, but provides no information on how to distinguish between useful and irrelevant information once vast amounts of information have been accessed. The absence of this behavioural objective has been identified as a **weakness** of the Module.

(iii) Level 3: Internalisation

None of the third level behavioural objectives were identified by the analysis. The behavioural objectives of the BO Taxonomy aim for *"personal empowerment"* (A3), *"enlightenment"*(C3), and *"lifelong information seeking and enjoying its rich benefits"* (S3). The writer is of the opinion that it is not possible for learners in their first year to achieve the third level in the Taxonomy of Behavioural Objectives for Information Literacy. It would therefore be unreasonable to even attempt to include these domains in the current format of the Information Literacy Module. Consequently, by using the BO Taxonomy, the omission of this level within the Taxonomy has to be identified as an area of **weakness** of the Module. However, the inappropriateness of this level for first year interventions will be addressed in the following chapter.

Table 4.20: Analysis of the Module into the Taxonomy of Behavioural Objectives for Information Literacy according to Potential Strengths and Potential Weaknesses

	Affective	Cognitive	Sensorimotor
Level 1 (Orientation) Critical Thinking **Objective: Information evaluation**	A1 Becoming sensitive to the need to evaluate information	C1 Evaluating the source of the information according to appropriate standards	S1 Coping in an information society and engaging in learning activities
Level 2 (Interaction) Using Information Retrieval Knowledge **Objective: Information use**	A2 Having the perception of an information need and feeling the excitement of being an independent searcher	C2 Formulating the questions and planning a search strategy	S2 Recognizing the information provided as suitable to the need and experiencing a sense of well being
Level 3 (Internalization) Learning to Learn **Objective: Information success**	A3 Attaining the feeling of personal empowerment	C3 Evaluating the information content and being enlightened by it	S3 Facilitating one's life through lifelong information seeking and enjoying its rich benefits

Note: Heavy shading indicates potential strengths, regular shading indicates areas identified as potential weaknesses of the Module, and absence of shading indicates areas not addressed by the Module.

Table 4.20: Analysis of the Module into the Taxonomy of Behavioural Objectives for Information Literacy according to Potential Strengths and Potential Weaknesses

	Affective	Cognitive	Sensorimotor
Level 1 (Orientation) Critical Thinking **Objective: Information evaluation**	A1 Becoming sensitive to the need to evaluate information	C1 Evaluating the source of the information according to appropriate standards	S1 Coping in an information society and engaging in learning activities
Level 2 (Interaction) Using Information Retrieval Knowledge **Objective: Information use**	A2 Having the perception of an information need and feeling the excitement of being an independent searcher	C2 Formulating the questions and planning a search strategy	S2 Recognizing the information provided as suitable to the need and experiencing a sense of well being
Level 3 (Internalization) Learning to Learn **Objective: Information success**	A3 Attaining the feeling of personal empowerment	C3 Evaluating the information content and being enlightened by it	S3 Facilitating one's life through lifelong information seeking and enjoying its rich benefits

Note: Heavy shading indicates potential strengths, regular shading indicates areas identified as potential weaknesses of the Module, and absence of shading indicates areas not addressed by the Module.

4.7 Conclusion

The question asked at the beginning of the chapter was whether the success of the intervention could be predicted on the basis of the taxonomic evaluation. The cross-validation tested the theoretical predictions against the perceptions of learners and facilitators, and the history of the implementation.

The results of the cross validation indicated a support for the findings of the theoretical analysis. Potential strengths and weaknesses predicted during the theoretical analysis of the Module aims using the Taxonomy of Library Skills and Errors manifested themselves during the implementation of the Module. These were recorded during interviews with facilitators and using questionnaires for learners.

This chapter has demonstrated that the taxonomic approach used as an theoretical evaluative framework has construct validity as demonstrated by the analysis of the Module aims into the Taxonomy of Library Skills and Errors and the updated Taxonomy of Behavioural Objectives for Information Literacy. The cross-validation, although somewhat limited in scope, lends credible support to the claim that the theoretical analysis has predictive validity in line with the identified potential strengths and weaknesses of the Module.

CHAPTER 5

TAXONOMY OF EDUCATIONAL OUTCOMES FOR INFORMATION LITERACY INTERVENTIONS IN HIGHER EDUCATION

5.1 Introduction

During the application of the Taxonomy of Library Skills and Errors, and later the Taxonomy of Behavioural Objectives for Information Literacy to the evaluation of the IFYE information literacy Module, to determine whether they would provide suitable evaluative frameworks for information literacy interventions, difficulties were encountered. These difficulties will be discussed and a new taxonomy, which addresses these difficulties, will be proposed.

5.2 A Comparison of the Two Taxonomies as Evaluative Tools

The results of the analyses of both taxonomies have been summarised from the previous chapter in table 5.1 and 5.2 for comparative purposes.

Table 5.1: Summary of the Taxonomy of Library Skills and Errors according to 'Strengths' and 'Weaknesses' of the IFYE Module

	Affective Domain	Cognitive Domain	Psychomotor Domain
Level 3 Internalizing the library	A3 *Affective Internalization* Demonstrating support for the library perspective on society and self.	C3 *Cognitive Internalization* Acquiring personal and subjective intuition of a scholarly discipline.	P3 *Psychomotor Internalization* Performing cumulative searches in one's field and promoting the library in one's life.
Level 2 Interacting with the library	A2 *Affective Interaction* Demonstrating continuous striving and value preferences favorable to the library and its system.	C2 *Cognitive Interaction* Acquiring objective knowledge of search sequences, their analysis and synthesis.	P2 *Psychomotor Interaction* Negotiating search queries and performing a single, one-time search that meets a current information need.
Level 1 Orienting to the library	A1 *Affective Orientation* Demonstrating willingness to practice library tasks and maintaining selective attention.	C1 *Cognitive Orientation* Acquiring representative knowledge and comprehending library-relevant distinctions.	P1 *Psychomotor Orientation* Performing physical operations (hands-on experiences, browsing and walking around).

Note: Heavy shading indicates identified strengths, regular shading indicates identified weaknesses, absence of shading indicates areas not addressed by the Module.

Table 5.2: Summary of the Taxonomy of Behavioural Objectives for Information Literacy according to Potential Strengths and Potential Weaknesses of the IFYE Module

	Affective	Cognitive	Sensorimotor
Level 3 (Internalization) Learning to Learn **Objective: Information success**	A3 Attaining the feeling of personal empowerment	C3 Evaluating the information content and being enlightened by it	S3 Facilitating one's life through lifelong information seeking and enjoying its rich benefits
Level 2 (Interaction) Using Information Retrieval Knowledge **Objective: Information use**	A2 Having the perception of an information need and feeling the excitement of being an independent searcher	C2 Formulating the questions and planning a search strategy	S2 Recognizing the information provided as suitable to the need and experiencing a sense of well being
Level 1 (Orientation) Critical Thinking **Objective: Information evaluation**	A1 Becoming sensitive to the need to evaluate information	C1 Evaluating the source of the information according to appropriate standards	S1 Coping in an information society and engaging in learning activities

Note: Heavy shading indicates identified strengths, regular shading indicates identified weaknesses, and absence of shading indicates areas not addressed by the Module.

5.2.1 The Taxonomy for Library Skills and Errors

This taxonomy proved very useful in the evaluation of the IFYE Module. The Library Skills and Errors identified by the Taxonomy were relevant and very applicable and it was easy to relate them to the aims of the Module, although the taxonomy focused exclusively on library literacy. Library literacy, although a crucial aspect, is only one part of the concept of information literacy. Subsequently, the relevant aspects of the Taxonomy were retained for the new Taxonomy.

5.2.2 The Taxonomy of Behavioural Objectives for Information Literacy

This revealed itself to be far more difficult in its application as an evaluative tool, compared to the Taxonomy of Library Skills and Errors. The second evaluation using

the Taxonomy of Behavioural Objectives for Information Literacy did not only indicate potential strengths and weaknesses of the **Module**, but also "strengths" and "weaknesses" of the **Taxonomy** of Behavioural Objectives for Information Literacy, compared to the Taxonomy of Library Skills and Errors. However, it is important to note that these "strengths" and "weaknesses" should be considered using the IFYE Module within the unique features of the South African context.

In order to explore more fully the extent, to which one Taxonomy may be more suited for the purpose of the evaluation, a comparison between the two Taxonomies is offered below:

Level 1: Orientation:

Comparing the Taxonomy of Library Skills and Errors to this taxonomy, it appears evident that the interpretation of the term "orientation" differs between the two.

Learners, particularly in the context of this evaluation, need to be introduced to the basic concepts of information and information literacy before being able to progress to the levels required at entry level or orientation level for the BO Taxonomy. Critical thinking skills and evaluation skills (listed as Critical **Exit** Level Outcomes on the NQF in the South African Education System), are hardly suited as an entry-level behavioural objective for first-year learners entering Higher Education. Consequently Level 1 of the Taxonomy of Behavioural Objectives for Information Literacy appears to be **unsuitable** as an evaluative tool for the specific purpose and context of this study.

Level 2: Interaction

Unlike the Taxonomy of Library Skills and Errors, where " a positive library attitude" was identified specifically as a library skill required for A2, in the Taxonomy of Behavioural Objectives for Information Literacy, no mention is made of encouraging a positive attitude towards information literacy. Although it is not highlighted, a "positive attitude" is mentioned in Aim 2. The Module accommodates the encouragement of a positive library attitude, yet no provision is made to suitably accommodate this objective in the Taxonomy of Behavioural Objective for Information Literacy. This aspect was thus identified as a **weakness** of the BO Taxonomy, compared to the S&E Taxonomy.

However, it is interesting to note that during the evaluation of the IFYE Module, those aspects of the Module which were identified as a strength were represented exclusively in the interactive level of both Taxonomies (refer to Table 5.2 and 5.3).

Level 3: Internalisation

During the analyses of the IFYE Module aims into the Taxonomy of Library Skills and Errors and the Taxonomy of Behavioural Objectives for Information Literacy, this level was identified as **unsuitable** as an evaluative tool for the specific purpose and context of this study. It is therefore interesting to note that no domain at Level 3 within either taxonomy was identified during the analyses.

Particularly the third level of behavioural objectives appear beyond the reach of Higher Education. It is this third level of "internalisation", which calls for "personal empowerment" (A3), "enlightenment"(C3), and "lifelong information seeking and enjoying its rich benefits" (S3). These terms come across as being idealistic rather than measurable objectives.

Furthermore, the average length of academic programmes offered in Higher Education varies between three and five years. At the Cape Technikon, for example, the majority of programmes offered extend over a period of three to four years. Within this short time frame it appears unrealistic that the behavioural objectives of "personal empowerment", "enlightenment", and "lifelong information seeking", may be achieved. However as

ambitious as these objectives may be, and as much as stakeholders may aim to achieve these, it appears that it is the second level – interaction - which is most realistic in terms of behavioural objectives that can be aimed for at an academic institution.

5.2.3 The Evaluative Aspect

A further issue that emerged was the evaluative aspect of the programme itself. One of the major weaknesses of the Module was the lack of evaluation. Little or no evaluative components were built into the Module to determine to what extent the aims of the Module had in fact been achieved. This was reflected in the many areas identified as weaknesses within the Module. These weaknesses appear to be based on where the assumption was made that the aim had been achieved.

The most distinct example of this is demonstrated in using the first level of the Taxonomies. The orientation level was identified in the evaluation using both Taxonomies, yet at no point did the Module incorporate any evaluative aspect to determine whether the learners had in fact received any form of orientation to the library. This was consequently identified as a major area of weakness within the Module.

An evaluative aspect had been incorporated into those aims of the model which were analysed into and identified as the interactive level (Level 2) of both Taxonomies, and these aspects of the Module were identified as a strength. However, taking the taxonomic design and the holistic approach of the study into account, it must be noted that, without sufficient orientation (Level 1), the chance of learners reaching their full potential at Level 2 (interaction), is seriously compromised.

5.3 A New Taxonomy

In response to these observations, a framework for a new evaluative taxonomy is proposed. This taxonomy is a combination of the Taxonomy of Library Skills and Errors and the Taxonomy of Behavioural Objectives for Information Literacy developed by Nahl-Jakobovits and Jakobovits (1990: 449), and Nahl-Jakobovits and Jakobovits (1993: 79) respectively. Some domains and levels have been removed completely and replaced

by the writer's own recommendations. The domains of each taxonomy that appear to relate appropriately to the South African context were included in the new taxonomy.

The taxonomy proposed is designed to be used as an evaluative framework which may be used formatively, during the design of an information literacy programme, or summatively:

(i) When used formatively, it is aimed as a guide, to ensure that the intervention take cognisance of all the domains to ensure that maximum learning take place.

(ii) When used during the design of a programme, it is recommended that the aims and activities of the intervention be analysed into the taxonomy to determine **potential** strengths and **potential** weaknesses.

(iii) Used summatively, the evaluation will identify actual weaknesses and programme strengths, allowing for comparison between programmes.

5.3.1 A Conceptual Model of Information Literacy – The Information Literacy Cycle

The conceptual model of information literacy presented in figure 5.1 is a synthesis of the theoretical work and practical experience gained during the study. Its aim is to conceptualise the complex nature of information literacy. Furthermore, it offers a tentative answer as to how information literacy could be integrated into the educational system. It is this understanding of information literacy that is used for the development of the newer taxonomy presented in the next section.

It was felt that a circular model would best represent the concept of information literacy, as with any cycle, there is the implication of an iterative process. This model reflects the goal of information literacy, which is to contribute towards an ongoing, life-long, learning experience.

The model consists of three stages, starting with the attitude stage, and circling via the skills stage to the cognitive stage of the concept of information literacy. All three stages

are of equal value and can only contribute successfully towards the achievement of information literacy when all three stages are linked together and the 'circle' of encouraging information literacy is kept in constant motion.

The model should be viewed beginning in the centre, the focal point remaining always on the learner. A broken line surrounds the learner in the centre. The broken line heeds a warning not to regress to the "old" model of teaching where the learner was isolated and the teaching and learning process was one in which the teacher was the sole source of information. The student's mind was seen as an empty vessel that needed to be 'filled' with information. There was little two-way communication; the main stream of information was from the teacher to the student. Little thought was given to the fact that information on its own was of little use and that it is actually the utilisation of information to create knowledge that is the crucial learning experience. Knowledge, unlike information, is not a simple exchange of information between the lecturer's set of notes and the student's set of notes. Instead, knowledge is something personal that is created in the mind of the learner when information is associated with independent thought and personal experience on the part of the learner. This idea is best summed up by William Butler Yeats (cited in Baer, 1999):

"Education is not the filling of a pail, but the lighting of a fire."

The contemporary view of education takes cognisance of the fact that learning is an active process, which involves the quest for knowledge rather than a passive transfer of information. The lecturer's role has been replaced by that of facilitator who plays essentially a supporting role. Rather than relying solely on the facilitator for information, learners are encouraged, through the facilitator's teaching style, to utilise the many different information sources available, thereby preparing them for active and responsible citizenship in an information society. The permeable circle surrounding the learner in the centre of the model represents the two–way communication that is being encouraged in the 'new' paradigm. Learners are thus no longer solely reliant on the facilitator for information (South Africa. Department of Education, 1997a: 6-7).

Stage 1: Facilitators have the responsibility to adapt their teaching style to create an awareness in their learners that there is a need for information. This may be achieved through relevant subject-specific assignments, which encourages the use of various information sources, such as for example, different sections within the library, the media, government papers, and the Internet, for the successful completion of the assignments.

By awakening an intrinsic interest within the learner, and by integrating the teaching of information literacy into the subject content, and making it relevant to a direct and immediate information need, learners should be more motivated to react positively than if it were offered as an "add on" with no perceived relevance.

Thus, it is important to start by encouraging a positive **attitude** towards information literacy by creating an **awareness** that there is a **need for information.** Once a positive attitude has been awakened, learners are ready and more intrinsically motivated to learn the skills required to access the information that they require.

Stage 2: It is at this stage that the learner is ready to learn the skills required to be able to access the information that they require. Only now would the teaching of **library literacy** reach its full potential with learners. The use of **information technology** and **computer literacy**, particularly for those learners who have not yet had access to computers, is now of critical importance since it relates to a direct information need (for example, their assignments).

"Knowing how to work a PC, use word-processing software, and surf the Internet have become practical, entry-level skills, not key competencies" (Albrecht, 2001: 28).

A slight overlap of the skills and cognitive stage occurs in the model at this stage. It was decided to incorporate **library literacy** and **academic literacy** into the "skills" stage of the conceptual model together with **computer literacy** even-though they each contain a significant cognitive aspect. Together these literacies constitute the skills of the second stage, required towards achieving the broader concept of information literacy.

Stage 3: Once learners have been taught how to access information using the library and the latest information technology they are, however, left with vast amounts of accessed information (represented by the large arrow in the model). The adverse effects of this information overload frightens many learners into aborting their searches for information if they are not readily equipped with probably the most critical ability in information literacy – the cognitive ability to **evaluate** information for relevance and **apply** it to **satisfy an information need.** The "cognitive stage" of the model represents the higher order cognitive abilities required of the learner, namely to **critically analyse** and **evaluate** the accessed information for relevance, thus eliminating all unnecessary information. With specific reference to the exponential growth rate of information available on the Internet, Albrecht (2001: 29) wrote:

" as the sheer quantity of information increases, its quality inevitably decreases. Mass and class are incompatible ... and the tendency of the Internet to level all information to the same common denominator of mediocrity – make it crucially important to evaluate the quality of what you see, hear, and read."

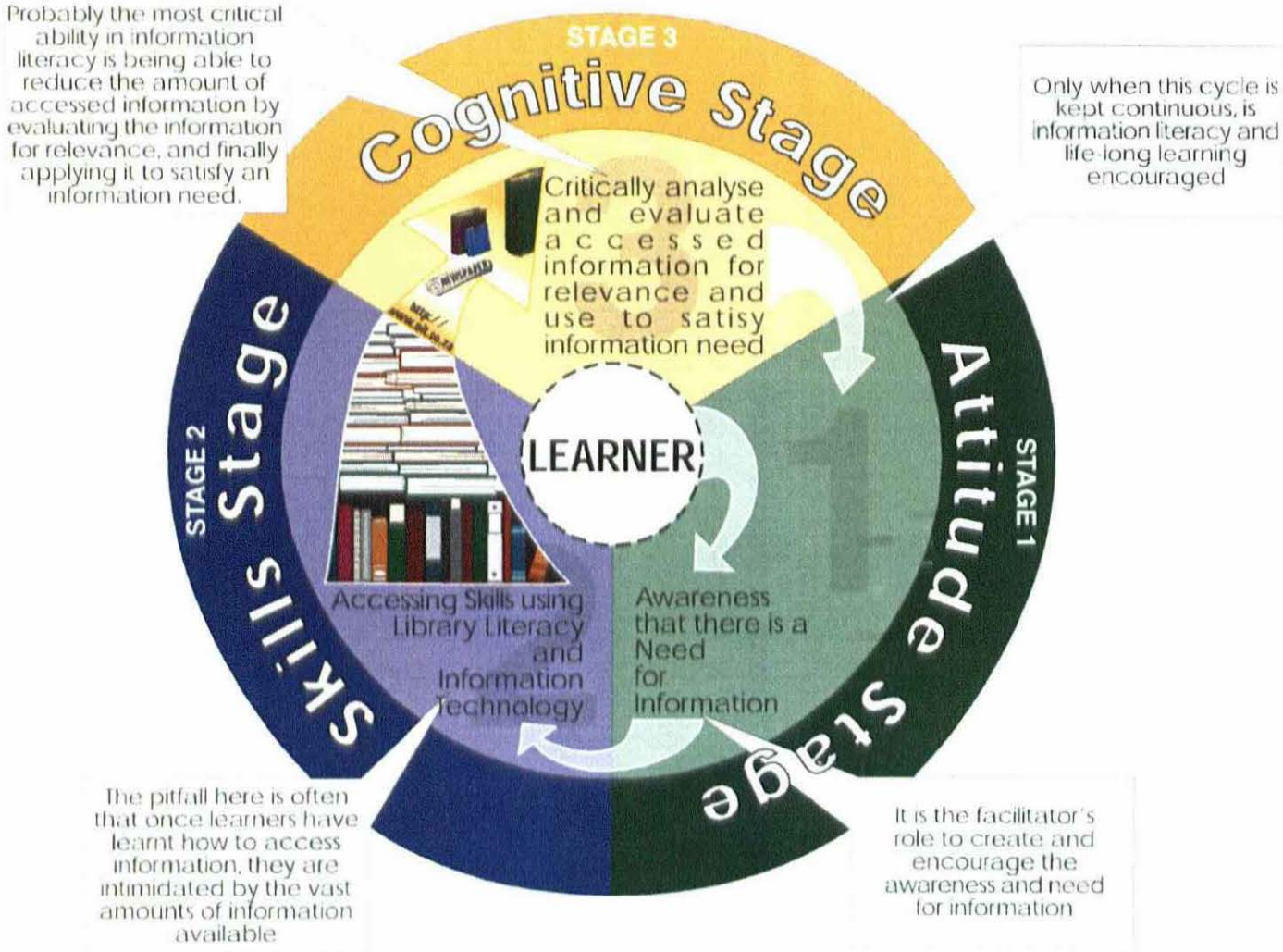
However, information literacy requires even more from the learner, and that is the ability to **use** and **apply** the selected information to help solve an educational or social problem. This final stage of the model can only be reached successfully and learners reach their full potential when they have moved through each consecutive stage of the information cycle:

The higher order cognitive skill of evaluating the accessed information for relevance is not restricted only to information found in an academic library and the application of this information to solve a problem is not restricted only to an academic context, but may instead be applied to any information need, be it in an academic, social, economic, or political context. Thus, it was felt that a separate stage needed to be included to signify the importance of the higher order cognitive skills contributing towards information literacy

Information Cycle – information literacy as a life skill: Once the initial information need has been satisfied, many traditional information literacy initiatives end. However, it is suggested that only once another information need is created, thus keeping the **information cycle** in **constant motion,** can the objectives of encouraging

information-literate behaviour amongst learners be achieved. It is within the academic environment that facilitators have the opportunity to create such a cycle and the responsibility towards their learners to encourage information-literate behaviour. However, it is only when learners leave the academic environment and proceed to apply their information-literate behaviour to their everyday lives (professional, personal and social), may it be said that the mission of encouraging life-long learners, who will be responsible citizens in an information society, has ultimately been achieved.

Figure 5.1: A Conceptual Model of Information Literacy – The Information Literacy Cycle



5.3.2 The Taxonomy of Educational Outcomes for Information Literacy Interventions in South Africa

The proposed structure was based on the BO Taxonomy as the aim was to move towards achieving the aim of information literacy, and not to regress towards using a taxonomy designed exclusively for library literacy (S&E Taxonomy). The order of the affective, cognitive and physical domains was retained up to Level 3 of the new Taxonomy. From the holistic perspective of the taxonomic approach used in this evaluation, the order of the domains is not of vital consequence as the concept of information literacy is seen to constitute all three domains. However, within the conceptual model of information literacy - the information literacy cycle - was incorporated into the design of the new taxonomy and consequently, a change in the order of the cognitive and physical domains is observed in Level 4 of the taxonomy. This will be discussed in further detail later in this chapter.

From an educational perspective the use of objectives was useful as it aligns with the contemporary trend in the South African Educational system towards Outcomes Based Education. Instead of writing behavioural objectives, however, it was decided to focus on developing educational outcomes that focus specifically on representing the outcome from the learner's perspective rather than from the facilitator's viewpoint. Significantly, this contemporary evaluative framework thus reflects the unique factors affecting the South African Educational System.

Table 5.3: Taxonomy of Educational Outcomes for Information Literacy Interventions in Higher Education

	Affective	Cognitive	Physical	Evaluative
Level 1: Infrastructural Prerequisites **Objective: Provision of Adequate Resources for information Literacy Development** **Stakeholders: Institution**	**A1** Provided with adequate information literacy training and a support infrastructure, facilitators will accept their role in the provision of information literacy education.	**C1** Commitment from the institutional decision-makers for the promotion of information literacy will be evident in all policy forums and policy documentation.	**P1** The institution will provide adequate resources and the infrastructure required for the successful implementation of the information literacy intervention.	**E1** An evaluation programme covering all institutional stakeholders involved with promoting the information literacy will be implemented.
Level 2: Orientation **Objective: Introduction to the Concept of Information Literacy** **Stakeholders: Library**	**A2** Learners will evidence an awareness of the general need for information in academic and social life.	**C2** Learners will acquire information- relevant terminology and be able to comprehend information- relevant distinctions.	**P2** Learners will be able to access and retrieve information from the various electronic and non-electronic information sources available in the library.	**E2** The library will implement a program to evaluate the effectiveness of the information literacy orientation received by learners on all three domains.
	Affective	**Cognitive**	**Physical**	**Evaluative**
Level 3: Interaction **Objective: Information Access & Retrieval** **Stakeholders: Facilitators in co-operation with subject Librarian**	**A3** Learners will be able to confidently identify specific information needs required to complete a subject-specific information retrieval task/ assignment.	**C3** Given the subject-specific information retrieval task, learners should be able to formulate appropriate questions and plan an effective search strategy.	**P3** Provided with a specific information retrieval task, learners should negotiate search queries and assess the accessed information for relevance.	**E3** Stakeholders will jointly evaluate how comprehensively the learners have been engaged with the information literacy interaction in all three domains.
	Affective	**Physical**	**Cognitive**	**Evaluative**
Level 4: Problem Solving **Objective: Learning to Learn** **Stakeholders: Facilitators in co-operation with subject Librarian**	**A4** Learners will respond positively to the challenge of evaluating substantial amounts of accessed information for relevance.	**P4** Learners will be able to identify and successfully access multiple information sources relevant to a variety of problems	**C4** Learners will be able to evaluate the information content and apply the information to solve a variety of problems.	**E4** Stakeholders will jointly evaluate learners' progress through information literacy interventions, across all three domains.

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Level 2: Orientation **Objective: Introduction to the Concept of Information Literacy** **Stakeholders: Library**	**A2** Learners will evidence an awareness of the general need for information in academic and social life.	**C2** Learners will acquire information- relevant terminology and be able to comprehend information- relevant distinctions.	**P2** Learners will be able to access and retrieve information from the various electronic and non-electronic information sources available in the library.	**E2** The library will implement a program to evaluate the effectiveness of the information literacy orientation received by learners on all three domains.
	Affective	**Cognitive**	**Physical**	**Evaluative**
Level 3: Interaction **Objective: Information Access & Retrieval** **Stakeholders: Facilitators in co-operation with subject Librarian**	**A3** Learners will be able to confidently identify specific information needs required to complete a subject-specific information retrieval task/ assignment.	**C3** Given the subject-specific information retrieval task, learners should be able to formulate appropriate questions and plan an effective search strategy.	**P3** Provided with a specific information retrieval task, learners should negotiate search queries and assess the accessed information for relevance.	**E3** Stakeholders will jointly evaluate how comprehensively the learners have been engaged with the information literacy interaction in all three domains.
	Affective	**Physical**	**Cognitive**	**Evaluative**
Level 4: Problem Solving **Objective: Learning to Learn** **Stakeholders: Facilitators in co-operation with subject Librarian**	**A4** Learners will respond positively to the challenge of evaluating substantial amounts of accessed information for relevance.	**P4** Learners will be able to identify and successfully access multiple information sources relevant to a variety of problems	**C4** Learners will be able to evaluate the information content and apply the information to solve a variety of problems.	**E4** Stakeholders will jointly evaluate learners' progress through information literacy interventions, across all three domains.

The Evaluative Domain: A Fourth Dimension

This vertical dimension was added to the Taxonomy of Behavioural Objectives for Information Literacy Interventions in Higher Education to accommodate the self-evaluative component that any educational intervention should contain. This evaluative dimension would place specific emphasis on the competence of the learner, the facilitator, and on the adequacy of the institutional infrastructure at each of the four horizontal levels of the Taxonomy.

The section below reviews the new Taxonomy, and as each level is discussed, the associated evaluative domain is explained in context. In addition, significant departures from the wording or concepts of the original taxonomies upon which this one is based are noted and explained.

Level One: Infrastructural Prerequisites

Prior to the development of any educational project an analysis of the infrastructural prerequisites is required. An information literacy needs analysis for learners in the Western Cape is provided by Sayed (1998). The objective of Level 1 of the new taxonomy is to ensure that adequate resources for information literacy development are provided.

The stakeholders included in this level are those who, although involved with the promotion of the information literacy intervention, are not primarily involved with its development (as compared to the library and its staff, for example). It is therefore important to determine the commitment, availability and adequacy of these infrastructural resources before proceeding with the development of the information literacy intervention.

Table 5.4: Level One – Infrastructural Prerequisites

	Affective	Cognitive	Physical	Evaluative
Level 1: Infrastructural Prerequisites **Objective: Provision of Adequate Resources for Information Literacy Development** **Stakeholders: Institution**	A1 Provided with adequate information literacy training and a support infrastructure, facilitators will accept their role in the provision of information literacy education.	C1 Commitment from the institutional decision-makers for the promotion of information literacy will be evident in all policy forums and policy documentation	P1 The institution will provide adequate resources and the infrastructure required for the successful implementation of the information literacy intervention.	E1 An evaluation programme covering all institutional stakeholders involved with promoting the information literacy will be implemented.

A1: For facilitators to contribute towards the education of information literacy requires that they adapt their teaching style to accommodate an information seeking and problem-solving approach. This teaching style falls directly in line with the new paradigm shift in Higher Education in South Africa (SAQA, 1997: 7), which has brought with it a requirement that facilitators change their attitude to their job and accept that as educators it is they who need to teach information literacy. However, before they can accept this responsibility, there needs to be a willingness on their part to acknowledge that they themselves may not have adequate information literacy skills.

C1: For any intervention to be acknowledged and implemented successfully across an academic institution requires that the intervention be supported by the institutional decision-makers. The success of any information literacy intervention depends upon the co-operation between the various stakeholders with the support from the institutional decision-makers. It is when the institution as a whole supports the intervention, that the co-operation between stakeholders contributes to the maximum benefit of the learner.

Promotion of information literacy should be supported by institutional decision-makers in at least the following ways:

- the provision of an adequate library budget,
- the writing of information literacy outcomes for all educational programmes
- the provision of sufficient staff resources in the library,

- the provision of "space" on the timetable for the inclusion of information literacy
- the provision of training for academic staff in information literacy in the form of workshops (see chapter two 2.5.3 - *Griffith University Information Literacy Blueprint*), and
- the willingness to invest in information technology not only in the library but also by providing information access points across the entire campus so that learners may have equal access and be encouraged to participate actively in an information society.

P1: Prior to the programme development, the availability of physical and human resources needs to be assessed and aspects such as information technology infrastructure need to be considered:

- Is the information technology infrastructure capable of supporting the number of learners?
- Are there enough terminals available to support the learner numbers?
- What about the capacity of the library staff, number of books and journals available?
- What is the capacity of the administrative staff and library staff to assist in the final evaluation process?

E1: The evaluation at this initial level of the taxonomy would include all institutional stakeholders involved with promoting the information literacy intervention. The extent to which facilitators are prepared and equipped to accept their role as educators of information literacy is a fundamental issue. The benefit of introducing this new domain is that any weaknesses that are identified at this point may then be dealt with prior to the implementation of the programme. An example would be providing adequate training workshops for facilitators so that they feel sufficiently prepared to implement the programme.

The extent to which institutional decision-makers are committed to the promotion of information literacy would have to be evaluated prior to the development of the intervention.

Level Two: Orientation

The objective at Level two – orientation – is to introduce learners to the concept of information literacy. Information literacy is a complex literacy comprising of many skills and abilities (including the affective, cognitive and physical domains). It should neither be limited exclusively to library use, as suggested in the S&E Taxonomy, nor should learners be expected to be able to evaluate information (Level 1 of the BO taxonomy) – a higher order cognitive skill – without suitable orientation.

The stakeholders in this level are the academic library and its staff. It appears sensible that the library has the infrastructure and the staff to take on the responsibility of orienting learners to the concept of information literacy.

Table 5.5: Level Two - Orientation

	Affective	Cognitive	Physical	Evaluative
Level 2: Orientation **Objective: Introduction to the Concept of Information Literacy** **Stakeholders: Library**	A2 Learners will evidence an awareness of the general need for information in academic and social life.	C2 Learners will acquire information-relevant terminology and be able to comprehend information-relevant distinctions.	P2 Learners will be able to access and retrieve information from the various electronic and non-electronic information sources available in the library.	E2 The library will implement a program to evaluate the effectiveness of the information literacy orientation received by learners on all three domains.

A2: Was adopted and modified from the BO Taxonomy (*"becoming sensitive to the need to evaluate information"*). The evaluative aspect was omitted for reasons stated above, and the term 'general' was added. As an introduction, learners should receive a general overview of why information is important.

C2: Was adopted from the S&E Taxonomy (*"acquiring representative knowledge and comprehending library-relevant distinctions"*). This domains complements A1 by offering learners a suitable introduction to information literacy by teaching learners the representative knowledge which they will be required to know in order to find their way

around the facility, which houses access to many sources of information within their academic environment - the academic library. Although the Internet has allowed for remote accessibility to information sources, many learners in South Africa are still dependent on the institutional infrastructure to provide access to information, most of which is located in the library or provided by the library.

P2: This outcome was based on the library skill of the S&E Taxonomy *("performing physical operations")*. During a physical orientation tour through the library, learners are taught how to access and retrieve information from the various electronic and non-electronic information sources within the library. However, many learners have not had the privilege of acquiring the computer literacy skills necessary to operate the electronic information accessing sources available. Consequently, special provision would have to be made for these learners who should be identified during this stage of the information literacy orientation.

E2: With the library being the stakeholder at this level, it would be their responsibility to evaluate whether learners have received sufficient orientation. It is not sufficient to provide a library orientation, or even to evaluate the satisfaction of the learners orientated, but it is the learners themselves who need to be evaluated to see whether the orientation was adequate in achieving the objectives. The evaluation should encompass the affective, cognitive and physical domain to ensure that learners have successfully achieved the required behavioural objectives on all three domains on the orientation level of the Taxonomy. This evaluative component should be built into the information literacy intervention.

Level Three : Interaction

This level represents the interaction with information that learners should engage with once they have achieved the outcomes necessary for an adequate orientation to the concept of information literacy. This third level of the EO Taxonomy is a synthesis of the behavioural objectives and the library skills and errors identified in the previous Taxonomies. Those aspects of the behavioural objectives, which were too vague, making them difficult to evaluate reliably, were removed in the new taxonomy. The aspects of the Library Skills and Errors, which were too restrictive in that they were limited to library use, were expanded to include the more comprehensive concept of information

literacy. These aspects will be dealt with more specifically as each outcome is discussed individually.

The objective at this level is that learners be able to access and retrieve information. Although many relevant information sources are available in the academic library, learners should be encouraged not to limit themselves only to the academic library. Being able to keep updated with the latest developments and trends through staying in contact with industry is an important example of being information-literate.

The stakeholders at this level of interaction are the facilitators working in co-operation with the subject librarian to ensure that learners are continually encouraged to make use of various information sources (within and outside of the library) through their teaching style. Co-operation from subject librarians ensures that facilitators have a support system which does not leave them feeling as though they are left with an added work-load, or de-motivated due to a lack of confidence in own information literacy ability.

Table 5.6: Level Three - Interaction

	Affective	Cognitive	Physical	Evaluative
Level 3: Interaction **Objective: Information Access & Retrieval** **Stakeholders: Facilitators in co-operation with subject Librarian**	A3 Learners will be able to confidently identify specific information needs required to complete a subject-specific information retrieval task/ assignment.	C3 Given the subject-specific information retrieval task, learners should be able to formulate appropriate questions and plan an effective search strategy.	P3 Provided with a specific information retrieval task, learners should negotiate search queries and assess the accessed information for relevance.	E3 Stakeholders will jointly evaluate how comprehensively the learners have been engaged with the information literacy interaction in all three domains.

A3: It is proposed that learners require a specific and relevant information need, which acts a motivational driving force. The outcome for the new EO Taxonomy was based on the behavioural objective of the BO Taxonomy *("having the perception of an information need and feeling the excitement of being an independent searcher")*, but was shortened to remove the aspect that was identified as an area of weakness in the previous analysis: *"feeling of excitement of being an independent searcher"* (refer to chapter four, section 4.6.1 (ii) Level 2 – Interaction: A2). The word "specific" was added to

encourage a subject integrated approach, which should in turn add to the intrinsic motivation of the learner.

C3: Compared to the library skill in the S&E Taxonomy which requires learners to acquire objective knowledge about the search sequence at an interactive level *("acquiring objective knowledge of search sequences, their analyses and synthesis")*, the behavioural objective in the BO Taxonomy encourages learners to actually perform the cognitive task of formulating questions and actually planning and executing a search strategy, thereby constructing new knowledge *("formulating the questions and planning a search strategy")*. As this paradigm reflects the educational outcome aimed for by the new taxonomy, this behavioural objective was adopted for the new taxonomy. Requiring learners to plan a search strategy and have the cognitive insight to be able to ask the right questions, encourages interaction with information, which forms a vital aspect of information literacy.

P3: This educational outcome is a synthesis of P2 of the S&E Taxonomy *("negotiating search queries and performing a single, one-time search that meets a current information need")* and S2 of the BO Taxonomy *("recognizing the information as suitable to the need and experiencing a sense of well being")*. Compared to the library skill in the S&E Taxonomy, which requires learners to perform a single search for information, the behavioural objective of the BO Taxonomy requires that learners take this action one step further and *recognise information as suitable to the need.* The outcome in the new taxonomy was shortened slightly by excluding the last section *("experiencing a sense of well being")* of the behavioural objective, as this was considered to be too vague a statement.

Physical access to information at this stage necessitates that learners be taught the specific skills required to access and retrieve information from the various electronic and non-electronic information sources within the library. Once learners have received a physical orientation of the library and those learners who have not yet had the opportunity to acquire computer literacy skills have been given the opportunity to "catch up" to the other learners (P1), they receive instruction from their subject librarian on how to access and retrieve information (P2).

E3: Facilitators are ultimately responsible for encouraging learners to interact with information through their teaching style, which encourages information use. The subject-specific librarians work in close co-operation with the facilitator in that they

support learners in their search for information, guiding them through the interactive level. However, the subject librarian's role should also be one of guiding the facilitators in developing their confidence in information literacy so that they may convey more confidently the concept of information literacy – in all three domains - to their learners. The format of evaluation at this stage would encompass an evaluation of learners and their interactive activities to ensure that they have been engaged in all three domains of information interaction.

Level Four: Problem-solving

The order of the cognitive and physical domain was exchanged to align with the concept of information literacy presented earlier in the chapter. At this level of the taxonomy higher order cognitive skills are required to be able to apply the accessed and selected information in order to solve a problem and satisfy the information need.

Level 3 of the original S&E taxonomy and BO Taxonomy – internalisation - was replaced by an entirely new set of educational outcomes. However, "lifelong information users" and "lifelong learners" are terms that are synonymous with information literacy and thus the objective of "learning to learn" remains the same. Although difficult to measure within the short period of time that learners spend in an academic environment, learners may none-the-less be equipped with the attitude, cognitive ability and physical skills necessary to encourage them to become future lifelong learners and information consumers. The criticism at this point is that these terms come across as being idealistic goals rather than achievable objectives, which should be measurable and attainable. For this reason the objectives have been reformulated in terms which are measurable and attainable within the scope of a higher education programme.

The stakeholders on Level 3 are again the facilitators in co-operation with subject librarians. The subject librarian provides the support system for both facilitators and learners in their journey towards information literacy.

Table 5.7: Level Four – Problem Solving

	Affective	Physical	Cognitive	Evaluative
Level 4: Problem Solving **Objective: Learning to Learn** **Stakeholders: Facilitators in co-operation with subject Librarian**	A4 Learners will respond positively to the challenge of evaluating substantial amounts of accessed information for relevance.	P4 Learners will be able to identify and successfully access multiple information sources relevant to a variety of problems.	C4 Learners will be able to evaluate the information content and apply the information to solve a variety of problems.	E4 Stakeholders will jointly evaluate learners' progress through information literacy interventions, across all three domains.

A4: Once learners have become aware of why information and information literacy is important (A1), and have then received a specific information need by means of subject integrated assignments (A2), they are required to be able to face the vast amount of information that is available in order to then evaluate it for relevance. It is imperative that learners be prepared to cope with the challenge of facing this vast amount of retrieved information and not be intimidated by the volume of information available.

P4: In order to reduce the amount of irrelevant accessed information to a minimum, learners need to possess the necessary skills to identify which information sources will yield the most suitable information and how to operate it. Co-ordinating efforts between facilitator and skilled subject librarians should encourage the maximum utilisation of expertise to the benefit of the learner.

An overarching objective within the affective domain throughout the new EO Taxonomy is the development of a positive attitude towards information literacy by all stakeholders. It was first identified as an affective library skill on an interactive level within the S&E Taxonomy, but its value across the entire affective domain and the subsequent effect on the remaining domains should not be underestimated.

C4: At this stage learners are faced with an enormous problem-solving task of evaluating the retrieved information for relevance. Without the cognitive ability and knowledge acquired in (C1) and (C2), learners would probably not be able to successfully achieve this behavioural objective (C3). Furthermore, without the support of the co-

ordinated efforts of their facilitators and subject librarian, the majority of learners would probably not reach this level of problem-solving. Ultimately, it is about teaching learners how to help themselves, how to solve problems now and in their future careers that makes them **potential** "information consumers" and **potential** "lifelong learners".

E4: Once the stakeholders have accepted their role in the educational process towards information literacy, undeniably, the single most important aspect of the evaluation is to determine the extent to which learners have made progress through the programme. Once all the other factors are in place (A4, C4 & S4), and the intervention has accommodated all the educational outcomes identified for each level, ultimately, it comes down to determining the extent to which the learners benefited from the programme and have learnt to evaluate, identify and apply suitable information resources to information-rich problems.

As identified in chapter two, information literacy is not a concept that may be offered in isolation as a once off approach. Consequently, the evaluation of this educational outcome should not be restricted to one problem-solving task, but should be extended across the entire curriculum, encompassing all subjects. The recommendation is that the evaluation should be based on a continuous evaluation approach, which encourages learners to constantly engage with problem-solving activities, which incorporate a distinctive information literacy component. The use of a final year problem based project would be the ultimate educational outcome for learners prior to graduation. However, the application of the new Taxonomy is aimed at all learners. It is up to the facilitators and the subject librarian to determine the level of difficulty of the information retrieval task at hand. Learners in their first year of study, having successfully accomplished the educational outcomes required for level three, should be able to attain all the educational outcomes of the Taxonomy of Educational Outcomes for Information Literacy in South Africa, relative to their level of capability.

5.4 Conclusion

This chapter has demonstrated that the application of a taxonomic approach to the evaluation of information literacy interventions is both practicable and informative. However, it also demonstrated that the two taxonomies that were applied had distinct limitations in their application to the context of higher education in South Africa. For

this reason a new taxonomy was developed which incorporated the three primary domains of the existing taxonomies while making substantial changes to the concepts described and the attendant wording of the various objectives. More significantly a new level was added, which sought to capture the need for adequate orientation to information literacy, something that was implied but not explicit in either of the two taxonomies used. A further addition was the inclusion of a distinct and separate evaluative domain across all four levels, to accentuate the need to ensure that all levels are appropriately evaluated in terms of the objectives set for them.

In order to assess whether the proposed framework is adequate and useful for the evaluation of information literacy in higher education, chapter six evaluates a proposed information literacy intervention and makes recommendations on the strength of that evaluation. This, in turn, will allow the adequacy and suitability of the new proposed taxonomy to be determined.

CHAPTER 6

APPLYING THE TAXONOMY OF EDUCATIONAL OUTCOMES FOR INFORMATION LITERACY IN HIGHER EDUCATION TO THE E-LEARNING INFORMATION LITERACY COURSE

6.1 Introduction

The information explosion has not yet ceased, and with the sustained development of information technology, the nature of information appears to still be changing. This is evidenced in the updated technology available on the market in terms of the Internet, intranet, satellite broadcast, audio/videotape, and CD-ROMs (McCuaig, 2000) with which the average consumer can hardly keep pace. The impact of the Internet on the information explosion is best summed up by Katz and Oblinger (2000, 1):

" in a networked world, you can add 'e-' to almost anything: e-mail, e-commerce, e-business, ..., e-learning".

In chapter two of this study the analogy of a clock was used to illustrate the exponential growth rate of the communication revolution, which occurred in the last five minutes using a twenty-four timeframe (where 5 minutes equals 100 years). The development of electronic media has occurred only in the last few seconds.

The contribution of the Internet specifically to this development is well illustrated in table 6.1 (Albrecht, 2001: 26):

Table 6.1: Comparison of the volume of information available in the United States

1960 Media	2004 Media
4,5000 magazine titles	18,000 magazine titles
18 local radio stations	44 local radio stations
4 television channels	200 television channels
	2,400 Internet radio stations
	20 million Internet sites

According to Katz & Oblinger (2000: 1), the Internet is fundamentally changing the way that the business community, the government and even the educational sector operate:

- in business the Internet has had an effect on the way brands are promoted, products are sold,
- in government the information technology is used to make payments, grant proposals and provide services, and
- in education the Internet is affecting the method of instruction, administration, research and public service.

This mass availability of electronic media has had particular repercussions on the delivery format of education. The potential for improving learners' access to education and learning experiences has been recognised; in Higher Education this new emphasis on using information technology as a medium of learning is now often termed 'e-learning'.

Even the South African government held a national workshop as far back as 1995, with the aim of introducing and utilising technology effectively in the South African education and training system. The investigation was termed the Technology-Enhanced Learning Investigation (TELI). From this investigation a Strategic Planning Committee identified six lead projects, which would be effective in implementing the use of technologies at all levels and in all sectors of the South African education and training system.

Significantly, the fourth project included "developing a generic information literacy course for use in schools, community centres, industry-based training sites, and other appropriate sites of teaching and learning" (South Africa. Department of Education, 1997b). This approach is in direct alignment with the concept of information literacy offered in chapter five, which supports the notion of information literacy as a fundamental life skill, not just a skill restricted to a secondary or tertiary academic environment.

6.2 An E-learning Information Literacy Initiative at the Cape Technikon

The envisaged timeframe for CALICO's Infolit project was five years and expired in 2000 (the project was launched in 1995). However, given the importance attached to the promotion of information literacy, the Adamastor trust decided to extend its support for the Infolit project until at least the end of 2002. During this time the nature of Infolit's role in the promotion of information literacy in the Western Cape has changed, from initiator to collaborator. Since 1995, Infolit has completed the needs assessment study for information literacy and its information literacy pilot project initiative. Their role is now one of providing workshops and other opportunities for the various tertiary institutions to share their experiences of information literacy education (Underwood, 2001).

Parallel to this, in July 2000 the Cape Technikon contracted Philip Uys, an e-learning specialist from New Zealand, for a five-month period to initiate and lay the foundation for e-learning at the Cape Technikon. Interested parties were invited to submit e-learning projects.

This prompted Janine Lockhart from the Department of Library Services to submit an information literacy e-learning intervention. The projects had to be submitted within a six-month time-period. Amongst the projects submitted, was another information literacy intervention, designed by Julie Strauss from the Department of Library and Information Studies. Both e-learning projects were accepted by the Cape Technikon's e-learning committee on the condition that they co-ordinate their efforts to develop one e-learning intervention. Circumstances determined that Lockhart completed the design of the intervention on her own. Given the initial six-month time restriction, the intervention that was produced was a generic non-compulsory e-learning intervention, which is currently only available on the Cape Technikon's intranet [http://infocats.ctech.ac.za/Infolit/Infolit.html].

The Cape Technikon's information literacy e-learning intervention (hereafter referred to as the intervention) by Lockhart has subsequently been accepted by Infolit as the model information literacy project which will be used by all five tertiary institutions throughout the Western Cape. Research is currently being carried out to determine the specific

needs of each institution and modifications to the current format of the intervention will be undertaken once this needs analysis has been completed.
The evaluation of the current format of the e-learning intervention will accomplish two significant purposes:

It undoubtedly serves a valuable purpose to this study in that it provides an opportunity to apply and validate the new taxonomy.

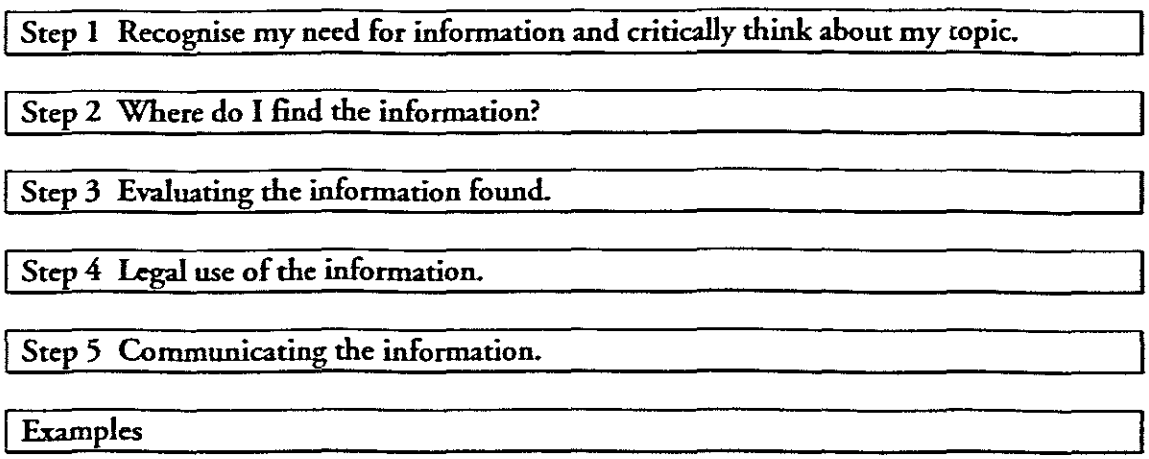
However, it also provides a useful, independent, and theoretical evaluation of the intervention, which will contribute towards the development and improvement of that intervention. This is potentially useful to:

- the developer of the intervention,
- Infolit who have selected it as their model project,
- all five institutions of Higher Education who are working in collaboration with regard to information literacy, and
- ultimately the learners who will benefit from the intervention.

6.2.1 The E-learning Information Literacy Intervention

The intervention is accessed via the Cape Technikon's intranet. In the library's home page, the "help" page provides a heading called "information literacy training", which identifies the intervention. Once accessed, the home page of the intervention is based on a concept of information literacy, which consists of five steps. This is illustrated in figure 6.1:

Figure 6.1: E-learning Information Literacy Intervention Home Page



By clicking on each step, learners gain access to a wide range of information on that specific topic of the information literacy process. The final step 'examples' provides two examples of the completed five-step information literacy process.

The intervention uses a number of graphics to help illustrate certain aspects of the information literacy process. An example is illustrated in figures 6.2 and 6.3:

Figure 6.2 Graphic illustrating a learner recognizing their need for information (step 1)

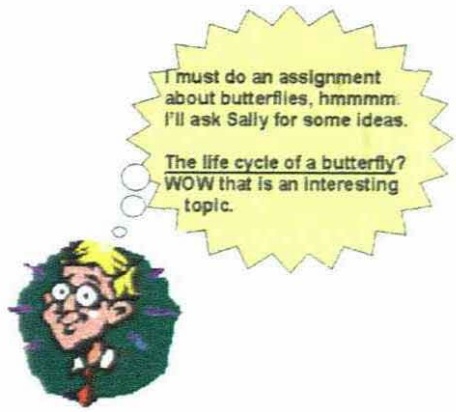
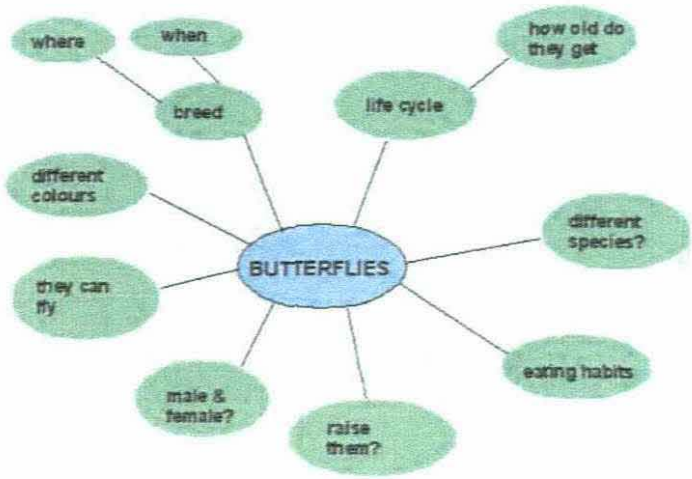


Figure 6.3 Graphic illustrating a mind map – an example of critically thinking about a topic (step 1)



There are no explicit guidelines yet as to the recommended method of implementation, and there is to date no means of monitoring the number of learners or facilitators who have accessed or completed the intervention.

However, a discussion with the developer of the intervention revealed that the recommended method of implementation of the intervention would be based on the co-ordinated efforts of the subject-specific librarian and the facilitator. The aim is that the subject librarian uses time-tabled periods for an orientation session in the library training room, using information technology to demonstrate to learners how to access the intervention on the intranet and how to use the intervention. Making full use of the e-learning concept, learners will be encouraged to work at their own pace and from access points suitable to their needs (Technikon, home, work, or elsewhere). In a co-ordinated effort with the facilitator, learners will then be given a subject-specific assignment by the facilitator, who will also be responsible for the assessment of the assignment.

Currently, the intervention is not compulsory and has not been marketed to any programmes within the Cape Technikon. However, for the purpose of this evaluation, the analysis of the intervention will be based on the recommended method of implementation.

6.3 Analysis of the E-learning Information Literacy Objectives into the Taxonomy of Educational Outcomes for Information Literacy in Higher Education

Step 1: Recognise the need for information and critically think about the topic

Learners/users should be able to:

- Recognise their need for information
- Critically think about their topic
- Formulate their search terms by making use of narrower and wider categories as well as different spelling of words
- Learn searching techniques (Boolean, truncation, etc.)

Table 6.2: Analysis of Step 1 into the Taxonomy of Educational Outcomes for Information Literacy Interventions in Higher Education

	Affective	Cognitive	Physical	Evaluative
Level 1: Infrastructural Prerequisites	A1	C1	P1	E1
Level 2: Orientation **Objective: Introduction to the Concept of Information Literacy**	A2 Learners will evidence an awareness of the general need for information in academic and social life.	C2 Learners will acquire information-relevant terminology and be able to comprehend information-relevant distinctions	P2	E2
Level 3: Interaction **Objective: Information Access & Retrieval**	A3 Learners will be able to confidently identify specific information needs required to complete a subject-specific information retrieval task/ assignment.	C3 Given the subject-specific information retrieval task, learners should be able to formulate appropriate questions and plan an effective search strategy.	P3	E3
	Affective	**Physical**	**Cognitive**	**Evaluative**
Level 4: Problem Solving	A4	P4	C4	E4

A3: "recognise their need for information"

The outcome for the interactive affective domain is perceiving a specific information need, as opposed to Level 2, where a general awareness for the need for information is

created. The initial interpretation of this objective made an analysis difficult as, "recognise their need for information," may be interpreted as a general or specific need. For the purpose of this evaluation, the distinction between the two information needs was important and needed to be clarified. The course content on the web-page provides two examples for when information may be needed:

- getting a project/assignment from a lecturer
- having a personal need that requires certain information before you can make a decision, e.g. buying a car, and mention is made that information is not only required for study purposes but to help make decisions in daily life (Lockhart, 2001).

A2: **"recognise their need for information"**

A short paragraph in the first step of the intervention points out that information is not only required for academic purposes but that information is needed to be able to make informed choices in daily life (Lockhart, 2001). The affective domain is the one, which is responsible for motivation. However, the degree to which three sentences can motivate and create an awareness for the general need for information is debatable. Notwithstanding, the objective "recognise their need for information" was tentatively identified as the taxonomic educational outcome – A2.

C3: **"critically think about their topic" &**
"formulate their search terms by making use of narrower and wider categories as well as different spelling of words"

These two objectives agree with the outcome of the interactive cognitive level of the EO Taxonomy – Level 3. The intervention uses an example to demonstrate the process of formulating the questions required to solve an information need. Learners are taken through the process of formulating questions and beginning to plan a search strategy. The paradox that exists, however, is that this knowledge is only representative in nature. Level 3 of the EO Taxonomy stipulates interaction for the outcome to be successfully achieved. For the purposes of the analysis this objective will be classified as C3, although it will be highlighted as a weakness that no transition is made within the intervention from representative knowledge (the example) to interaction (formulating their own questions and strategy).

C2: "learn searching techniques (Boolean, truncation, etc.)"

The intervention demonstrates the various searching techniques (Boolean, truncation and proximity searches) that are used for electronic information sources. This objective is represented by the cognitive domain on Level 2 - orientation – *acquiring representative knowledge and comprehending information-relevant distinctions.*

Step 2: Where do I find information?

Learners/users should be able to use different information sources.

Table 6.3: Analysis of Step 2 into the Taxonomy of Educational Outcomes for Information Literacy Interventions in Higher Education

	Affective	Cognitive	Physical	Evaluative
Level 1: Infrastructural Prerequisites	A1	C1	P1	E1
Level 2: Orientation **Objective: Introduction to the Concept of Information Literacy**	A2	C2 Learners will acquire information-relevant terminology and be able to comprehend information-relevant distinctions	P2	E2
Level 3: Interaction	A3	C3	P3	E3
	Affective	**Physical**	**Cognitive**	**Evaluative**
Level 4: Problem Solving	A4	P4	C4	E4

C2: The intervention provides a thorough cognitive orientation to the learner on the use of the various electronic and non-electronic information sources. Learners are provided with comprehensive examples of how to access information on these information sources: books, dictionaries, encyclopaedias, periodicals/magazines/journals, newspapers, audio-visual services, use of maps, and CD-ROM. This objective has been identified as a taxonomic cognitive outcome even though its focus is on the "use" of information sources; from which a physical orientation (P2) outcome would be expected. The reason for this allocation is that the information is provided on a purely representative and cognitive level. There is no interaction provided for learners to

practice physically accessing any of the resources. The medium of learning may be interactive in its design, and by clicking on various icons, learners are gaining access to the representative information they require, yet there is no opportunity in the intervention for learners to practice using any of the information sources.

Step 3: Evaluating the information found.

Learners/users should be able to evaluate the information found.

Table 6.4: Analysis of Step 3 into the Taxonomy of Educational Outcomes for Information Literacy Interventions in Higher Education

	Affective	Cognitive	Physical	Evaluative
Level 1: Infrastructural Prerequisites	A1	C1	P1	E1
Level 2: Orientation	A2	C2 Learners will acquire information-relevant terminology and be able to comprehend information-relevant distinctions	P2	E2
Level 3: Interaction	A3	C3	P3	E3
	Affective	**Physical**	**Cognitive**	**Evaluative**
Level 4: Problem Solving **Objective: Learning to Learn**	A4 Learners will respond positively to the challenge of evaluating substantial amounts of accessed information for relevance.	P4	C4	E4

C2: This objective is represented by C2 in the EO Taxonomy. In this third step of the intervention learners are provided with theoretical information on how to evaluate information sources. Links offering tips and techniques on the following issues are provided, for example, "fact vs. opinion", "eliminating irrelevant information", "primary vs. secondary source", "currency", "intended audience", "publishing body", "authority", and "popular vs. scholarly". Direct links to web-sites are also provided:

- Evaluating information on the World Wide Web
- Evaluating information found on the Web
- Evaluating Information Sources
- Evaluating Information

What is provided is terminology and distinctions (C2). There is no activity that would require learners to demonstrate that they can distinguish between relevant or irrelevant information, or that they can distinguish between primary and secondary sources (given examples of each).

A4: Information is provided on evaluating the accessed information for relevance. Should the learner be experiencing difficulty at this stage, a link has been built into the initiative at the "relevance" sub-heading, taking the learner back to the first step. It is the first step of the intervention which visually and cognitively demonstrates to learners how to *"critically think about the topic"* to ensure that the learner has refined their topic sufficiently.

Step 4: Be able to use information legally, e.g. plagiarism & copyright.

Learners/users should be able to use information legally by making use of citing and referencing styles.

Table 6.5: Analysis of Step 4 into the Taxonomy of Educational Outcomes for Information Literacy Interventions in Higher Education

	Affective	Cognitive	Physical	Evaluative
Level 1: Infrastructural Prerequisites	A1	C1	P1	E1
Level 2: Orientation **Objective: Introduction to the Concept of Information Literacy**	A2	C2 Learners will acquire information-relevant terminology and be able to comprehend information-relevant distinctions	P2	E2
Level 3: Interaction	A3	C3	P3	E3
	Affective	**Physical**	**Cognitive**	**Evaluative**
Level 4: Problem Solving	A4	P4	C4	E4

C2: The objective of step 4 is represented in the cognitive domain in the orientation level of the EO Taxonomy. Learners are provided with extensive information on copyright and plagiarism and links to web sites are provided. However, the objective stalls at the orientation level, as no evaluative aspect has been incorporated into the intervention to determine how much learners have learnt from this section. Furthermore, the correct application of the information acquired in step 4 would require learners to be involved in an information retrieval task, encouraging them to interact with the information on an affective, physical, and cognitive level.

Step 5: Communicating the information.

Learners/users should be able to communicate the information via report writing, presentations and/or designing a poster.

Table 6.6: Analysis of Step 5 into the Taxonomy of Educational Outcomes for Information Literacy Interventions in Higher Education

	Affective	Cognitive	Physical	Evaluative
Level 1: Infrastructural Prerequisites	A1	C1	P1	E1
Level 2: Orientation **Objective: Introduction to the Concept of Information Literacy**	A2	C2 Learners will acquire information-relevant terminology and be able to comprehend information-relevant distinctions	P2	E2
Level 3: Interaction	A3	C3	P3	E3
	Affective	**Physical**	**Cognitive**	**Evaluative**
Level 4: Problem Solving	A4	P4	C4	E4

C2: Again, learners are guided through the steps to writing a report, with an example of a completed assignment provided. Learners gain representative knowledge and learn to make the information-relevant distinctions to help them prepare a report, a presentation or a poster. At this stage no interaction has occurred where the learner has been encouraged to apply any of the knowledge gained.

Subject-Specific Assignment:

The assignment is included in the analysis as this is a fundamental part of the intervention, although as will be shown later, the assumption that the assignment will be completed is an area of serious potential weakness. Furthermore, there was some hesitation to include the level four outcomes - C4 and E4 - since the intervention envisages only one assignment, and what these require is the inclusion and evaluation of information literacy-based projects across the curriculum. Further discussion on this will follow later in the results section.

Table 6.7: Analysis of the Assignment into the Taxonomy of Educational Outcomes for Information Literacy Interventions in Higher Education

	Affective	**Cognitive**	**Physical**	**Evaluative**
Level 1: Infrastructural Prerequisites	A1	C1	P1	E1
Level 2: Orientation	A2	C2	P2	E2
Level 3: Interaction **Objective: Information Access & Retrieval**	A3	*C3*	P3 Provided with a specific information retrieval task, learners should negotiate search queries and assess the accessed information for relevance.	E3 Stakeholders will jointly evaluate how comprehensively the learners have been engaged with the information literacy interaction in al three domains
	Affective	**Physical**	**Cognitive**	**Evaluative**
Level Four: Problem Solving Objective: Learning to Learn	A4	P4	C4 Learners will be able to evaluate the information content and apply the information to solve a variety of problems.	E4 Stakeholders will jointly evaluate learners' progress through information literacy interventions, across all three domains.

P3: The evaluation is based on the recommended method of implementation, which involves the co-ordinated efforts of the subject librarian and facilitator. The information retrieval task which is provided by the facilitator, should be completed using the intervention as a guide to help progress from one step of the information literacy process to the next (recognise the need & critically think about the topic _ where do I find

information _ evaluating the information found _ be able to use the information legally _ communicate the information). The information is presented by the intervention (C2), and it is the physical interaction which learners are encouraged to engage in that has been identified as P3.

E3: Objectives within step one identified A3 and C3, and the subject-specific assignment corresponded with P3. In Level 3 the focus is on interaction. The envisaged method of implementation of the intervention requires that learners submit their assignments to their facilitator for evaluation. It is this evaluative component, attached to the intervention, that identified E3.

C4: In order for learners to complete an information retrieval task, they will have to apply the information; and some evaluative process must have occurred in order for learners to satisfy their information need and solve the problem. The assignment does not entirely comply with the taxonomic outcome for Level 4, since the intervention relies on only one assignment and C4 is based on information literacy-based projects across the curriculum. However, the intervention does encourage learners to satisfy an information need and, thus solve a problem. Consequently, this domain was identified in the analysis.

E4: This outcome was identified following the recommended method of implementation and the submission of the assignment to the facilitator for evaluation. It is this evaluative component which has been identified in the analysis as E4. Again this aspect of the intervention does not entirely comply with the outcome of E4, since the intervention relies on only one assignment and this outcome is based on the evaluation of information literacy-based projects across the curriculum.

6.4 Results of the Taxonomic Evaluation using the Taxonomy of Educational Outcomes for Information Literacy Interventions in Higher Education

6.4.1 Areas within the EO Taxonomy accounted for by the e-learning intervention

The results of the analysis have been summarised in table 6.8 below:

Table 6.8: Summary of the Analysis of the E-learning Initiative into the Taxonomy of Educational Outcomes for Information Literacy Interventions in Higher Education

	Affective	Cognitive	Physical	Evaluative
Level 1 Infrastructural Prerequisites **Objective: Provision of Adequate Resources for information Literacy Development** **Stakeholders: Institution**	A1 Provided with adequate information literacy training and a support infrastructure, facilitators will accept their role in the provision of information literacy education.	C1 Commitment from the institutional decision-makers for the promotion of information literacy will be evident in all policy forums and policy documentation	P1 The institution will provide adequate resources and the infrastructure required for the successful implementation of the information literacy intervention.	E1 An evaluation programme covering all institutional stakeholders involved with promoting the information literacy will be implemented.
Level 2 Orientation **Objective: Introduction to the Concept of Information Literacy** **Stakeholders: Library**	A2 Learners will evidence an awareness of the general need for information in academic and social life.	C2 Learners will acquire information-relevant terminology and be able to comprehend information-relevant distinctions	P2 Learners will be able to access and retrieve information from the various electronic and non-electronic information sources available in the library.	E2 The library will implement a program to evaluate the effectiveness of the information literacy orientation received by learners on all three domains.
Level 3 Interaction **Objective: Information Access & Retrieval** **Stakeholders: Facilitators in co-operation with subject Librarian**	A3 Learners will be able to confidently identify specific information needs required to complete a subject-specific information retrieval task/ assignment.	C3 Given the subject-specific information retrieval task, learners should be able to formulate appropriate questions and plan an effective search strategy.	P3 Provided with a specific information retrieval task, learners should negotiate search queries and assess the accessed information for relevance.	E3 Stakeholders will jointly evaluate how comprehensively the learners have been engaged with the information literacy interaction in all three domains.
	Affective	**Physical**	**Cognitive**	**Evaluative**
Level 4 Problem Solving **Objective: Learning to Learn** **Stakeholders: Facilitators in co-operation with subject Librarian**	A4 Learners will respond positively to the challenge of evaluating substantial amounts of accessed information for relevance.	P4 Learners will be able to identify and successfully access multiple information sources relevant to a variety of problems.	C4 Learners will be able to evaluate the information content and apply the information to solve a variety of problems.	E4 Stakeholders will jointly evaluate learners' progress through information literacy interventions, across all three domains.

▨ = shading indicates areas addressed by the e-learning intervention

☐ = indicates areas not addressed by the intervention, identified as potential weaknesses

The discussion of the results will be in a different format due to the modified version of the EO Taxonomy used for this analysis. With the expansion of the taxonomy to include

a fourth dimension – the evaluative domain, the need to discuss the extent to which each individual outcome contains an evaluative aspect has become superfluous. It appears evident from the table above that the evaluative aspect is not well represented by the intervention. The evaluation of each outcome, according to potential strength or potential weakness, will thus not be affected by its lack of an evaluative component. This does not mean that the lack of an evaluative aspect will not affect or change the overall evaluation of the intervention; only that this will be discussed and evaluated in the next section under a separate subheading entitled the "evaluative domain".

(i) Level Two – Orientation

A2: Learners will evidence an awareness of the general need for information in academic and social life.

The degree to which reference is made to the general need for information within the intervention, is restricted to a few sentences in the first step of the intervention. Although A2 was tentatively identified as an educational outcome during the analysis, no further support for the attainment of this outcome was found throughout the intervention. Subsequently, this outcome was identified as a **potential weakness.**

C2: Learners will acquire information-relevant terminology and be able to comprehend information-relevant distinctions.

There is a strong emphasis on the cognitive domain. Each of the five steps, which constitute the framework of the intervention, addressed this cognitive domain of the orientation level. The amount of relevant information provided to learners is comprehensive in nature, and linear in structure, enabling learners to readily comprehend the information-relevant distinctions. The information provided is representative in nature as learners are not expected to interact with it at this level of orientation. The objectives, which corresponded with C2 of the taxonomy were identified as a **potential strength** of the intervention.

(ii) Level Three - Interaction

A3: Learners will be able to confidently identify specific information needs required to complete a subject-specific information retrieval task/assignment.

One of the objectives of the first step of the intervention states that *"learners should be able to recognise their [specific] need for information"*. For learners to obtain the taxonomic outcome A3, requires that they have been motivated by a subject-specific information retrieval task, which creates a relevant and specific information need. At present, the application of the intervention is not compulsory, and the number of facilitators and learners aware of its existence is uncertain. Although the support structure for the intervention may be identified as a weakness, the intervention should be evaluated on its envisaged and recommended method of implementation, which involves facilitators working in co-operation with subject librarians to encourage learners to perform a subject-specific information retrieval task. Based on the adherence to the recommended method of implementation of the intervention, this objective has been identified as a **potential strength.**

C3: Given the subject-specific information retrieval task, learners should be able to formulate appropriate questions and plan an effective search strategy.

Two objectives of the first step of the e-learning intervention address this taxonomic outcome. Learners are encouraged to *"critically think about their topic"* (refer to figure 6.3) and to *"formulate their search terms by making use of narrower and wider categories as well as different spelling of words"*. The example of the topic on the butterfly is used in step one of the intervention to demonstrate how learners should widen their search by using words related to the topic such as "cocoons, insects and entomology".

A factor to be considered is that the third level of the taxonomy is based on interaction with information, yet the intervention on its own provides purely representative information. As mentioned previously in the analysis, it was highlighted as a weakness that no transition is made from representative knowledge (the example) to interaction (formulating their own questions and strategy) within the intervention. As will be noted under E3, there is no component within the intervention to evaluate the extent to which learners have successfully achieved the objective. This absence may have an overall effect

on the evaluation of the domain. However, this will be clarified in the discussion of the evaluative domain.

At this stage, based on the recommended method of implementation of the intervention, which involves the applied use of the e-learning intervention in conjunction with a subject-specific assignment, these two objectives may be identified as a **potential strength.**

P3: **Provided with a specific information retrieval task, learners should negotiate search queries and assess the accessed information for relevance.**

This outcome is not stated explicitly in the objectives of the intervention, but is rather implied through the recommended method of implementation using a subject-specific information retrieval task in combination with the intervention. Based on the ideal implementation of the intervention, learners should be progressing through the different steps of the information literacy process presented in the intervention and so access information parallel to their needs. The subject-specific retrieval task would ensure that learners are encouraged to apply physically what they have learnt from the objectives of the cognitive domain of Level 3, and to negotiate a search query for their specific information need.

This aspect of the intervention was identified as a **potential strength** of the intervention.

E3: **Stakeholders will jointly evaluate how comprehensively the learners have been engaged with the information literacy interaction in all three domains.**

Cognisance was taken of the recommended method of implementation for the intervention, which recommends that learners hand in the subject-specific information retrieval task to the facilitator for evaluation. Although not completely in agreement with the taxonomic outcome in that the subject librarian is not involved in the evaluation although they have been identified as one of the stakeholders, the intervention does provide an external evaluative component of how learners have interacted with information through the information retrieval task. The criteria used for the evaluation of the assignment have not yet been documented and no guidelines are provided to the facilitator.

The outcome in the evaluative domain of Level 3 – interaction - requires that the degree to which learners have been engaged with information literacy interaction in all three domains be evaluated, an area which requires confident levels of information literacy on behalf of the evaluator. The current format of the intervention assumes confident levels of information literacy on behalf of the facilitators, and a willingness on their part to accept an active role in the education of information literacy without the provision of any training or a support infrastructure. In the light of Level 1 having been identified as a potential weakness, this aspect of the intervention is therefore considered a **potential weakness.**

[It is significant to note that the cross-validation of the evaluation of the IFYE Module identified that even with the provision of a workshop on information literacy, facilitators were not confident in applying the IFYE information literacy Module and only one of four facilitators who were interviewed used the recommended information retrieval task].

(iv) Level Four – Problem-solving

A4: Learners will respond positively to the challenge of evaluating substantial amounts of accessed information for relevance.

The extent to which a Level 4 taxonomic outcome may be achieved in the affective domain without the motivational influence of a facilitator and/or subject librarian was a cause for concern. Tone of voice and body language play an important role in the affective domain in associating a positive attitude with information literacy. On the other hand, it is this human perspective which also makes this domain so subjective, for example, facilitators who are not information-literate themselves and are, thus, unable to convey a confident attitude towards information literacy.

In the section of the intervention that addresses the issue of relevance (step three), the wording used throughout most sections is direct speech. This may benefit the learner when addressing an affective issue, for example, *"however valuable an information resource may appear, if it is not directly relevant to <u>your</u> chosen topic, <u>you</u> are simply wasting <u>your</u> time, ..., it is not always easy to determine if information on the World Wide Web is credible. However, using the guidelines below will help <u>you</u> in making that evaluation".*

This objective was tentatively identified as a **potential strength** of the intervention based on the recommended implementation of the intervention.

C4: Learners will be able to evaluate the information content and apply the information to solve a variety of problems.

The objective of the intervention *"[learners] should be able to evaluate the information found"* was earlier identified as C2 as there is no activity within the intervention requiring learners to demonstrate that they have successfully accomplished the objective.

Taking the information retrieval task into consideration and based on the ideal method of implementation, where learners are required to submit an information retrieval task/assignment to the facilitator, this outcome was identified during the analysis. Completion of one information retrieval task does not comply completely with the fourth level educational outcome of the EO Taxonomy. The intervention envisages only one assignment, and what is needed is the inclusion of information literacy-based projects, which will engage learners in a constant searching and problem-solving approach to learning across the curriculum. Further discussion on the development of the taxonomy will ensue in chapter seven.

This aspect of the intervention was identified as a **potential strength** in the partial achievement of the learning outcome for C4.

E4: Stakeholders will jointly evaluate learners' progress through information literacy interventions, across all three domains.

Discussion with the developer of the intervention revealed that, upon completion of the information retrieval task, learners are required to hand in the assignment for evaluation by the facilitator. Although not completely in agreement with the outcome of the taxonomy in that the subject librarian is not involved in the evaluation, the intervention does provide an evaluative component of how learners solved their information need. The criteria used for the evaluation have not yet been documented and the evaluation presupposes that the outcomes for the preceding levels and domains have been successfully achieved. In addition, E4 requires an evaluation across all three domains. However, the analysis has revealed that the intervention only addresses the affective and

cognitive domain of the problem-solving level of the EO Taxonomy. Consequently, this aspect of the intervention must be considered a **potential weakness.**

6.4.2 Areas within the EO Taxonomy not accounted for by the Intervention

In the previous analyses of the IFYE Module using the Taxonomy of Library Skills and Errors and later the Taxonomy of Behavioural Objectives for Information Literacy, the discussion of results was formatted within each horizontal level. Due to the extended areas of the EO Taxonomy not addressed by the e-learning intervention, the discussion of the results is presented in a different format. The results of this analysis are presented both horizontally, i.e. Level 1, 2, 3, and vertically, i.e. the affective domain.

(i) Level One -Infrastructural Prerequisites

A1: Provided with adequate information literacy training and a support infrastructure, facilitators will accept their role in the provision of information literacy education.

According to the taxonomic design of the EO Taxonomy, prior to the development of any educational intervention, a needs analysis is recommended. The extent to which facilitators are prepared to accept their active role in the provision of information literacy education should be determined prior to the development of an information literacy intervention which relies on the co-operation of teaching staff for successful implementation.

Within the taxonomy, the affective domain is the domain responsible for motivating the learner into cognitive and physical learning action. Within this domain the e-learning intervention accommodates the learners on levels two to four (orientation, interaction, and problem-solving). However, according to the taxonomic design, for learners to reach their full potential, the outcomes for Level 1 must be achieved prior to a progression to the next level. Furthermore, in line with the holistic design of the EO Taxonomy, this vertical progression within the affective domain makes little sense without the completion of the outcomes required for the related cognitive, physical, and evaluative domains on each horizontal level.

In addition, the overarching objective within the affective domain throughout the new EO Taxonomy is the development of a positive attitude towards information literacy. The stakeholders in the foundation level of the taxonomy are the facilitators and by accepting their role in the provision of information literacy education, they have a responsibility to convey a positive attitude towards information literacy to their learners. However, the developers of the intervention, in turn, have a responsibility towards the facilitators to ensure that they are provided with adequate information literacy training and a support structure prior to the inception of the intervention.

The absence of any evidence that the intervention addresses these concerns leads to the conclusion that that the affective domain on Level 1 has been identified as a **potential weakness** of the intervention.

C1: Commitment from the institutional decision-makers for the promotion of information literacy will be evident in all policy forums and policy documentation.

In the cognitive domain, the outcome in the first level of the new taxonomy requires institutional support and commitment for a specific information literacy intervention, which should be explicitly evident in its policy forums and policy documentation. This institutional support aligns with the national support documented by SAQA, which identifies information literacy as a critical outcome.

At an institutional level a senate decision was taken four years ago regarding computer literacy, which has subsequently been incorporated into every programme. However, no decision has yet been documented at the Cape Technikon that curricula require the inclusion of information literacy as a subject (Carstens, 2001). This inadequacy of institutional support must therefore be identified as a fundamental **potential weakness.**

P1: The institution will provide adequate resources and the infrastructure required for the successful implementation of the information literacy intervention.

The current physical location of the intervention on the Cape Technikon's intranet is in an unfortunate position and one not easily accessed even by those learners and facilitators who are aware of the intervention.

Another disadvantage is that there is currently only one library training room, which accommodates computer terminals. These are used to familiarise learners with the various electronic information sources (Coetzee, 2001).

Furthermore, based on the figures presented in the Cape Technikon's Library Services Annual Report 2000, there were 2 senior librarians and 12 librarians amongst the professional staff complement of the library to help orientate the 2 922 first-year learners registered for the year 2000 (Cape Technikon Library Services, 2000: 2-6). Applying these figures to the e-learning intervention, a calculation shows the following:

- assuming the full staff complement (all 12 librarians) are involved with the orientation of all first-year learners, and all twenty computer terminals are fully functional at all times, **146 training sessions** would have to be repeated in the library training room. Furthermore, these orientation sessions have to be held at the start of the year, or at least within a certain period of time. The effect on the functioning of the rest of the library would have to be considered when investing so many staff hours into orientation. Provision would have to be made for this in the allocation of staff to the library. However, due to the moratorium on new posts implemented by the Cape Technikon Council, no new posts were approved for 2000 (Cape Technikon Library Services, 2000: 1). This further supports the absence of institutional support for the information literacy intervention.

The omission of this entire level within the EO Taxonomy was identified as an area of **potential weakness** during the evaluation. Further discussion on this will follow in the next chapter where recommendations are proposed.

(ii) The Physical Domain

The analysis has shown that most of the e-learning intervention's objectives lie within the cognitive domain. Yet the taxonomic structure is holistic in its design and encompasses the integration of the affective, cognitive, physical, and evaluative domains. Promotion of outcomes solely in one domain without considering the remaining three domains, prevents the full potential of the learning experience from being reached.

The analysis reveals that the intervention is focused on the cognitive domain, with only Level 3 of the physical domain having been identified indirectly in the evaluation. At no point does the intervention itself require learners to undertake any physical searching operations and, it relies solely on the assignment for this purpose. The knowledge gained is purely representative. This lack of interaction within the intervention where learners are provided with an opportunity to practice physically and apply the accessing skills acquired, has been identified as a **weakness** of the intervention.

P2: **Learners will be able to access and retrieve information from the various electronic and non-electronic information sources available in the library.**

This objective, that *"[learners] should be able to use different information sources"* was earlier identified as a taxonomic cognitive outcome even though its focus is on the "use" of information sources; from which a physical orientation (P2) outcome would be expected. The reason for this allocation is that the information in the intervention is provided on a purely representative and cognitive level. There is no interaction provided for learners to practice physically accessing any of the resources. This has been identified as a **potential weakness** of the intervention.

P4: **Learners will be able to identify and successfully access multiple information sources relevant to a variety of problems.**

The assignment does accommodate the physical interactive aspect (P3) required, yet this is limited to only one assignment. The hesitation to identify any of the outcomes with Level 4 of the taxonomy was mentioned previously. The intervention envisages only one assignment, and the taxonomy requires the inclusion and evaluation of information literacy-based projects across the curriculum. Furthermore, there are to date no criteria or guidelines which stipulate any format for the information retrieval task such as, for example:

- minimum or maximum number of information sources which should be accessed, and
- the type of information sources that should be accessed, for example, shortloan, CD-ROM, journals, Internet, etc.

The absence of this domain has been identified as a **potential weakness** of the intervention.

(iii) The Evaluative Domain

The evaluative domain was introduced to the EO Taxonomy as a result of the shortcomings observed within the IFYE information literacy Module which failed to incorporate an evaluative component within the intervention. Instead, the Module relied solely on an information retrieval task supplied by the facilitator for its evaluation, and was heavily reliant on external factors, which evidenced a detrimental effect on the intervention. These factors included: poor co-operation between academic staff and library staff, little willingness amongst academic staff to co-operate, low levels of confidence in information literacy amongst academic staff, and no institutional support in the form of space in the curriculum and timetables, and the lack of physical resources. An evaluation of the state of the conditions may have avoided a potentially useful intervention falling into disuse.

Thus, the value of an evaluative component within the intervention and the overall effect that the absence such a component may have an on the overall evaluation should not be underestimated.

E1: An evaluation programme covering all institutional stakeholders involved with promoting information literacy will be implemented.

It must be mentioned that given the short time period (6 months) within which the intervention had to be completed, it is understandable that there was little time for an evaluation of the institutional support climate and support infrastructure. Nonetheless, it is highly improbable that any intervention that has not undertaken such an evaluation of the infrastructural prerequisites will have any chance of success. Further discussion on this issue will ensue in the final chapter, where recommendations are presented.

E2: The library will implement a program to evaluate the effectiveness of the information literacy orientation received by learners on all three domains.

With reference to Level 2 – orientation - the intervention provides learners with comprehensive and extensive information content (C2). The level is, however, not complete with the absence of P2, and the intervention itself does not provide any opportunity for learners to interact with the information they are supplied with or to apply and practice what they have learnt. Instead, it relies solely on the assignment.

According to the figures presented by the Cape Technikon Library Services Annual Report 2000, first-year learners oriented to the library had markedly increased from 57.1% in 1999 to 72.6% at the beginning of 2000 (Cape Technikon Library Services, 2000: 6). This positive impact may be attributed to the increased awareness towards information literacy encouraged by Infolit and its initiatives. However, the degree to which learners have received an adequate orientation still needs to be evaluated. In its current format, there is no evaluative component built into the intervention to ensure that learners have been exposed to and successfully achieved the objectives required for the orientation.

[It is significant to note that the cross-validation of the evaluation of the IFYE Module identified that many learners had not attended the library orientation.]

Taking the entire evaluative domain into consideration (including E4, which was previously identified as a potential weakness), the extent to which learners have successfully achieved each of the relevant objectives within the e-learning intervention itself, is thus not evaluated. The omission of a suitable evaluative dimension has been identified as an **overriding potential weakness** of the intervention and therefore supersedes any previous analysis results.

Consequently, a potentially good program (based on the many areas identified as potential strengths) may end up not performing as well in practice (due to the lack of a suitable evaluative component). This discussion will be elaborated on in chapter seven in which conclusions will be summarised and recommendations will be presented.

(Discussion of the results of IFYE Module evaluation and the lack of any evaluative component in the e-learning intervention with Lockhart, the intervention developer, might result in changes to the current format to include an evaluative dimension).

6.4.3 Summary of Results According to Potential Strengths and Potential Weaknesses, and Overriding Potential Weaknesses

In table 6.9 below the potential strengths and potential weaknesses of the e-learning intervention have been summarised in terms of the EO Taxonomy prior to the effect of the evaluative domain. The table shows that compared to the original objectives of the intervention based on the five steps, the predicted success of the intervention in terms of learners acquiring those objectives will largely be confined to the interactive level of the taxonomy.

(Discussion of the results of IFYE Module evaluation and the lack of any evaluative component in the e-learning intervention with Lockhart, the intervention developer, might result in changes to the current format to include an evaluative dimension).

6.4.3 Summary of Results According to Potential Strengths and Potential Weaknesses, and Overriding Potential Weaknesses

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Table 6.9: Summary of the Results According to Potential Strengths and Potential Weaknesses

	Affective	Cognitive	Physical	Evaluative
Level 1 Infrastructural Prerequisites **Objective: Provision of Adequate Resources for information Literacy Development** **Stakeholders: Institution**	A1 Provided with adequate information literacy training and a support infrastructure, facilitators will accept their role in the provision of information literacy education.	C1 Commitment from the institutional decision-makers for the promotion of information literacy will be evident in all policy forums and policy documentation.	P1 The institution will provide adequate resources and the infrastructure required for the successful implementation of the information literacy intervention.	E1 An evaluation programme covering all institutional stakeholders involved with promoting the information literacy will be implemented.
Level 2 Orientation **Objective: Introduction to the Concept of Information Literacy** **Stakeholders: Library**	A2 Learners will evidence an awareness of the general need for information in academic and social life.	C2 Learners will acquire information-relevant terminology and be able to comprehend information-relevant distinctions.	P2 Learners will be able to access and retrieve information from the various electronic and non-electronic information sources available in the library.	E2 The library will implement a program to evaluate the effectiveness of the information literacy orientation received by learners on all three domains.
Level 3 Interaction **Objective: Information Access & Retrieval** **Stakeholders: Facilitators in co-operation with subject Librarian**	A3 Learners will be able to confidently identify specific information needs required to complete a subject-specific information retrieval task/ assignment.	C3 Given the subject-specific information retrieval task, learners should be able to formulate appropriate questions and plan an effective search strategy.	P3 Provided with a specific information retrieval task, learners should negotiate search queries and assess the accessed information for relevance.	E3 Stakeholders will jointly evaluate how comprehensively the learners have been engaged with the information literacy interaction in all three domains.
	Affective	**Physical**	**Cognitive**	**Evaluative**
Level 4 Problem Solving **Objective: Learning to Learn** **Stakeholders: Facilitators in co-operation with subject Librarian**	A4 Learners will respond positively to the challenge of evaluating substantial amounts of accessed information for relevance.	P4 Learners will be able to identify and successfully access multiple information sources relevant to a variety of problems.	C4 Learners will be able to evaluate the information content and apply the information to solve a variety of problems.	E4 Stakeholders will jointly evaluate learners' progress through information literacy interventions, across all three domains.

☐ = indicates areas not addressed by the intervention, identified as weaknesses

▢ = light shading indicates areas of potential weakness of the e-learning intervention

■ = heavy shading indicates areas of potential strengths of the e-learning intervention

Similar to the IFYE Module, the same fundamental oversight in the design of the intervention is evident in that the assumption appears to have been made that learners were already familiar with the library. The analysis indicates that no provision was made for learners who may not yet possess the physical accessing skills necessary to operate the

information technology required to utilise the e-learning intervention. Furthermore, without an adequate orientation learners would not know how or where to find the various information sources, they would be unfamiliar with the various services that the library offers and they would be unacquainted with the relevant subject librarian, and therefore may be reluctant to ask for assistance.

In addition, the analysis of the intervention objectives into the EO Taxonomy identified that the cognitive domain appears to dominate, particularly in the orientation level – C2 was identified by five objectives of the five steps constituting the intervention.

Highly significant was the inadequate reflection of the physical and the evaluative aspect incorporated into the intervention. Although the subject-specific information retrieval task would provide physical action and incorporate an evaluative aspect, the intervention as such contained neither. It has been mentioned that the evaluation of the intervention was based on the ideal method of implementation, in which case these two aspects will be accommodated by the assignment. However, this presupposes co-operation between academic staff and library staff, and an acceptance of the role to be played by academic staff both at the level of understanding information literacy and also their active role in the education of information literacy. A further assumption is that facilitators accept this role without training or demonstrated institutional support, and without space in the timetable or curriculum.

The effect that the absence of an evaluative component may have on an intervention is well illustrated in table 6.10 below, where the potential strengths are converted into potential weaknesses due to the overriding effect of the evaluative domain.

Table 6.10: Summary of the Effect of the Overriding Potential Weakness' of the Evaluative Domain on the Overall Evaluation

	Affective	Cognitive	Physical	Evaluative
Level 1 Infrastructural Prerequisites **Objective: Provision of Adequate Resources for information Literacy Development** **Stakeholders: Institution**	A1 Provided with adequate information literacy training and a support infrastructure, facilitators will accept their role in the provision of information literacy education.	C1 Commitment from the institutional decision-makers for the promotion of information literacy will be evident in all policy forums and policy documentation.	P1 The institution will provide adequate resources and the infrastructure required for the successful implementation of the information literacy intervention.	E1 An evaluation programme covering all institutional stakeholders involved with promoting the information literacy will be implemented.
Level 2 Orientation **Objective: Introduction to the Concept of Information Literacy** **Stakeholders: Library**	A2 Learners will evidence an awareness of the general need for information in academic and social life.	C2 Learners will acquire information-relevant terminology and be able to comprehend information-relevant distinctions.	P2 Learners will be able to access and retrieve information from the various electronic and non-electronic information sources available in the library.	E2 The library will implement a program to evaluate the effectiveness of the information literacy orientation received by learners on all three domains.
Level 3 Interaction **Objective: Information Access & Retrieval** **Stakeholders: Facilitators in co-operation with subject Librarian**	A3 Learners will be able to confidently identify specific information needs required to complete a subject-specific information retrieval task/ assignment.	C3 Given the subject-specific information retrieval task, learners should be able to formulate appropriate questions and plan an effective search strategy.	P3 Provided with a specific information retrieval task, learners should negotiate search queries and assess the accessed information for relevance.	E3 Stakeholders will jointly evaluate how comprehensively the learners have been engaged with the information literacy interaction in all three domains.
	Affective	**Physical**	**Cognitive**	**Evaluative**
Level 4 Problem Solving **Objective: Learning to Learn** **Stakeholders: Facilitators in co-operation with subject Librarian**	A4 Learners will respond positively to the challenge of evaluating substantial amounts of accessed information for relevance.	P4 Learners will be able to identify and successfully access multiple information sources relevant to a variety of problems.	C4 Learners will be able to evaluate the information content and apply the information to solve a variety of problems.	E4 Stakeholders will jointly evaluate learners' progress through information literacy interventions, across all three domains.

- ☐ = indicates areas not addressed by the intervention, identified as weaknesses
- ▨ = light shading indicates areas identified as potential weakness of the e-learning intervention
- ■ = heavy shading indicates areas initially identified as potential strengths of the e-learning intervention, subsequently converted to potential weaknesses due to the overriding effect of the absence of the evaluative component.

6.5 Conclusion:

The theoretical validation of the Taxonomy of Educational Outcomes for Information Literacy Interventions in Higher Education was presented in the previous chapter. This chapter has demonstrated its practical application as an evaluative framework. A significant point is that the EO Taxonomy was applied to an intervention using the non-traditional delivery format of e-learning, which underlines its general applicability as an evaluative framework for information literacy interventions.

In the final chapter of this study, the implications of the evaluations for the two specific information literacy interventions that form the basis of this study are discussed together with recommendations for their improvement. The major focus in this section will be in the e-learning intervention since this is the one currently being considered for wider implementation. On the basis of the theoretical evaluative framework presented in the study, the implications for information literacy and information literacy interventions in general will be discussed. Furthermore, the adequacy of the EO Taxonomy as a theoretical evaluative framework will be reviewed, identifying areas for further research and suggesting the way forward.

CHAPTER 7

RECOMMENDATIONS AND THE WAY FORWARD

7.1 Introduction

The aim of this study is to develop an evaluative model that can be applied to information literacy interventions. With the recognition that information literacy has received on an international scale (refer to chapter two), a national scale (via the SAQA policy documents), and a provincial scale (as evidenced by the Infolit initiative), there was evidently a need for an evaluative framework that can be applied to the various information literacy initiatives being developed and implemented.

The evaluative framework was based on a behavioural taxonomic approach using the Taxonomy of Library Skills and Errors developed by Nahl-Jakobovits & Jakobovits (1990) and subsequently the Taxonomy of Behavioural Objectives for Information Literacy developed by Nahl-Jakobovits and Jakobovits (1993).

Initially in 1997, the information literacy Module of the Integrated First Year Experience Programme was evaluated using this taxonomic approach. The motivating factor behind the evaluation of the IFYE information literacy Module was to determine whether it would be suitable as an implementable intervention at other institutions in the Western Cape. This coincided with the aims of Infolit, which had invited institutions of Higher Education to submit pilot projects on information literacy in a drive to promote information literacy throughout the Western Cape.

The application of the Taxonomy of Library Skills and Errors and the Taxonomy of Behavioural Objectives for Information Literacy to the IFYE information literacy Module was used to validate the evaluative framework. Chapter four demonstrated that the taxonomic approach, used as a theoretical evaluative framework, has both construct validity and predictive validity. Potential strengths and potential weaknesses predicted by the theoretical analysis manifested themselves during the practical implementation of the Module. The theoretical evaluation was cross-validated using interviews with facilitators and questionnaires for learners.

However, the application of the taxonomic approach also demonstrates that the two taxonomies had distinct limitations in their application. Subsequently, by 2001, a new taxonomy had been developed which incorporated the three primary domains of the existing taxonomies, but made substantial changes to the concepts within each domain and rewrote them in terms of contemporary educational outcomes. More significantly, a new level was added prior to the orientation level, requiring institutional support for the intervention across all domains. A further domain was also added to accentuate the need for an evaluative component within each level of the taxonomy. The absence of any evaluative component that emerged during the analysis of the IFYE Module, highlighted the need for such a component.

The opportunity to evaluate the e-learning information literacy intervention was particularly crucial to the study. The application of the Taxonomy of Educational Outcomes for Information Literacy Interventions in Higher Education to this contemporary information literacy intervention was able to determine that this new taxonomy would be useful as an evaluative framework.

Based on the results of this study, the hypotheses proposed in chapter one may therefore be accepted. The taxonomic approach was applied and the EO Taxonomy developed. The basis on which each individual hypothesis was accepted, is detailed in parenthesis below:

(i) Evaluating information literacy initiatives **summatively** using the EO Taxonomy will determine to what extent an intervention that has been applied has succeeded in achieving the goals of information literacy from **a theoretical point of view.** (This hypothesis was accepted on the basis of the findings from the summative evaluation of the IFYE Module.)

(ii) Identifying **actual weaknesses** and programme strengths, will provide the potential for further development of the initiative to eliminate such weaknesses for **future implementations.** (The hypothesis was accepted on the basis of the actual weaknesses identified in the evaluation of both interventions.)

(iii) Used **formatively,** the EO Taxonomy will predict, from **a theoretical point of view,** to what extent an intervention that has not yet been applied will succeed in

achieving the goals of information literacy. (This hypothesis was accepted on the basis of the formative evaluation of the e-learning intervention.)

(iv) Identifying **potential weaknesses** and programme strengths, will provide the potential for further development of the initiative to eliminate such weaknesses **prior to the implementation** of the initiative. (The hypothesis was accepted on the basis of the formative evaluation of the e-learning intervention.)

From the findings made and conclusions drawn in chapters four, five and six, recommendations are grouped into three logical areas:

(i) specific recommendations about the e-learning intervention
(ii) recommendations about information literacy interventions in general
(iii) recommendations about the application of the Taxonomy of Educational Outcomes for Information Literacy Interventions in Higher Education.

7.2 Recommendations relating to the E-learning Information Literacy Intervention

7.2.1 Infrastructural Prerequisites

The analysis revealed that the entire Level 1 of the taxonomy was identified as a weakness due to the absence of any domains being identified. According to the taxonomic design of the EO Taxonomy, prior to the development of any educational intervention, an analysis of the infrastructural prerequisites in each of the affective, cognitive and physical domains, is required.

The evaluation of both information literacy interventions was based on the ideal method of implementation of each. The analysis revealed that this assumption of ideal implementation conditions was identified as an area of serious potential weakness across the affective, cognitive and physical domains. Based on these findings, the recommendations put forward are the following:

- A1: **Provision of training for both academic staff and library staff in information literacy and education respectively to create a learning climate, which encourages information literacy across the entire curriculum.**

In the affective domain, the extent to which facilitators are prepared to accept their active role in the provision of information literacy education should be determined prior to the development of an information literacy intervention which relies on the co-operation of teaching staff for successful implementation. The results from the evaluation suggest that contributing factors to the identification of the affective domain as an area of weakness were:

- insufficient co-operation between academic staff and library staff;
- non-acceptance of the role to be played by academic staff both at the level of understanding information literacy; and, their active role in the education of information literacy
- facilitators expected to accept this role without any training and support.

It is imperative that the expertise of both stakeholders involved in the learning process of information literacy be recognised and utilised to the maximum benefit of the learner. Both the librarian and the facilitator are directly and actively involved in the teaching and learning process of information literacy: the facilitator contributing as a specialist in education and training, and the librarian as the content specialist.

Training in information literacy skills, to empower academic staff to actively contribute towards the education of information literacy, should form a fundamental part of every information literacy intervention. This must be stated explicitly as an aim. The converse is true for librarians: they, too, require additional training in educational matters to facilitate their interaction with academic staff and learners.

It is significant to note that the cross-validation of the evaluation of the IFYE Module identified that even with the provision of a one-hour voluntary workshop on information literacy, facilitators did not feel empowered to teach their learners information literacy and, only one of the four facilitators interviewed used the recommended information retrieval task. A one-hour voluntary training session is not sufficient (as was demonstrated by the IFYE Module): instead a three stage interactive workshop is proposed:

1. Affective stage:

Positively motivate facilitators (use the conceptual model of information literacy – the information literacy cycle) to make them aware of the need for information in academic, social, political and economic life. Make facilitators aware of how difficult it is for them to remain up to date with the constant and rapid developments in their field and then extend that to how the learners must feel, particularly when they are not equipped with the skills required for lifelong learning. Then, show them the solution· the concept of information literacy.

2. Skills stage:

With added training in education, it might be appropriate that librarians be empowered using the intervention to help academic staff to update their information accessing skills and thereby keep them updated on the latest developments in information literacy and information accessing technology.

3. Cognitive stage:

The cognitive stage could then contribute towards the collaboration between facilitators and subject librarians, by requiring them to become actively involved in developing and setting up assignments that encourage information-literate behaviour. In a workshop, both stakeholders could then have the opportunity to report back and discuss their contribution towards future implementations.

- **A1: Promotion of information literacy amongst academic staff as an integrated learning issue, not a separate library issue.**

It is important that the promotion of information literacy be promoted within the faculty not as a **separate library issue**, but as an **integrated learning issue** that will support them in their role as facilitators (Breivik, 1998: 78). An incorrect approach may result in information literacy being perceived by facilitators as "just another project/workload/issue" which gets added to their already crowded workload. Actions that might be taken to help avoid this perception could include:

- subject librarians approaching each faculty/department individually, rather than on a collective institutional scale
- acknowledging the importance of the facilitator's contribution as the education specialist in the process of information literacy education
- involving academic staff in the development of a customised approach to implementing the information literacy initiative in their faculty/department. This would provide facilitators with the opportunity to participate in the development of an approach that will suite the specific needs of their learners and themselves.

- **C1: Target institutional decision-makers to commit to information literacy by acknowledging it as an academic requirement for every course.**

Chapter six provided evidence for the lack of demonstrated institutional support for information literacy (within the cognitive domain of Level 1), such as accrediting information literacy and providing space in the timetable and curriculum. It is, therefore, recommended that information literacy be acknowledged as an academic

matter. In order for information literacy to be taken seriously by the institution, it is probably necessary for it to be included in the formal decision-making structures. It might, for example, be appropriate to establish a committee, which could function as a standing committee, to ensure that information literacy is given its rightful place as an academic requirement for every course across the curriculum (as was done for computer literacy). This would probably also contribute towards the support received by the academic faculty who would be required to report on the progress of the incorporation of information literacy in their academic programme.

- **P1: Financial assistance through funding from industry towards the development of lifelong learning.**

The impact of the financial implications of implementing information literacy throughout the curriculum must be considered in these times of financial constraints and extreme budget cuts.

Lifelong learning is the central theme in education (SAQA, 1997; Western Cape. Provincial Administration, 2000; South Africa. Department of Education, 2001) and information literacy's contribution as a means to this goal has been firmly established. Additional financial support from industries towards additional resources required could be rallied by marketing information literacy as a means towards achieving lifelong learning, social well-being and economic development.

Significantly, information literacy could locate itself well in the Cape Technikon's institutional profile of assisting as a community resource located in District 6. The extent of this would, however, require further investigation due to the current suspension of activity in this field (Favish, 2001).

- **P1: Provision of additional human resources specialised in information literacy and education**

Consultation with the Director of Library Services, Mr Adriaan Coetzee, revealed that a minimum of an additional four staff members are required who are specialised in information literacy and education (the equivalent of the classic educational librarian with the qualification of B.Bibl.Ed.) for the e-learning initiative to have the desired impact. They would provide the link between the faculty and the library. Their function

would be to focus specifically on the training of academic staff, and learners in information literacy.

With specialised staff available to focus on the training of information literacy for academic staff and learners, a support infrastructure for academic staff could be provided to engage learners in a constant information seeking and problem-solving approach to learning. This should then result in the remaining librarians being freed up to spend more time helping learners with information literacy queries. These queries would relate to learners' constant interaction provided by academic staff and supported by specialised educational librarians.

However, as pointed out by Beivik (1998: 95), "library services are driven by headcount, not FTE('s)". Therefore the recommendation of additional human resources will have a significant impact on the financial constraints of the library services. One possible solution might be to credit the additional educational librarians to each of the faculties who would then pay their salaries out of the faculty budget – as they serve specifically to assist in the teaching of information literacy across the faculty.

- **P1: Provision of the physical infrastructure to support an information literate learning environment.**

The best information literacy intervention does not have a chance of success if it is not supported by a suitable infrastructure. In discussion with the Director of Library Services, it was suggested that a minimum of forty computer terminals should be available (instead of the 20 presently available) for the specific purpose of orientation and continuous information literacy training in the library.

However, to support an ongoing interaction, the issue of access to information sources across the campus is an issue that has to be considered and in particular the provision of sufficient terminals on campus and in residences for disadvantaged learners (whose current access is limited to the library hours). An economical approach could be to investigate the possibility of one centralised computer laboratory, which provides twenty-four hour supervised access to learners from all faculties.

[It is significant to note that such a proposal was accepted a number of years back. The fact that it has not yet been implemented further reinforces the conclusion that there is

inadequate support for information literacy from the key decision-makers and decision-making bodies within the institution.]

7.2.2 Orientation

A consideration of the results of the analyses of the study revealed that the orientation level stands out quite significantly as an area of potential weakness.

With reference to the analysis of the IFYE Module and the application of the S&E Taxonomy, and later, the BO Taxonomy, it appeared that there was a discrepancy in the interpretation of the term "orientation" between the two taxonomies. According to the BO Taxonomy, learners at an orientation level are already expected to function cognitively on an evaluation level, without any introduction or a sufficient 'orientation' to the basic concepts of information and information literacy. Although not included in the BO Taxonomy, the basic orientation found in the S&E Taxonomy, although not stated explicitly, was assumed for the purpose of the analysis.

This discrepancy in the interpretation of the term orientation between the S&E Taxonomy and the BO Taxonomy may well reflect the discrepancy in interpretation of the term "orientation" between librarians, academic staff, and learners. A fundamental oversight in the design of both interventions was the assumption that learners were already familiar with the library, the basic concepts of information literacy, and information technology.

A2: Motivational talk to be incorporated into the library orientation.

For this positive attitude to be developed it is imperative that all learners attend an orientation session at the library. Traditionally orientation has been all about the physical domain, yet according to the behavioural taxonomic approach used in this study, the affective domain is considered the most important. It is the affective domain that determines the motivational aspect that drives learners to respond and react to the requirements of the cognitive and physical domains.

To develop a positive attitude towards information literacy, it is probably necessary to incorporate a motivational affective aspect into the orientation to ensure that learners are

aware of how important it is in today's society to be information-literate. This may be in the form of a motivational talk or presentation, which illustrates the positive academic, social, and economical benefits of being information-literate.

- **P2: Provision of a physical orientation session to the library as part of the e-learning initiative.**

In order to ensure that learners know where the library is situated, and are familiar with its infrastructure, the recommendation put forward is that a physical orientation to the library be included as of the e-learning initiative.

- **C2: Instruction on bibliographic citation to help prevent plagiarism.**

Based on the analysis of the e-learning intervention, which found no information on bibliographic citation, and the importance attached to understanding the consequences of plagiarism and infringement of copyright, the inclusion of this critical aspect may be necessary.

- **E2: Implementation of an evaluation programme to determine the success of orientation received by learners on all three domains**

Consultation with library stakeholders determined that at present there is no evaluative component built into the library's voluntary orientation session. From an educational perspective, learners need to receive clear guidelines as to what is expected from them at the beginning of the learning experience in the form of outcomes, so that they have clear goals towards which they can strive. The extent to which they have achieved these outcomes needs to be evaluated, before they are allowed to move on to the next outcome.

Consultation with library stakeholders concluded that a register should be kept of learners attending the orientation session. Upon completion of the orientation, learners could fill in questions relating to the location and services provided by the library. An important aspect is that the orientation may not be divorced from the learner's academic work to ensure that learners recognise the orientation as directly relevant to their immediate information need. The results might be incorporated towards a year mark.

A word of caution at this entry level is not to confuse *orientation* with *interaction,* by means of a subject-specific information retrieval task, which requires the formulation of a search strategy. This is not yet required at the orientation level. At this point, learners should not be required to develop a search strategy; this will be evaluated in due course and on an ongoing basis through subject-specific information retrieval tasks. At this stage, all that is required of learners is that they can find their way around the library, know where the different information sources are located, how they operate, why it is important to know about them, and who they can approach to help them with any queries.

The overarching outcome at this stage is to help overcome the initial fear experienced by most learners of an academic library and replace this instead with a positive attitude towards information and information literacy. However, most orientation sessions are evaluated in terms of the physical and cognitive domains, whereas the affective domain is probably the most important (but also the one most difficult) which requires evaluation. This may be done in the form of presenting learners with attitude statements relating to the library and information literacy in general, to which learners may be asked to respond either positively or negatively. This area does, however, require further investigation and will be addressed when identifying areas for further research.

7.2.3 Interaction

- **P3: Interactive aspects should be included into the intervention itself, which require the learner to undertake physical operations such as plan and practice searches within the intervention.**

The intervention identified all three taxonomic domains of the interactive level as potential strengths, based on the ideal method of implementation. However, it relied entirely on the information retrieval task (this assumption was clearly identified as a weakness) to encourage learners to physically undertake any searching operations. The initiative itself encouraged no interaction. This prevented the transition from representative knowledge (the examples provided), through interaction (formulating their own questions and strategy), to objective knowledge (knowledge resulting from personal experience).

Therefore, it might be appropriate to require learner interaction with the intervention, independent of an information retrieval task. Learners would, hereby be provided with the opportunity to apply the representative knowledge gained and develop through personal experience and interaction, objective knowledge.

- **E3: Inclusion of an interactive evaluative aspect within the intervention.**

It is further recommended that an evaluative aspect be included within the e-learning intervention which requires the learner to evaluate their own performance within each level before being able to move on to the next level.

7.2.4 Problem-Solving

For learners to reach Level 4 of the EO Taxonomy, presupposes successful achievement of all the previous taxonomic domains and levels within the taxonomy. Thus, the intervention needs the co-operative efforts of each of the identified stakeholders. The development of information literacy is not an isolated product but a process, which depends on the contribution and co-operation of the institution, administrators, facilitators, librarians, and ultimately the learner.

On the basis of the results of the analysis, greater emphasis needs to be focused on a problem-solving approach to education rather than the inclusion of one information literacy-based project, which forms part of a voluntary information literacy intervention. It is recommended that learners be engaged in a constant searching and problem-solving approach to learning across the curriculum. Actions by stakeholders in the following areas are recommended:

- **A4: By adopting a problem-solving approach/attitude in their teaching style, facilitators should create a learning climate, which encourages information literacy and lifelong learning across the entire curriculum.**

The e-learning intervention alone cannot be responsible for engaging learners in an ongoing problem-solving approach to learning across the curriculum without the support of the other stakeholders identified in the information literacy process. Facilitators play a vital role in encouraging an information-literate behaviour through their approach/attitude to teaching and learning.

- P4: **Formal collaboration between facilitators and educational librarians should encourage, through resources-based education, the continuous development of the physical accessing skills required for information literacy.**

For learners to be encouraged to develop their information accessing and searching skills throughout their academic career, it may be necessary to establish a formal collaboration between facilitators and educational librarians. It might, for example, be appropriate to develop a training strategy for learners for the continuous development of the physical skills required for information literacy.

- C4: **Setting multiple assignments, which encourage cognitive problem-solving and information-literate behaviour.**

If facilitators adopt a problem-solving approach in their teaching, this should be reflected in the activities they require of their learners. The recommendation is that facilitators provide their learners with more problem-solving assignments that demand they generate their own knowledge based on the information they have accessed.

- E4: **The successful achievement of information literacy should be linked to a measurable, credit bearing exit-level outcome.**

In order for information literacy to be taken seriously by facilitators and learners, it is probably necessary to link the outcomes to a credit-bearing exit level outcome. It might, for example, be appropriate to provide learners with a year-end assignment based on a subject-integrated problem. In order for learners to successfully solve the problem, they would be required to apply their information literacy skills acquired throughout that particular year of study (this would be applied independently for each year of study -first, second, third and finally the fourth year). The results might be incorporated towards a year-mark. The format of continuous evaluation could also be implemented, whereby a

series of tasks would have to be completed throughout the year to contribute towards a year-mark.

The evaluation of information literacy initiatives is a contentious issue, with proponents of stand-alone credit-bearing information literacy courses ranged against those who claim they are irrelevant because they are not part of the curriculum of a specific discipline. The proposed recommendation aims at accommodating both views – a credit-bearing initiative – but, in the sense that the assignment would contribute towards a mark in a traditional discipline-specific subject. This matter will be discussed in more detail in the following section, under 'general recommendations'.

The recommendations above are summarised in Table 7.1:

Table 7.1: Summary of recommendations for the e-learning information literacy initiative, presented in the format used for the EO Taxonomy

	Affective	Cognitive	Physical	Evaluative
Level 1: Infrastructural Prerequisites **Objective: Provision of Adequate Resources for *information Literacy* Development** **Stakeholders: Institution**	A1: Provision of training for both academic staff and library staff in information literacy and education respectively to create a learning climate, *which encourages* information literacy across the entire curriculum. Promotion of information literacy amongst academic staff as an integrated learning issue, not a separate library issue.	C1: Target institutional decision-makers to commit to information literacy by acknowledging it as an academic requirement for *every course*	P1: Provision of the human resources (four extra staff) and the physical infrastructure to support an *information-literate* learning environment. Financial assistance through funding from industry towards the development of lifelong learning. *Credit* posts for staff specialized in information literacy and education to the faculties that they serve, whose salaries are therefore paid out of the faculty budget.	
Level 2: Orientation **Objective: Introduction to the Concept of Information Literacy** **Stakeholders: Library**	A2: Motivational talk to be incorporated into the library orientation.	C2: Instruction on bibliographic citation to help prevent plagiarism	P2: Provision of a physical orientation session to the library as part of the e-learning initiative.	E2: Monitor the learners who have attended an orientation and assess the level of understanding reached through general questions on information and services located in the library.
	Affective	**Cognitive**	**Physical**	**Evaluative**
Level 3: Interaction			P3: Interactive aspects should be included into the intervention itself which require the learner to undertake physical operations such as plan and practice *searches within* the intervention.	E3: Inclusion of an interactive evaluative aspect within the intervention.
	Affective	**Physical**	**Cognitive**	**Evaluative**
Level 4: Problem Solving **Objective: Learning to Learn** **Stakeholders: Facilitators in co-operation with subject Librarian**	A4 By adopting a problem solving approach in their teaching style, facilitators may contribute to creating a learning climate, which encourages information literacy and lifelong learning across the entire curriculum.	P4 Collaboration between facilitators and educational librarians should encourage continuous development of information literacy skills through resource-based education.	C4 Setting multiple assignments, which encourage cognitive problem solving and information-literate behaviour.	E4: The successful achievement of information literacy should be linked to a measurable, credit bearing exit-level outcome.

7.3 Recommendations about Information Literacy Interventions in General

Many of the recommendations made for the e-learning initiative are applicable to any information literacy intervention. Therefore, the recommendations in this section should be viewed as additional recommendations.

- **For information literacy to be taken seriously by all stakeholders (learners, facilitators, librarians, administrators, and the institutional decision-makers) it requires a combination of a course-integrated and a full-credit literacy subject approach; linking the course integrated instruction to a measurable exit-level outcome.**

The results of the evaluation indicate that information literacy, treated as an **intervention**, a term, which implies an isolated and sidelined approach, is not sufficient. Being treated as a separate issue and implemented as a prerequisite for the attainment of a qualification without integration into the subject content, affects the extent to which information literacy is taken seriously by the stakeholders involved. Furthermore, without a subject relevant content to complement the information literacy initiative, the grounds for extending it across the entire period of learners' academic careers may be seriously affected.

The teaching of information literacy as a **separate** first year subject (under the heading: information science) must be acknowledged for its contributing towards the attainment of information literacy. However, implementing a separate information literacy course running parallel to the normal first year curriculum, may not adequately serve the purpose of contributing to the behaviour of lifelong learning.

Instead, for information literacy to be taken seriously by all stakeholders (learners, facilitators, librarians, administrators, and the institutional decision-makers) it should be course integrated to increase the relevance. It should be acknowledged with an accredited and measurable outcome, thereby amalgamating the course integrated and full credit literacy subject approach (Young and Harmony, 1999: 45). For learners to recognise the relevance and be intrinsically motivated is it recommended that information literacy skills be integrated into the subjects directly relevant to their course of study. To have any chance of success at encouraging an information-literate behaviour and potential lifelong learning, requires that at the very least, information literacy be integrated throughout the

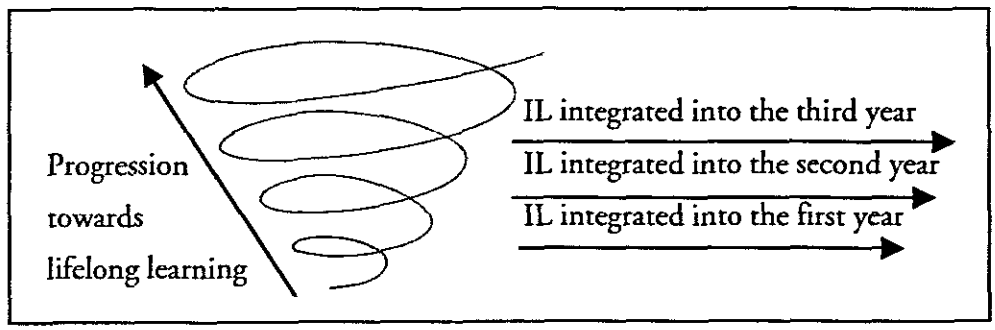
entire academic career (average of three to four years) of every learner. It must be remembered that the contribution towards lifelong learning involves the encouragement of a continuous cycle of information-literate behaviour – a goal that is challenging enough to attempt to contribute to in the short period 3 – 4 year period of the average learner's academic career.

The implementation of such a combined approach as recommended above, involves that parallel to each year of advancing study, learners are familiarised with information sources relevant to their level of study, for example: first-year learners would be engaged in a problem-solving approach equivalent to their capabilities at that level. Thus every learner, by the end of their first year, should have attained the Level 4 outcomes presented in the EO Taxonomy, on a level, relevant to their affective, cognitive and physical capabilities. This should not be compared with a fourth year learner, whose level of problem-solving should be more advanced due to more exposure and experience.

However, it is important that each learner should achieve the problem-solving level represented in the EO Taxonomy at Level 4, within each year of study and this problem-solving behaviour should be encouraged and maintained through constant interaction, and orientation to new relevant information sources (for example, new databases or online services) – in a constant information literacy cycle.

This concept has been illustrated in figure 7.1, in which the learner, through constant engagement with course integrated information and problem-solving, becomes progressively more information-literate. As the learner progresses from one academic year to the next, the extent to which they are challenged increases to match their capabilities and experience.

Figure 7.1: The Information Literacy Cycle integrated into the academic curriculum



Note: IL refers to Information Literacy

- **Re-introduction of the classic educational librarian (B.Bibl.Ed., librarian with a teaching qualification) to facilitate the training of both academic staff and library staff in information literacy and education respectively, and provide a support infrastructure.**

During this first year of tertiary education learners are expected to make the giant leap from dependent to independent learning. The educational librarian would play an active educational role in teaching and facilitating information literacy. They would be required to encourage positive attitudes, they would have to know how to train others in computer skills, and they have to know how to assess and provide feedback on assignments. These are all educational tasks for which current training does not prepare them.

The prognosis for recommending such a commitment to information literacy in times of financial constraints may look bleak; however, considering that investing in the additional recruitment of only one librarian may have an effect across a wide variety of disciplines needs to taken into consideration (Breivik, 1998: 95). However, the positive financial return of this investment in terms of increased pass rates and increased FTE's, and the improved quality of learning and graduate produced, far outweigh the investment with regard to training and salary that the institution would have to make.

- **Target information literacy needs of learners from historically disadvantaged backgrounds**

The operational definition of information literacy accepted for this research in chapter one is based on the requirements in the South African context. Prior learning experience was identified as a primary factor, which needed to be taken into consideration. It was assumed that learners upon entering higher education, possess basic literacy skills from which the more complex skills required of an information-literate person could be developed. However, the results from the practical evaluation of the IFYE Module suggest that many learners from historically disadvantaged educational institutions possess only rudimentary English language skills which present a barrier to acquiring more complex information literacy skills. Research statistics by Hodge & Miller (1996: 54) support this observation. They reported that only 9.1% of South Africa's population speak English as a home language, yet it is the medium of instruction in the majority of educational institutions. Another factor, which may pose a barrier to information literacy for these learners is that the majority of information sources (including both printed and electronic sources) are available only in English. The recommendation is thus made that remedial programmes be offered to these learners which focus on teaching those skills necessary to bring them up to the same academic level as learners from historically advantaged institutions.

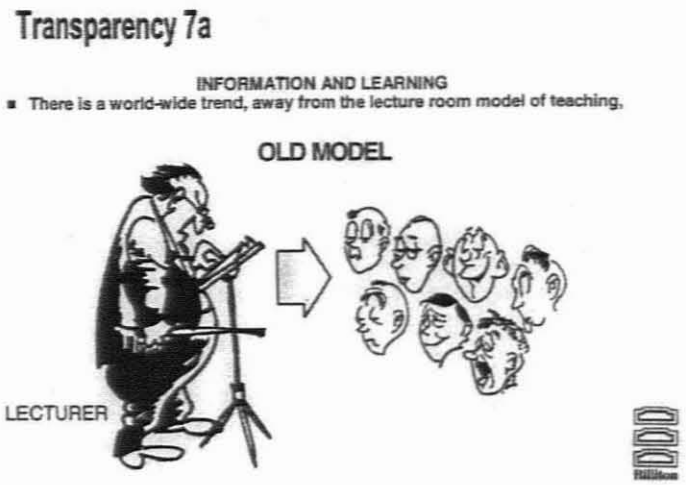
The University of Namibia has implemented a programme, which extends three-year courses to four years, thus providing disadvantaged learners with an extra year during which they are taught "core" skills necessary to become successful, independent learners. Information literacy skills are amongst the "core" skills taught in an integrated approach in collaboration between both library and teaching staff. Learners who already possess the required skills advance to the second year (Jacobs, 1997). The example from Namibia illustrates that stakeholders have taken the problem seriously and have been willing to introduce really significant changes to their educational programme. In South Africa the problem is just as serious, yet few institutions have gone beyond a "patch-up" approach.

- **Facilitators actively involved in the restructuring of the learning process to a learner-centred, resource based approach which encourages the development of independent life-long learners.**

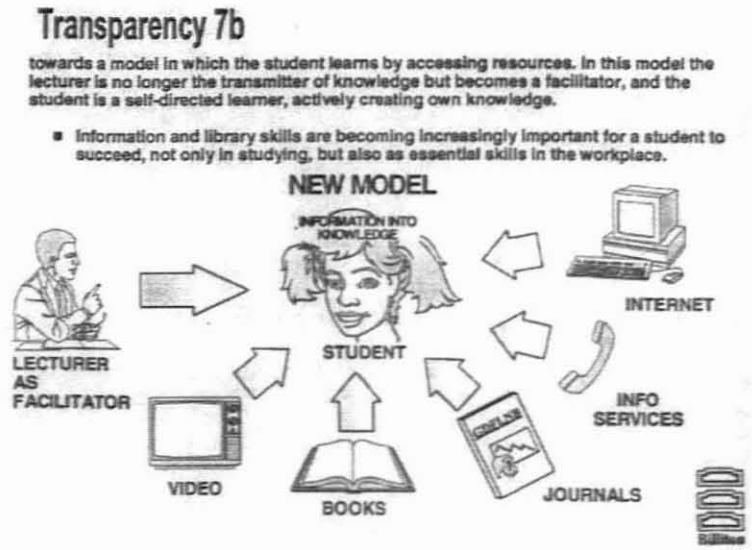
Following the international trend, a paradigm shift in higher education is recommended. The emphasis is moving away from a teacher-centred approach, in which the teacher is the sole source of information and, towards a learner-centred approach which encourages learners to utilise a variety of information sources through resource-based learning, thus becoming independent life-long learners with the information literacy skills necessary to successfully navigate their way through an information society.

A prerequisite for the credit-bearing, course-integrated approach is the active participation of the facilitator. Their contribution towards this process cannot be overemphasised. This change in approach is well illustrated by figure 7.2:

Figure 7.2: IFYE Module Transparencies 7a and 7b:



"There is a world wide trend away from the lecture room model of teaching towards a model in which the student learns by accessing resources.



In this model the facilitator is no longer the transmitter of knowledge but becomes a facilitator, and the student is a self-directed learner, actively creating own knowledge."

7.4 Recommendations for future application of the Taxonomy of Educational Outcomes for Information Literacy Interventions in Higher Education

7.4.1 EO Taxonomy as a Theoretical Evaluative Framework

Chapter six demonstrated that the application of the EO Taxonomy was both practical and informative. This supports its proposed application as an evaluative framework within a wider context: that it may be used formatively and summatively.

In addition, the summative evaluation allows for different interventions to be compared in terms of their theoretical adequacy and therefore the better programme(s) can be selected for implementation.

7.4.2 Structural Changes to the Evaluative Domain

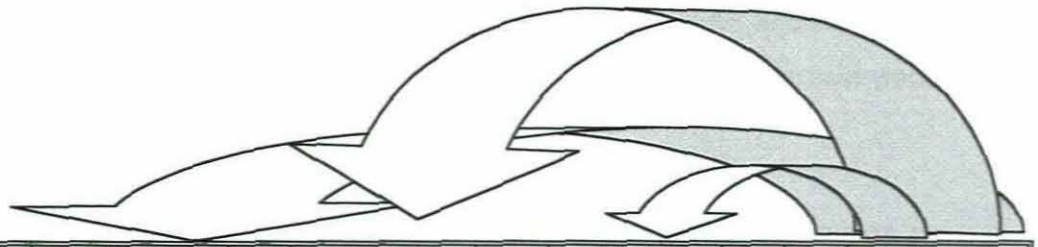
Initially the evaluative domain was added as a fourth vertical dimension as it became evident that it was not sufficient to have an aim or an activity that met the outcome, unless there was clear evidence that this was going to be evaluated in terms of that outcome. However, from the analysis of the e-learning intervention came the realisation that the EO Taxonomy in its current format does not have the capacity to accommodate the extent to which each of the individual affective, cognitive, and physical domains, embedded within each of the four levels of the taxonomy, may well contain an evaluative component.

The conclusion was reached that the evaluative domain is not one of four, but rather a separate domain, which refers back to each of the other three, and is therefore different in quality from these. Consequently, the format of the EO Taxonomy was adjusted (see Table 7.2) to stress the overarching importance of the evaluative domain - this is indicated by taking it out of the matrix and integrating it into each of the existing domains (affective, cognitive, and physical). This change of format forces the question to be asked for each individual domain and corresponding outcome, whether any evidence exists that an evaluative component has been incorporated into the initiative to ensure the attainment of the outcome for that particular domain.

The significance of this change from a developer's and evaluator's perspective is that the identification of each individual outcome according to potential strength or potential weakness allows for a far more accurate result than if an entire level is evaluated as a potential weakness, as was done in chapter six.

Although the situation did not arise during this first application of the EO Taxonomy, future applications may now attribute an evaluative component to individual domains to ensure that each individual outcome is being met. These individual domains could then be credited as areas of potential strength. However, this approach is still based on and continues to maintain a holistic taxonomic approach in that all three domains, the affective, cognitive, and physical domains within each level have to work together in order for **each level** to be successfully achieved.

Table 7.2: Proposed Re-structuring of the Evaluative Domain within the EO Taxonomy



	Affective	AE	Cognitive	CE	Physical	PE	Evaluative (E)
Level 1 **Infrastructural Prerequisites** **Objective:** **Provision of Adequate Resources for information Literacy Development** **Stakeholders:** **Institution**	**A1** Provided with adequate information literacy training and a support infrastructure, facilitators will accept their role in the provision of information literacy education.	E1	**C1** Commitment from the institutional decision-makers for the promotion of information literacy will be evident in all policy forums and policy documentation.	E1	**P1** The institution will provide adequate resources and the infrastructure required for the successful implementation of the information literacy intervention.	E1	**E1** An evaluation programme covering all institutional stakeholders involved with promoting the information literacy will be implemented.
Level 2 **Orientation** **Objective:** **Introduction to the Concept of Information Literacy** **Stakeholders:** **Library**	**A2** Learners will evidence an awareness of the general need for information in academic and social life.	E2	**C2** Learners will acquire information-relevant terminology and be able to comprehend information-relevant distinctions.	E2	**P2** Learners will be able to access and retrieve information from the various electronic and non-electronic information sources available in the library.	E2	**E2** The library will implement a program to evaluate the effectiveness of the information literacy orientation received by learners on all three domains.
Level 3 **Interaction** **Objective:** **Information Access & Retrieval** **Stakeholders:** **Facilitators in co-operation with subject Librarian**	**A3** Learners will be able to confidently identify specific information needs required to complete a subject-specific information retrieval task/ assignment.	E3	**C3** Given the subject-specific information retrieval task, learners should be able to formulate appropriate questions and plan an effective search strategy.	E3	**P3** Provided with a specific information retrieval task, learners should negotiate search queries and assess the accessed information for relevance.	E3	**E3** Stakeholders will jointly evaluate how comprehensively the learners have been engaged with the information literacy interaction in all three domains.
	Affective		Physical		Cognitive		Evaluative (E)
Level 4 **Problem Solving** **Objective:** **Learning to Learn** **Stakeholders:** **Facilitators in co-operation with subject Librarian**	**A4** Learners will respond positively to the challenge of evaluating substantial amounts of accessed information for relevance.	E4	**P4** Learners will be able to identify and successfully access multiple information sources relevant to a variety of problems.	E4	**C4** Learners will be able to evaluate the information content and apply the information to solve a variety of problems.	E4	**E4** Stakeholders will jointly evaluate learners' progress through information literacy interventions, across all three domains.

The recommended application of the EO Taxonomy for future evaluations is that individual domains should still initially be identified as potential strengths or weaknesses independent of the evaluative component. However, the analysis of the evaluative component associated with each individual affective, cognitive, and physical domain,

should follow directly after this initial analysis. The resultant evaluative effect of the analysis for a particular domain, following the overarching evaluative domain, would have to be specified clearly. Consequently the analysis of each identified domain would contain a three-fold evaluation:

a. evaluation of the domain as a potential strength or weakness depending on the intervention, independent of the evaluative component
b. evaluation on whether an evaluative component is present within the intervention to ensure that the taxonomic outcome identified in (a) has successfully been achieved
c. final evaluation of the entire domain depending on the outcome of (b), which has an overarching effect on (a) and may thus alter the initial outcome of the evaluation of (a).

An example to illustrate the concept above has been applied from chapter 6:

Table 7.3: An Example of the Application of the Re-structured EO Taxonomy

	Affective	AE	Cognitive	CE	Physical	PE	Evaluative
Level 1 Infrastructural Prerequisites							
Level 2 Orientation **Objective: Introduction to the Concept of Information Literacy** **Stakeholders: Library**			C2 Learners will acquire information-relevant terminology and be able to comprehend information-relevant distinctions.	CE			*E2* The library will implement a program to evaluate the effectiveness of the information literacy orientation received by learners on all three domains
Level 3 Interaction							
	Affective	AE	Physical	PE	Cognitive	CE	Evaluative
Level 4							

■ = dark shading indicates areas of potential strength of the e-learning intervention, identified by 5objectives of the intervention

□ = light shading indicates areas of potential weakness of the e-learning intervention

AE = affective evaluative domain

CE = cognitive evaluative domain

PE = physical evaluative domain

Table 7.3 above illustrates the effect of C2, the cognitive domain at the orientation level, identified most often during the analysis of the objectives into the EO taxonomy (five objectives identified this domain). Applying the three-fold evaluation:

a. The objectives, classified as C2, identified C2 as a potential strength of the intervention, however,

b. due to the absence of an evaluative component the evaluative domain was identified as a weakness, and thus

c. the initial result was re-assessed and finally evaluated as a potential weakness.

Table 7.4: An Example of the Application of the Re-Structured EO Taxonomy: Summary of the Effect of the Overriding Potential Weakness' of the Evaluative Domain on the Overall Evaluation

	Affective	AE	Cognitive	CE	Physical	PE		Evaluative
Level 1 Infrastructural Prerequisites **Objective: Provision of Adequate Resources for information Literacy Development** **Stakeholders: Institution**	A1 Provided with adequate information literacy training and a support infrastructure, facilitators will accept their role in the provision of information literacy education.		C1 Commitment from the institutional decision-makers for the promotion of information literacy will be evident in all policy forums and policy documentation.		P1 The institution will provide adequate resources and the infrastructure required for the successful implementation of the information literacy intervention.			E1 An evaluation programme covering all institutional stakeholders involved with promoting the information literacy will be implemented.
Level 2 Orientation **Objective: Introduction to the Concept of Information Literacy** **Stakeholders: Library**	A2 Learners will evidence an awareness of the general need for information in academic and social life.		C2 Learners will acquire information-relevant terminology and be able to comprehend information-relevant distinctions.		P2 Learners will be able to access and retrieve information from the various electronic and non-electronic information sources available in the library.			E2 The library will implement a program to evaluate the effectiveness of the information literacy orientation received by learners on all three domains.
Level 3 Interaction **Objective: Information Access & Retrieval** **Stakeholders: Facilitators in co-operation with subject Librarian**	A3 Learners will be able to confidently identify specific information needs required to complete a subject-specific information retrieval task/ assignment.		C3 Given the subject-specific information retrieval task, learners should be able to formulate appropriate questions and plan an effective search strategy.		P3 Provided with a specific information retrieval task, learners should negotiate search queries and assess the accessed information for relevance.			E3 Stakeholders will jointly evaluate how comprehensively the learners have been engaged with the information literacy interaction in all three domains.
	Affective	**AE**	**Physical**	**PE**	**Cognitive**	**CE**		**Evaluative**
Level 4 Problem Solving **Objective: Learning to Learn** **Stakeholders: Facilitators in co-operation with subject Librarian**	A4 Learners will respond positively to the challenge of evaluating substantial amounts of accessed information for relevance.		P4 Learners will be able to identify and successfully access multiple information sources relevant to a variety of problems.		C4 Learners will be able to evaluate the information content and apply the information to solve a variety of problems.			E4 Stakeholders will jointly evaluate learners' progress through information literacy interventions, across all three domains.

- ☐ = indicates areas not addressed by the intervention, identified as weaknesses
- ☐ = light shading (15%) indicates areas identified as potential weakness of the e-learning intervention
- ▩ = medium shading (25%)indicates individual domains initially identified as potential strengths of the e-learning intervention,
- ▩ = heavy shading (35%) indicates evaluative domains identified as potential weaknesses/weaknesses of the e-learning intervention, which has an overarching effect on the outcome.

The recommendation is that each aim/objective of the intervention still be analysed into the Taxonomy as suggested in Table 7.3 and that a summary of the potential strengths, potential weaknesses, and weaknesses (due to absence of an evaluative component) using the re-structured EO Taxonomy be presented at the end of the analysis summarising the final results as illustrated in Table 7.4.

7.5 The Way Forward

Infolit has lead the way of initiating an awareness towards information literacy throughout the Western Cape in terms of:

- completing a needs analysis of information literacy amongst learners
- the development of information literacy pilot projects amongst the five institutions of Higher Education
- identification of the Cape Technikon's e-learning information literacy intervention as the model project for wider implementation amongst other institutions
- encouraging communication and the exchange of ideas on information literacy amongst institutions.

On the basis of the evaluation, the potential value of implementing the e-learning intervention at the Cape Technikon and, through Infolit at other institutions, has been recognised. Recommendations have been made based on the results of the evaluation, that the course content should be re-structured to meet the all the outcomes identified by the EO taxonomy. The intervention would have to look at the following taxonomic areas:

- the evaluative domain - many of the taxonomic outcomes, initially identified as potential strengths, were reduced to weaknesses only due to the absence of an evaluative component
- institutional prerequisites
- incorporation of the physical domain into the intervention
- problem-solving approach, which is encouraged over a range of assignments/information retrieval, tasks.

The area of training both facilitators and librarians to adopt aspects of the others' field of expertise will require further research. It is unrealistic to expect that librarians to be adequately prepared to facilitate learners or facilitators when their area of expertise is information science and not education. Conversely, it is unrealistic to expect facilitators to be able to confidently convey complex information literacy skills. Research should focus on developing and implementing such training workshops, which should precede the implementation of the accredited information literacy course.

The extent to which the recommended course integrated and credit-bearing approach to information literacy may be implemented requires further research. Factors contributing to the successful implementation would have to be considered and their effect included in the research. These factors may include:

- applying the EO Taxonomy as a formative guide during the development of the initiative,
- investigating the extent to which the e-learning intervention could be implemented to contribute towards information literacy,
- applying the EO taxonomy for the summative evaluation,
- investigating the extent to which this approach could be adopted for the successful integration into various different faculties.

The research should focus on the extent to which such a programme could be implemented on a practical level and include the training programme for both facilitators and librarians. Factors affecting the practical implementation would have to be considered:

- the status of library staff,
- orientation of large numbers of learners in a small space of time;
- access to computer facilities on campus (and off campus), particularly for disadvantaged learners;
- accreditation issues and the changes in curriculum that this would require;
- evaluation issues, including the tremendous problem of electronic plagiarism.

Finally, the taxonomic approach has provided a method to approach the evaluation of learners in a holistic manner – including affective, cognitive and physical domains. Further research is required into evaluating learners adequately in terms of all three behavioural taxonomic domains, and not just the physical and cognitive domain, as is so

often done (by means of an information retrieval task/assignment). Nahl has pioneered research into the extent to which learners' attitudes could be evaluated, particularly as the affective domain is the initiating behavioural domain (Nahl & Tenopir, 1996; Nahl & James, 1997). However, in the South African context this area still requires extensive investigation. Furthermore, the extent of evaluating the higher order cognitive skills in terms of specified outcomes, as presented in this study, similarly requires further investigation.

7.6 Conclusion

This quotation was selected as it so aptly expresses the importance of being information-literate in today's fast paced world (Perelman, cited in McCuaig 2000):

"Learning is what most adults will do for a living in the 21st century."

As educators we have a responsibility to ourselves and to our learners to keep in touch with the latest developments in our field of study – not always an easy task, which is why the quotation above is so appropriate. Our task is to ensure that our learners have successfully achieved the outcomes required for their careers at the time that they exit Higher Education. As importantly, is that they be equipped with the life skill of information literacy to cope with the rapid developments in their field of study as the information explosion continues to escalate.

This challenge is not one that can be mastered by one stakeholder in isolation as has been clearly demonstrated by this study. The co-operation and commitment of institutional decision makers, administrators, librarians, facilitators, and ultimately learners is required. Failure to support information literacy will have repercussions on all stakeholders as poor performance of graduates in industry will not only have a negative economic effect on industry, but also reflect poorly on the entire institution, and on a national scale, the entire country.

If we want to contribute towards the success of SAQA and a re-structuring of the Higher Education system in South Africa, it is time to accept the challenge to become actively involved towards contributing the academic health and economic wealth of the country.

BIBLIOGRAPHY

Some sources are not referred to directly in the text but were consulted in the course of the study. These sources are marked with * at the end of the reference.

African National Congress (ANC) Education Department. 1995. *A Policy Framework for Education and Training.* Manzini: Macmillan.

Albrecht, K. *2001. The True Information Survival Skills.* Training & Development: *24-30, February.*

Alreck, P. & Settle, R. 1985. *The Survey Research Handbook.* Homewood: Richard D. Irwin.*

American Library Association (ALA). Undated. *Presidential Committee on Information Literacy: Final Report,* 1.

Association of College and Research Libraries (ACRL). 2000. *Information Literacy Competency Standards for Higher Education.* [Online]. Available: http://www.ala.org/acrl/ilcomstan.html [2 March 2001].

Baer, W. 1999. E-Learning: A Catalyst for Competition in Higher Education. *IMP: Information Impacts Magazine* [Online]. June. Available: http://www.cisp.org/imp/june_9906baer.html [September 2001].

Behrens, S. 1993. User Education at Tertiary Level: A Review of Recent Literature. *South African Journal of Library and Information Science,* 61(3): 124-130.

Behrens, S. 1994. A Conceptual Analysis and Historical Overview of Information Literacy. *College & Research Libraries:* 309-322, July.

Bloom, B. (ed.). 1956. *Taxonomy of Educational Objectives: The Classification of Educational Goals: Handbook I, Cognitive Domain.* [Online]. Available: http://www.coun.uvic.ca/learn/program/hndouts/bloom.html/ [29 July 2001].

Bloom, B. (ed.). 1973. *Taxonomy of Educational Objectives: Book 1-Cognitive Domain.* London: Longman.

Breivik, P. 1998. *Student Learning in the Information Age.* Phoenix: Oryx Press.

Breivik, P. & Gee, E. 1989. *Information Literacy: Revolution in the Library.* London: Collier Macmillan.

Bruce, C. 1994. Griffith University Information Literacy Blueprint. In *The Learning Link: Information Literacy in Practice.* Booker, D. (ed.). Adelaide: Australian Library Press. pp. 4 – 16.

Bruce, C. 1999. *Information Literacy: An International Review of Programs and Research.* Paper presented at the LIANZA Conference, Auckland, 9 – 12 November. [Online]. Available: http://www.auckland.ac.nz/lbr/conf99/bruce.html [19 March 2001].

Candy, P., Crebert, G. & O'Leary, J. 1994. *Developing Lifelong Learners Through Undergraduate Education.* Canberra: Higher Education Council.*

Carstens, K. 2001. The Status of Information Literacy at the Cape Technikon. Telephone conversation with Secretary of Senate on 25 August. Cape Technikon, South Africa.

Cape Technikon. Library Services. 2000. *Annual Report.* [Unpublished.]

Cape Technikon. Library Services. 2001. CALICO – The Ideas and the Benefits. In *Cape Technikon Library Services* [Online]. Available: http://infpcats.ctech.ac.za/abcalic.html. [31 March 2001].*

Cape Technikon. Teaching and Learning Centre. 1996/7. *The Integrated First Year Experience (IFYE): User Manual.* [Unpublished.]

Coetzee, A. 1997. Towards Information Literacy Using the Integrated First Year Experience Programme. Director of Library Services interviewed by writer on 20 February. Cape Technikon, South Africa.

Coetzee, A. 2001. Implementing Information Literacy at the Cape Technikon Using the E-learning Initiative. Director of Library Services interviewed by writer on 28 September. Cape Technikon, South Africa.

Cohen, L. & Manion, L. 1994. *Research Methods in Education.* 4th ed. London: Routledge.

Cooper, G. 1997. *Guidelines on Learning Skills.* University of Australia. [Online]. Available: http://www.acs.uwa.edu.au/csd/tt/learnskillsguidelines.html [4 May 1997].

Curzon, S. 1995. *Information Competence in the CSU: A Report.* Submitted to the Commission on Learning Resources and Instructional Technology, by the Work Group on Information Competence CLRIT Task 6.1, December.

Directory of Online Resources for Information Literacy. 2000. *Definitions of Information Literacy and Related Terms.* [Online]. Available: http://nosferatu.cas.usf.edu/lis/il/definitions.html [2 March 2001].*

Dunne, S. 1995. *Interviewing Techniques for Writers and Researchers.* London: Black.*

Evans, D. 1994. *People and Communication.* 2nd ed. London: Pitman.

Fang, P. & Callison, D. 1990. User Education in Academic Libraries of China, *International Library Review,* 22: 95-103.

Favish, J. 2001. Information Literacy as a Community Resource. Telephone conversation with the Director of Institutional Research and Planning on 15 October. Cape Technikon, South Africa.

Fisch, E. 1999. Evaluating Information Literacy Programmes. In *CRIG Annual User Education Seminar.* [Online]. Available: http://acoca.vicnet.net.au/~caval/fisch-crig99.html [19 March 2001].

Ford, D. 1997. Data Smog. *Sunday Life,* supplement to *The Sunday Argus,* 15 June: 16.

Ford, N. 1979. Towards a Model of 'Library Learning' in Educational Systems. *Journal of Librarianship*, 2: 247 – 60, October.

French, D., Hale, C., Johnson, C. & Farr, G. (eds.). 1999. *Internet (Based) Learning: An Introduction and Framework for Higher Education and Business.* London: Kogan Page.

Hade, H. 1982. In Information Literacy in the Educational Process. *The Educational Forum,* 57:315, Winter. Lenox, M. & Walker, M. 1993.

Hague, P. 1993. *Questionnaire Design.* London: Kogan Page.*

Halsey, A. 1972. Educational Priority: Problems and Policies. In *Research Methods in Education. 4th ed.* Cohen, L. & Manion, L. 1994. London: Routledge. p. 186.

Hart, J. 1996/7. Getting Ready to Study. *A Proposal for a Teaching Fellowship.* Huddersfield: University of Huddersfield. [Unpublished.]

Haycock, K. 2000. Applying Research in Information Literacy. *Teacher Librarian,* (27)3: 34, February.*

Hodge, J. & Miller, J. 1996. *Information Technology in South Africa.* Cape Town: Centre for Information Systems and Graduate School of Business, University of Cape Town, October.

House, E. 1980. *Evaluating with Validity.* London: Sage.

Infolit, 1997. *Information Literacy: Student Needs Survey.* [Questionnaire].

Jacobs, V. 1997. *A Comparative Study of Information Literacy Projects in the Western Cape, South African and Information Literacy Programmes and Projects in Namibia.* Cape Town: School of Librarianship, University of Cape Town. [Internship Report- M.Bibl.].

Karelse, C. 1996. Infolit: A South African Initiative to Promote Information Literacy. In *General Conference Proceedings.* 62nd International Federation of Library Associations and Institutions Annual Conference, 25 – 31 August. [Online]. Available: http://ifla.inist.fr/IV/ifla62/62-karc.htm [19 March 2001].

Katz, R. & Oblinger, D. (eds.). 2000. *The "E" is for Everything: E-Commerce, E-Business, and E-Learning in the Future of Higher Education.* San Francisco: Jossey-Bass.

Kvale, S. 1996. *Interviews: An Introduction to Qualitative Research Interviewing.* London: Sage.*

Leibowitz, B. 1995. Transitions: Acquiring Academic Literacy at the University of the Western Cape. *Academic Development,* 1(1): 33-46.

Lenox, M. & Walker, M. 1993. Information Literacy in the Educational Process. *The Educational Forum,* 57: 312-324, Spring.

Lockhart, J. 2001. Information Literacy Process. In *Cape Technikon Library Services.* [Online]. Available: http://infocats.ctech.ac.za/infolit/infolit.html [7 August2001].

Loertscher, D. & Woolls, B. 1999. *Information Literacy: A Review of the Research: A Guide for Practitioners and Researchers.* San Jose: Hi Willow.

Marchionini, G. 1995. *Information Seeking in Electronic Environments.* New York: Cambridge University Press.

Marchionini, G. 1999. Educating Responsible Citizens in the Information Society. *Educational Technology,* (39) 2: 17-26, March/April.

Maxwell, J. 1996. *Qualitative Research Design: An Interactive Approach.* London: Sage.*

M^{c}Cade, J. & Warmkessel, M. 2001. Information Anxiety and Other Pitfalls of the Information Age. In *EDTE 590 Information Literacy: Creating Independent Learners.* [Online]. Available: http://www.millersv.edu/~jmccade/EDTE590.html [14 March 2001].

McCuaig, H. 2000. What is E-Learning? In *University of Technology Sydney: E-Learning Courses.* [Online]. Available: http://learning.uts.edu.au/what/index.html [7August 2001].

McGarry, K. 1981. *A Change in Context of Information: An Introductory Analysis.* London: Bing Pey.

McGregor, J. 1999. Teaching the Research Process: Helping Students Become Lifelong Learners. *NASSP Bulletin,* (83) 605: 20-6, March.*

Mehl, M. 1997. SAQA and the NQF: An Outsider's View. *SAQA Bulletin,* (2) 2: 10 – 18.

Nahl, D. 1997. *An Integrated Theory of Information Behaviour: Taxonomic, Psychodynamic, Ethnomethodological.* Homepage of Diane Nahl [Online]. Available: http://www2.hawaii.edu/slis/nahl/integrated_toc.html [05 March 1997].

Nahl-Jakobovits, D. & Jakobovits, L. 1987. Learning the Library: Taxonomy of Skills and Errors. *College & Research Libraries:* 204-214, May.

Nahl-Jakobovits, D. & Jakobovits, L. 1990. Measuring Information Searching Competence. *College & Research Libraries:* 448-462, September.

Nahl-Jakobovits, D. & Jakobovits, L. 1993. Bibliographic Instructional Design for Information Literacy: Integrating Affective and Cognitive Objectives. *Research Strategies II:* 73 – 88, Spring.

Nahl, D. & Jakobovits, L. 1989. *Information Searching Competence.* Hawaii: University of Hawaii. [Internal Unpublished Publication.]

Nahl, D. & James, L. 1997. *Microdescriptors of Library Research: A Longitudinal Study of the Affective, Cognitive and Psychomotor Behaviour of Users.* Homepage of Diane Nahl [Online]. Available: http://www.soc.hawaii.edu/~leonj/leonpsy/instructor/nsf.html [28 February 1997].

Nahl, D. & Tenopir, C. 1996. Affective and Cognitive Searching Behaviour of Novice End-Users of a Full-Text Database. *Journal of the American Society for Information Science*, 47(4): 276-286.

National Forum on Information Literacy. 10 April 2000. *Reports & Programs.* [Online]. Available: http://infolit.org/documents/index.html [2 March 2001].*

Nielsen, B. & Baker, B. 1987. Educating the Online Catalog User. *Library Trends*, 35(4): 571-585, Spring.*

Oppenheim, A. 1996. *Questionnaire Design, Interviewing and Attitude Measurement.* London: Pinter.*

Parsons, P. 1997. Information Literacy and the Integrated First Year Experience. Head of the Teaching Development Unit interviewed by writer on 15 February. Cape Technikon, South Africa.

Parsons, P., & Häberle, N. 1997. Evaluation of the Information Literacy Module of the Integrated First Year Experience: Implementation 1997. [Unpublished Report]. Cape Technikon: South Africa.

Rader, H. & Coons, W. 1992. Information Literacy: One Response to the New Decade. In *The Evolving Educational Mission of the Library.* Baker, B & Litzinger, M. (eds.). Chicago: American Library Association. pp. 109-125.

Rafferty, C. 1999. Literacy in the Information Age. *Educational Leadership*, (57) 2: 22-25, October.

Riley, J. 1990. *Getting the Most from Your Data: A Handbook of Practical Ideas on How to Analyse Qualitative Data.* Bristol: Technical and Education Services.*

Saracevic, T. & Kantor, P. 1988. A Study of Information Seeking and Retrieving I, II, III. *Journal of the American Society for Information Science*, 39(3): 161-176.

Sayed, Y. 1998. *The Segregated Information Highway: Information Literacy in Higher Education.* Cape Town: Infolit.

Sayed, Y. & De Jager, K. 1997. Towards an Investigation of Information Literacy in South African Students. *South African Journal of Library and Information Science*, 65(1): 5-12.

Sayed, Y. & Karelse, C. 1997. *The Segregated Information-Highway: An Assessment of Information Literacy in Higher Education.* [Summary Report.] Rondebosch, Cape Town Infolit.

Schnetler, J. (ed.). 1989. *Survey Methods and Practice.* Pretoria: Human Sciences Research Council.*

Schuman, H. & Presser, S. 1996. *Questions and Answers in Attitude Surveys: Experiments on Question Form, Wording & Context.* London: Sage.*

Smithson, S. 1994. Information Retrieval Evaluation in Practice: A Case Study Approach. *Information Processing & Management*, 30(2): 205-221.

Sonntag, G. & Ohr, D. 1996. The Development of a Lower-Division, General Education, Course-Integrated Information Literacy Program. *College & Research Libraries*: 331-338, July.

South Africa. National Commission on Higher Education. 1996a. *A Framework for Transformation.* [Report]. Pretoria: Government Printer.

South Africa. Department of Education. 1996b. *Green Paper on Higher Education Transformation: Appendix I.* Pretoria: Government Printer.

South Africa. Department of Education. 1997a. *Curriculum 2005: Lifelong Learning for the 21st Century.* Pretoria: CTP Books.

South Africa. Department of Education. 1997b. Technology-Enhanced Learning Investigation. In *Centre for Educational Technology and Distance Education.* [Online]. Available: http://pgw.org/spc/chapter03.html [7August 2001].

South Africa. Department of Education. 2001. Address by the Minister of Education. [Online]. Available: http://education.pwv.gov.za/Media/Speeches_2001/March01/Plan_HE.html [25 April 2001].

South African Qualification Authority (SAQA). 1997. *SAQA Bulletin*, 1(1), May/June.

Spady, W. 1994. *Outcomes-Based Education: Critical Issues and Answers.* Vancouver: American Association of School Administrators.

Su, L. 1992. Evaluation Measures for Interactive Information Retrieval. *Information Processing & Management,* 28(4): 503-516.

Tiefel, V. 1989. Evaluating a Library User Education Program: A Decade of Experience. *College & Research Libraries*: 249-259, March.

Tuckman, B. 1994. *Conducting Educational Research.* 4th ed. New York: Harcourt Brace College Press.

Underwood, P. 2000. Origins and Aims. In *Infolit: Information Literacy: A Project of the Adamastor Trust.* [Online]. Available: http://www.adamastor.ac.za/Academic/Infolit/origins.html [10 September 2001].

University of Cape Town. School of Librarianship. 1997. *Bibliographic Instruction.* [Pamphlet].

Waters, D. 1997. Teaching Information Literacy and Improving Student Learning. *Paper presented at the HERDSA meeting.* [Unpublished].

Welgemoed, M. 2001. Outcomes Based Education in South Africa, and the National Qualification Framework. Head of Curriculum Development interviewed by writer on 3 March. Cape Technikon, South Africa.

Western Cape. Provincial Administration. Department of Economic Affairs, Agriculture and Tourism. 2000. *Green Paper on Preparing the Western Cape for the Knowledge Economy of the 21st Century.* [Executive Summary].

Wright, L. & McGurk, C. 1999. Curriculum Based Information Literacy Skills for First Year Students. In *The Learning Link: Information Literacy in Practice.* Booker, D. (ed.). Adelaide: Australian Library Press. pp. 136 – 148.

Young, R. & Harmony, S. 1999. *Working with Faculty to Design Undergraduate Information Literacy Programs.* New York: Neal Schuman.

APPENDIX A

ACRL Association of College & Research Libraries

Association of College and Research Libraries
Information Literacy Competency Standards for Higher Education

Standards, Performance Indicators, and Outcomes

Approved by: ACRL Board, January 18, 2000.

Standard One

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

Performance Indicators:

1. The information literate student defines and articulates the need for information.

   Outcomes Include:
   1. Confers with instructors and participates in class discussions, peer workgroups, and electronic discussions to identify a research topic, or other information need
   2. Develops a thesis statement and formulates questions based on the information need
   3. Explores general information sources to increase familiarity with the topic
   4. Defines or modifies the information need to achieve a manageable focus
   5. Identifies key concepts and terms that describe the information need
   6. Recognizes that existing information can be combined with original thought, experimentation, and/or analysis to produce new information

2. The information literate student identifies a variety of types and formats of potential sources for information.

   Outcomes Include:
   1. Knows how information is formally and informally produced, organized, and disseminated
   2. Recognizes that knowledge can be organized into disciplines that influence the way information is accessed
   3. Identifies the value and differences of potential resources in a variety of formats (e.g., multimedia, database, website, data set, audio/visual, book)
   4. Identifies the purpose and audience of potential resources (e.g., popular vs. scholarly, current vs. historical)
   5. Differentiates between primary and secondary sources, recognizing how their use and importance vary with each discipline
   6. Realizes that information may need to be constructed with raw data from primary sources

3. The information literate student considers the costs and benefits of acquiring the needed information.

Outcomes Include:

1. Determines the availability of needed information and makes decisions on broadening the information seeking process beyond local resources (e.g., interlibrary loan; using resources at other locations; obtaining images, videos, text, or sound)
2. Considers the feasibility of acquiring a new language or skill (e.g., foreign or discipline-based) in order to gather needed information and to understand its context
3. Defines a realistic overall plan and timeline to acquire the needed information

4. The information literate student reevaluates the nature and extent of the information need.

Outcomes Include:

1. Reviews the initial information need to clarify, revise, or refine the question
2. Describes criteria used to make information decisions and choices

Standard Two

The information literate student accesses needed information effectively and efficiently.

Performance Indicators:

1. The information literate student selects the most appropriate investigative methods or information retrieval systems for accessing the needed information.

Outcomes Include:

1. Identifies appropriate investigative methods (e.g., laboratory experiment, simulation, fieldwork)
2. Investigates benefits and applicability of various investigative methods
3. Investigates the scope, content, and organization of information retrieval systems
4. Selects efficient and effective approaches for accessing the information needed from the investigative method or information retrieval system

2. The information literate student constructs and implements effectively-designed search strategies.

Outcomes Include:

1. Develops a research plan appropriate to the investigative method
2. Identifies keywords, synonyms and related terms for the information needed
3. Selects controlled vocabulary specific to the discipline or information retrieval source
4. Constructs a search strategy using appropriate commands for the information retrieval system selected (e.g., Boolean operators, truncation, and proximity for search engines; internal organizers such as indexes for books)
5. Implements the search strategy in various information retrieval systems using different user interfaces and search engines, with different command languages, protocols, and search parameters
6. Implements the search using investigative protocols appropriate to the discipline

3. The information literate student retrieves information online or in person using a variety of methods.

Outcomes Include:

1. Uses various search systems to retrieve information in a variety of formats
2. Uses various classification schemes and other systems (e.g., call number systems

or indexes) to locate information resources within the library or to identify specific sites for physical exploration
3. Uses specialized online or in person services available at the institution to retrieve information needed (e.g., interlibrary loan/document delivery, professional associations, institutional research offices, community resources, experts and practitioners)
4. Uses surveys, letters, interviews, and other forms of inquiry to retrieve primary information

4. The information literate student refines the search strategy if necessary.

Outcomes Include:

1. Assesses the quantity, quality, and relevance of the search results to determine whether alternative information retrieval systems or investigative methods should be utilized
2. Identifies gaps in the information retrieved and determines if the search strategy should be revised
3. Repeats the search using the revised strategy as necessary

5. The information literate student extracts, records, and manages the information and its sources.

Outcomes Include:

1. Selects among various technologies the most appropriate one for the task of extracting the needed information (e.g., copy/paste software functions, photocopier, scanner, audio/visual equipment, or exploratory instruments)
2. Creates a system for organizing the information
3. Differentiates between the types of sources cited and understands the elements and correct syntax of a citation for a wide range of resources
4. Records all pertinent citation information for future reference
5. Uses various technologies to manage the information selected and organized

Standard Three

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

Performance Indicators:

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

Outcomes Include:

1. Reads the text and selects main ideas
2. Restates textual concepts in his/her own words and selects data accurately
3. Identifies verbatim material that can be then appropriately quoted

2. The information literate student articulates and applies initial criteria for evaluating both the information and its sources.

Outcomes Include:

1. Examines and compares information from various sources in order to evaluate reliability, validity, accuracy, authority, timeliness, and point of view or bias
2. Analyzes the structure and logic of supporting arguments or methods
3. Recognizes prejudice, deception, or manipulation
4. Recognizes the cultural, physical, or other context within which the information

was created and understands the impact of context on interpreting the information

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

   Outcomes Include:
   1. Recognizes interrelationships among concepts and combines them into potentially useful primary statements with supporting evidence
   2. Extends initial synthesis, when possible, at a higher level of abstraction to construct new hypotheses that may require additional information
   3. Utilizes computer and other technologies (e.g. spreadsheets, databases, multimedia, and audio or visual equipment) for studying the interaction of ideas and other phenomena

4. The information literate student compares new knowledge with prior knowledge to determine the value added, contradictions, or other unique characteristics of the information.

   Outcomes Include:
   1. Determines whether information satisfies the research or other information need
   2. Uses consciously selected criteria to determine whether the information contradicts or verifies information used from other sources
   3. Draws conclusions based upon information gathered
   4. Tests theories with discipline-appropriate techniques (e.g., simulators, experiments)
   5. Determines probable accuracy by questioning the source of the data, the limitations of the information gathering tools or strategies, and the reasonableness of the conclusions
   6. Integrates new information with previous information or knowledge
   7. Selects information that provides evidence for the topic

5. The information literate student determines whether the new knowledge has an impact on the individual's value system and takes steps to reconcile differences.

   Outcomes Include:
   1. Investigates differing viewpoints encountered in the literature
   2. Determines whether to incorporate or reject viewpoints encountered

6. The information literate student validates understanding and interpretation of the information through discourse with other individuals, subject-area experts, and/or practitioners.

   Outcomes Include:
   1. Participates in classroom and other discussions
   2. Participates in class-sponsored electronic communication forums designed to encourage discourse on the topic (e.g., email, bulletin boards, chat rooms)
   3. Seeks expert opinion through a variety of mechanisms (e.g., interviews, email, listservs)

7. The information literate student determines whether the initial query should be revised.

   Outcomes Include:
   1. Determines if original information need has been satisfied or if additional information is needed
   2. Reviews search strategy and incorporates additional concepts as necessary

3. Reviews information retrieval sources used and expands to include others as needed

Standard Four

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

Performance Indicators:

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

   Outcomes Include:
   1. Organizes the content in a manner that supports the purposes and format of the product or performance (e.g. outlines, drafts, storyboards)
   2. Articulates knowledge and skills transferred from prior experiences to planning and creating the product or performance
   3. Integrates the new and prior information, including quotations and paraphrasings, in a manner that supports the purposes of the product or performance
   4. Manipulates digital text, images, and data, as needed, transferring them from their original locations and formats to a new context

2. The information literate student revises the development process for the product or performance.

   Outcomes Include:
   1. Maintains a journal or log of activities related to the information seeking, evaluating, and communicating process
   2. Reflects on past successes, failures, and alternative strategies

3. The information literate student communicates the product or performance effectively to others.

   Outcomes Include:
   1. Chooses a communication medium and format that best supports the purposes of the product or performance and the intended audience
   2. Uses a range of information technology applications in creating the product or performance
   3. Incorporates principles of design and communication
   4. Communicates clearly and with a style that supports the purposes of the intended audience

Standard Five

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

Performance Indicators:

1. The information literate student understands many of the ethical, legal and socio-economic issues surrounding information and information technology.

   Outcomes Include:
   1. Identifies and discusses issues related to privacy and security in both the print

and electronic environments
2. Identifies and discusses issues related to free vs. fee-based access to information
3. Identifies and discusses issues related to censorship and freedom of speech
4. Demonstrates an understanding of intellectual property, copyright, and fair use of copyrighted material

2. The information literate student follows laws, regulations, institutional policies, and etiquette related to the access and use of information resources.

Outcomes Include:

1. Participates in electronic discussions following accepted practices (e.g. "Netiquette")
2. Uses approved passwords and other forms of ID for access to information resources
3. Complies with institutional policies on access to information resources
4. Preserves the integrity of information resources, equipment, systems and facilities
5. Legally obtains, stores, and disseminates text, data, images, or sounds
6. Demonstrates an understanding of what constitutes plagiarism and does not represent work attributable to others as his/her own
7. Demonstrates an understanding of institutional policies related to human subjects research

3. The information literate student acknowledges the use of information sources in communicating the product or performance.

Outcomes Include:

1. Selects an appropriate documentation style and uses it consistently to cite sources
2. Posts permission granted notices, as needed, for copyrighted material

APPENDIX B

INFORMATION LITERACY / RETRIEVAL

Billiton

AIM OF THIS EXERCISE:

Aim of the module:

1 to expose students to the basic ways in which information **can be useful to them now, and to indicate how important it is in their ultimate careers**

2 **to overcome the initial fear** and bewilderment that students experience in having to use information and the library, and help them form a positive attitude to information use

3 to bring all first-year students to a **functionally sufficient level of information literacy**, particularly those students from a disadvantaged educational background where they were not adequately exposed to basic information/library use and retrieval techniques.

4 to create a realistic opportunity for students **to experience first-hand the essential information problems and solutions** in the academic context

5 to convey to students an understanding of the **facilities** of a modern tertiary academic library

TIME REQUIRED FOR THIS EXERCISE:

Time required:

- Some time, spent with a subject librarian, to ensure that enough information resources in the various departments of the Library will be available;
- one lecture for sketching the background by means of the transparencies, setting the assignment and

- forces them to think about the processes of
  - using an academic library's basic services
  - searching for potentially useful resources, and
  - choosing the most appropriate information

- allows them to convert the information into own knowledge

- inculcates the essential methodology in information retrieval and use.

CHOICE OF TOPIC

At the outset the lecturer **would select a topic for a written assignment** that would satisfy the following criteria:

- it should cover/touch on a topic already included in the syllabus, to add to the realism of the exercise;

- an aspect of the topic, such as the theory or history, should ideally be touched on in the prescribed textbook and/or notes used by the students, but it should not provide them with all the information they would require;

- it should result in an essay of about 500 to 1 000 words (roughly 1.5 to 3 typed pages), so that students are forced to synthesise from a number of resources instead of just copying simple data which, in the experience of the Librarians, they will copy from one another;

- care should be taken to ensure that there are information resources available on the topic in the library - contact the Librarian to help on this;

- arrangements should be made with the Library to place the most important resource(s), that all of the group must read and that by itself should be sufficient information to write an acceptable essay, on the Shortloan (reserve) shelf. Contact the Librarian to do this for you;

- since the students would be directed to the reference section, to the lending collection as well as to the periodicals and video collections, it would be advantageous if a topic could be selected for which information resources in all these categories are available in the Library - again the Librarian

the lecturer convey these points the transparencies cover some of the information trends and also the changes that have shaped the information aspects of work as we experience it today.

The transparency showing random examples of information in the workplace is intended to indicate the many information challenges facing workers in all spheres of the economy. Should the lecturer wish to discuss these, it may be useful to explain to students that they, as people with a tertiary training, will one day in the workplace be called on to develop some of these, or will be called on to install/create some of these, and often will be asked to make it work for the other people in the organisation. They will have the competitive edge if they have a better background about the concepts underlying information-related tasks/functions.

Then hand out to students the more comprehensive **Assignment Plan (Handout 2)** and explain to them that they will fill out the questions, and will hand the Assignment Plan back, attached to their essays. They will also be doing **printouts of catalogue searches** that they would have to hand in as a check that they did do it and that it is their own work.

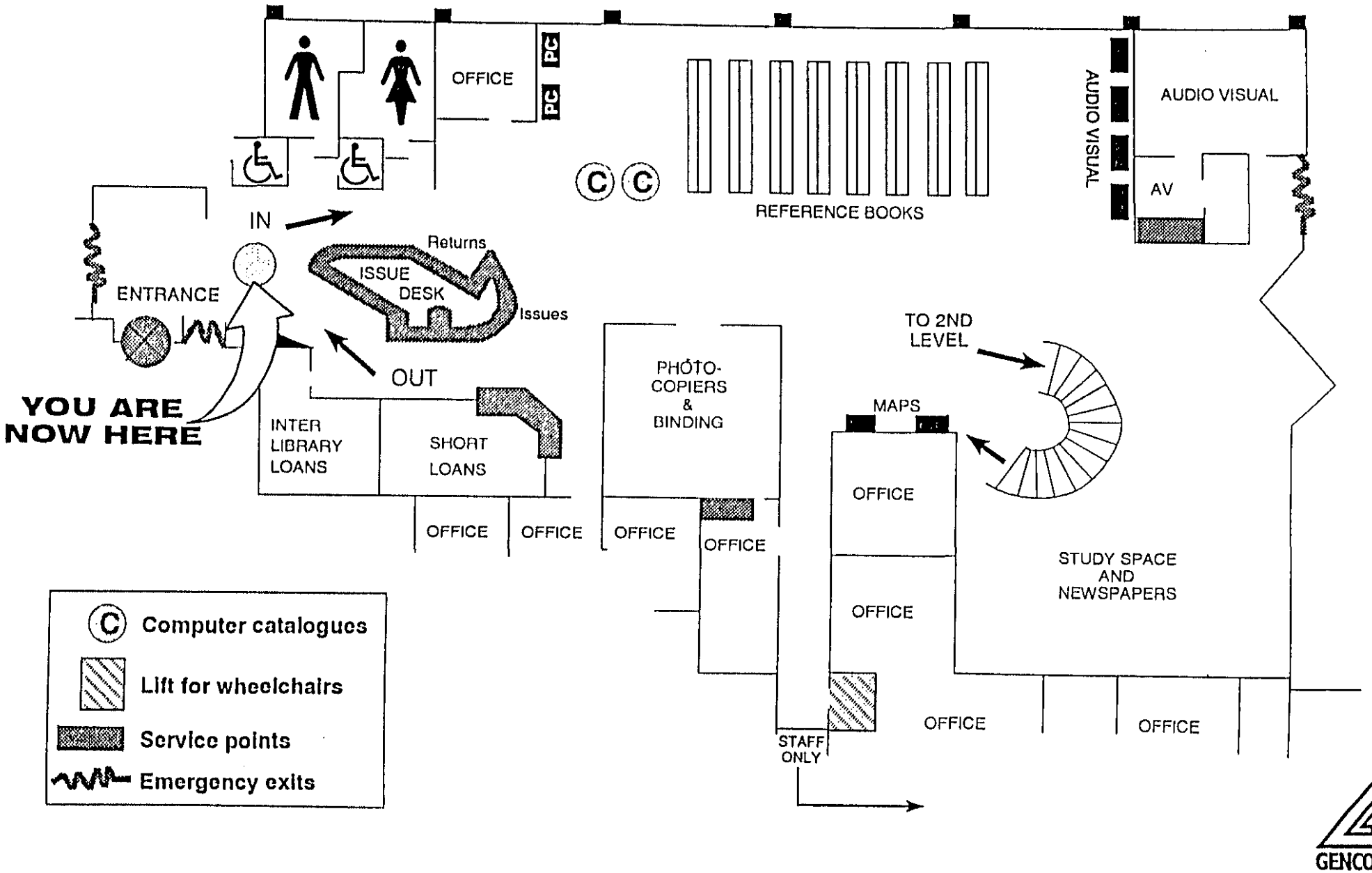
UPON RETURN OF THE ASSIGNMENT

By the time the assignments are handed in to you, your students will have worked through the process in a systematic way, and should have gained experience that will be invaluable to them in their studies. Their **completed Assignment Plans**, the **catalogue printouts** and the **brief essays** should give you enough indicators that they have performed the various steps successfully, and that they have therefore systematically been exposed to the key matters such as information retrieval and evaluation of the usefulness of various resources.

You may review/mark the assignments in any way that you see fit, and you may choose to assign marks or omit doing so. This would depend on you syllabus requirements.

Since the last page of the Assignment Plan contains useful feedback to the Library, the Library would ask that you tear off this page and forward it to the Library. The intention is that the Library staff will adjust their support as a result of the feedback. Furthermore, the feedback may lead to improvements in the format.

LOWER LEVEL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AND
NEWSPAPERS
STAFF
ONLY
OFFICE
OFFICE
C Computer catalogues
Lift for wheelchairs
Service points
Emergency exits
GENCOR

Handout 1

Assignment Sheet 1
Summary of Assignment Plan

Assignment topic	.....
Steps	1 Scan the Assignment Plan to familiarise yourself with the overall requirements. 2 Scan the supplemental resources 3 Keywords 4 Using the prescribed textbook/course notes as information resources 5 Refining your keywords 6 The catalogue search 7 Selecting useful resources 8 Find the resources and evaluate 9 Preselected resources 10 Follow new leads 11 Finalise your essay 12 Fill out Assignment Plan 13 Review the process 14 Hand in to lecturer

Handout 2

ASSIGNMENT PLAN

Assignment: .....
.....

Student's name:.....
Student no.....

This Assignment Plan contain the step-by-step instructions for completing the assignment. Remember that you must work on your own throughout, although you may ask the advice of the Library staff or your lecturer at any stage. Each student's answers will be different, and this is fine. What is important though is that you work through all of the process yourself.

You may now proceed with Step 1 below.

Step 1

Read through the Assignment Plan to familiarise yourself with the overall requirements. It will guide you through the steps of your assignment. As the last step of your assignment you will be required to answer some questions relating to your assignment. These answers are important, and your completed Assignment Plan must be handed in with your essay (available from the Library).

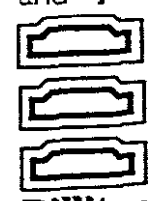
Step 2

Briefly scan the supplemental resources that you might find useful. These are:

- Library floor plan
- the booklet "Using the Library"

Step 3 formulate your initial keywords.

Working on your own, analyze the assignment topic to determine the important concepts. These, known as keywords, are the terms that you will use when searching for information. If you have difficulty with these, obtain assistance from a Librarian. In deciding your initial keywords you should look only at the title of your assignment. Eg. in the title "Mining in protected areas", your keywords might be "mining", "mines", "mineral exploitation", "protected areas", "game reserves" and "nature reserves".



Now back to the assignment topic: My keywords for this assignment are: . . . . .
. . . . . .
. . . . . .
. . . . . .

Step 4 The textbook / course notes

Still working on your own, and using the prescribed textbook and/or your course notes as information resources, see to what extent the notes and/or textbook will provide you with a sufficient answer to your information need. A sufficient answer means that you have enough information to complete the assignment. Even if you feel that you have found enough information in the textbook, you are still required to proceed with the other steps.

Has the textbook/notes provided you with enough information, and why do you say that? . . . . . .
. . . . . .
. . . . . .
. . . . . .
. . . . . .

Step 5 Refining your keywords

Based on the information that you obtained in your prescribed textbook, can you now refine your set of keywords by deleting inappropriate keywords or by adding further keywords? You may answer the question by completing the following:

Keywords in 3 above that are inappropriate :
. . . . . .
. . . . . .
. . . . . .

Additional keywords that might be useful to obtain more information: . . . . . .
. . . . . .
. . . . . .
. . . . . .
. . . . . .

Step 6 The catalogue search

You should now go to the Library and search the computerised catalogue, known as the OPAC, to determine what resources the Library has that can be found using your keywords.

The OPAC (Online Public Access Catalogue) presents you with a number of ways in which you can search for (retrieve) documents. Please explore the options at your leisure, and ask for assistance from any Librarian if you need anything explained.

For the purpose of your assignment, you should in any case search by means of the "Subject Search" option, using your keywords. For each keyword that you search with, you should print the results using the on-screen options. Attach these printouts to your Assignment Plan - the printouts should also be handed in.

When looking at the OPAC screen or the printout, you should find the "Status" of each item. The "Status" message indicates in which collection the specific item is, and if it is currently "On Shelf" or "Issued" to another user.

The OPAC covers all the books, periodicals and videos in the collection of the Cape Technikon Library.

Step 7 Selecting the really useful resources for your purpose

Identify the most promising books, journals and videos by reviewing the titles on the catalogue printout, and eliminating those that clearly are not going to help you. Cross those out.

Step 8 Finding the physical resources and evaluating the content

Using the list of additional resources that you have made during the catalogue search, find each item on the shelves.

To find the actual books/periodicals, you will use the Dewey Decimal Classification system. This system basically means that each book is assigned a number that describes the subject content of the book.

The Dewey concept is fairly simple: all knowledge is divided into the ten main classes, each being further subdivided into ten sub-classes. Each of these is again sub-divided into ten classes.

The ten main classes

000 Generalities
100 Philosophy and Psychology
200 Religion
300 Social sciences
400 Language
500 Natural sciences and maths
600 Technology (Applied sciences)

Billiton

Example of division of the 600's main class (sub-classes)
610 Medical sciences
620 Engineering and Allied operations
630 Agriculture
640 Home economics
650 Management and Auxiliary services
660 Chemical engineering
Example of further division (of the 660's) (sub-sub-classes)
661 Industrial chemicals technology
662 Explosives, fuels technology
663 Beverage technology
664 Food technology
665 Industrial oils, fats, waxes, gases
666 Ceramic and allied technologies
667 Cleaning, colour, related technologies
668 Technology of other organic products
669 Metallurgy
670 Manufacturing
680 Manufacture for specific uses
690 Buildings
700 The arts
800 Literature and rhetoric
900 Geography and history

The Dewey numbers are often extended, eg 615.03 APT. Look at the structure of the number. It is in the 600 class, i.e. in the Technology main class. It is in the 610 sub-class, meaning that it is in the Medical sciences subdivision. It is in 615, indicating that it is in Pharmacology and therapeutics. The extension further defines aspects in this topic. In the example above, the 03 indicates that it is a dictionary or an encyclopedia.

Many such extensions exist. Typically you will see extensions such as:
05 Periodicals
09 the history of the topic
068 management of the topic
07 education/research
076 Review and exercise, i.e. workbooks etc.

The three letters at the end assist in filing only, and indicate the author, or if there is an editor, the first three letters of the title.

It is important that you understand the concept, but not that you try to remember these numbers. The OPAC will always tell you the number(s) based on your keyword search. As you get to use the library for your studies, you will get to know

Billiton

The OPAC (Online Public Access Catalogue) presents you with a number of ways in which you can search for (retrieve) documents. Please explore the options at your leisure, and ask for assistance from any Librarian if you need anything explained.

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Example of division of the 600's main class (sub-classes)

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620 Engineering and Allied operations
630 Agriculture
640 Home economics
650 Management and Auxiliary services
660 Chemical engineering

Example of further division (of the 660's) (sub-sub-classes)

661 Industrial chemicals technology
662 Explosives, fuels technology
663 Beverage technology
664 Food technology
665 Industrial oils, fats, waxes, gases
666 Ceramic and allied technologies
667 Cleaning, colour, related technologies
668 Technology of other organic products
669 Metallurgy

670 Manufacturing
680 Manufacture for specific uses
690 Buildings

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It is important that you understand the concept, but not that you try to remember these numbers. The OPAC will always tell you the number(s) based on your keyword search. As you get to use the library for your studies, you will get to know

some of the numbers where items in your field of interest are kept. Browsing in that part of the collection is fine, but never totally rely on browsing, since many books cover more than one field of knowledge and might just be placed at one or another number. An example is the book "Computers in Management" This could be under 004 or 658, depending on what aspect is dominant. Another way of looking at this example is to say that if you are interested in the problem of how managers use computers, you would miss important resources by just looking at the resources at one of the two numbers. Always use the OPAC!

The Dewey number system has one primary function: it is a finding mechanism, because the books are shelved in the order of the Dewey numbers.

Now to find the resources that you have identified in step 7, go to the shelves and search for them. Ask a Librarian to help you if necessary.

Once you have found a book, scan its contents to determine the usefulness of each to your assignment. Use the Table of Contents in the front of the book, and also the Index at the back of the book, to get to the pages that might be of interest. You are now evaluating the information contained in the book. Review all your selected books this way.

Then select the best resources for use in writing your essay.

Ensure that you utilise at least:

- two books from the lending collection
- at least one periodical article
- a dictionary (kept in the reference section)
- an index (ask a librarian to help you on this)
- a general encyclopedia (available in the reference section) and
- a subject-specific encyclopedia (also in the reference section).

The Library staff can guide you if you need assistance.

Step 9 Preselected resources in the Shortloan Section

Some resources are considered so important to the assignment that you are now doing that your lecturer has reserved them by arranging that they be kept on the shortloan shelves for use by all students doing the assignment. These items may be used for a short period only, and only in the Library. Return them as soon as possible to the Shortloan Section, to give everyone a chance to use them.

You should now go to the Shortloan Section and consult these resources.

Using the resources held for this assignment in the Shortloan Section, begin workin

on your essay. Remember to keep a list of the resources that you use as the beginnings of your "Bibliography". Each of the resources you use in your assignment must be listed in the Bibliography at the end - it is an essential aspect of intellectual honesty!

The format for your Bibliography must conform to an accepted method. Many standardised methods exist, and your lecturer may prescribe a specific one. In the latter case you should follow the lecturer's instructions. Either way you must use the method consistently throughout your Bibliography.

One commonly-used method is known as the Harvard method. In this method, you describe the resources as follows:

Books, video's and other monographic resources (published once in its entirety)

Single author

HASTINGS, K. B. 1994. Current issues in organizations. New York, Heinemann.

Two or three authors

BEALE, K., RONSON, R.Q. & MILLER, S. 1995. The environment. 5th ed. Boston, Harcourt.

More than three authors

List the first author's surname and initial(s), and et.al.
e.g.

SIMPSON, B. et. al. 1992. The Principles...

Non-personal author (note that this example illustrates video)

TRANS WORLD INTERNATIONAL. 1993. What they still don't teach you at Harvard Business School. Video. Los Angeles, TWI.

Unpublished lecture notes

BOON, J. A. 1995. Information retrieval 4. Unpublished lecture notes. University of Pretoria, Pretoria.

Encyclopaedias with authors not named

Encyclopaedia Britannica. 1992. Information systems. Encyclopaedia Britannica, Seattle.

Newspapers

The Argus. 1993. Environmental group formed. 17 July. Cape Town.

Articles in journals (Note: the same rules as above about the number of authors apply)

VAN DER MERWE, S. W. 1995. Affirmative action and labour disputes. Personnel Management Quarterly, (16:3), 47 - 55.

Note that, as in the above example, with all journals the volume (i.e. Volume 16) and the edition number (i.e. Number 3), as indicated on the jounal itself, must be stated.

Step 10 Exploring new leads

As you progress, you may discover new concepts. These may be useful keywords for further searching to get more precisely to information of use to you. Feel free to explore these further by going back to Step 6 to find resources on the new aspect(s).

Step 11 Finalise your essay

Now, based on the useful information that you found, you can finalise your essay.

Step 12 Write up your Bibliography

The Bibliography is the final, but very important, part of your essay. In it you list all

the useful resources that you consulted and finally used in preparing your essay.

The following example illustrates what your Bibliography should look like. Note the alphabetical order according to the author's name.

Bibliography

AITCHESON, M. 1993a. Protectionist policies.
South African Nature Conservation Journal, (16:1) 13-16.

AITCHESON, M. 1993 b. Conservation versus development. New Yourk, McGraw Hill.

DELPORT, R.T. 1991. Mining in St. Lucia estuary. Conserva (2.4) 16.

HASTINGS, R & ANDERSON, S.N. Developmental options in South African reserves. Environmental policy quarterly (13:11) 167-169. etc.

Step 13 Reviewing the process

Go over the entire process to ensure that you have answered all the questions and that you have attached the printouts to this Assignment Plan.

Now finally answer the questions on the following page. This page will be forwarded to the Library anonymously, so that they can improve the practical aspects of the module. Please give your frank opinions.

ANONYMOUS

How often did you need assistance from the librarians?

Not at all	Occasionally	Quite often	Throughout

What are your impressions of the assistance by the Librarians? .....

.....

.....

.....

What step of the assignment proved to be the most difficult, and why? .....

.....

.....

.....

How many hours in total did it take you to complete this assignment? .....

Did you make any mistakes or errors in the process? Briefly tell us: .....

.....

.....

.....

What matters/processes/instructions are still not clear to you? .....

.....

.....

.....

.....

How much have you learnt during the course of this module?

Nothing	Very little	Considerable amount	It was all new

What did you like about the module? .....

.....

.....

.....

What did you not like? .....

.....

.....

.....

Any other comments or suggestions? .....

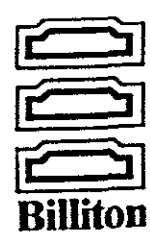
.....

.....

Transparency 1

Assignment Sheet 1
Summary of Assignment Plan

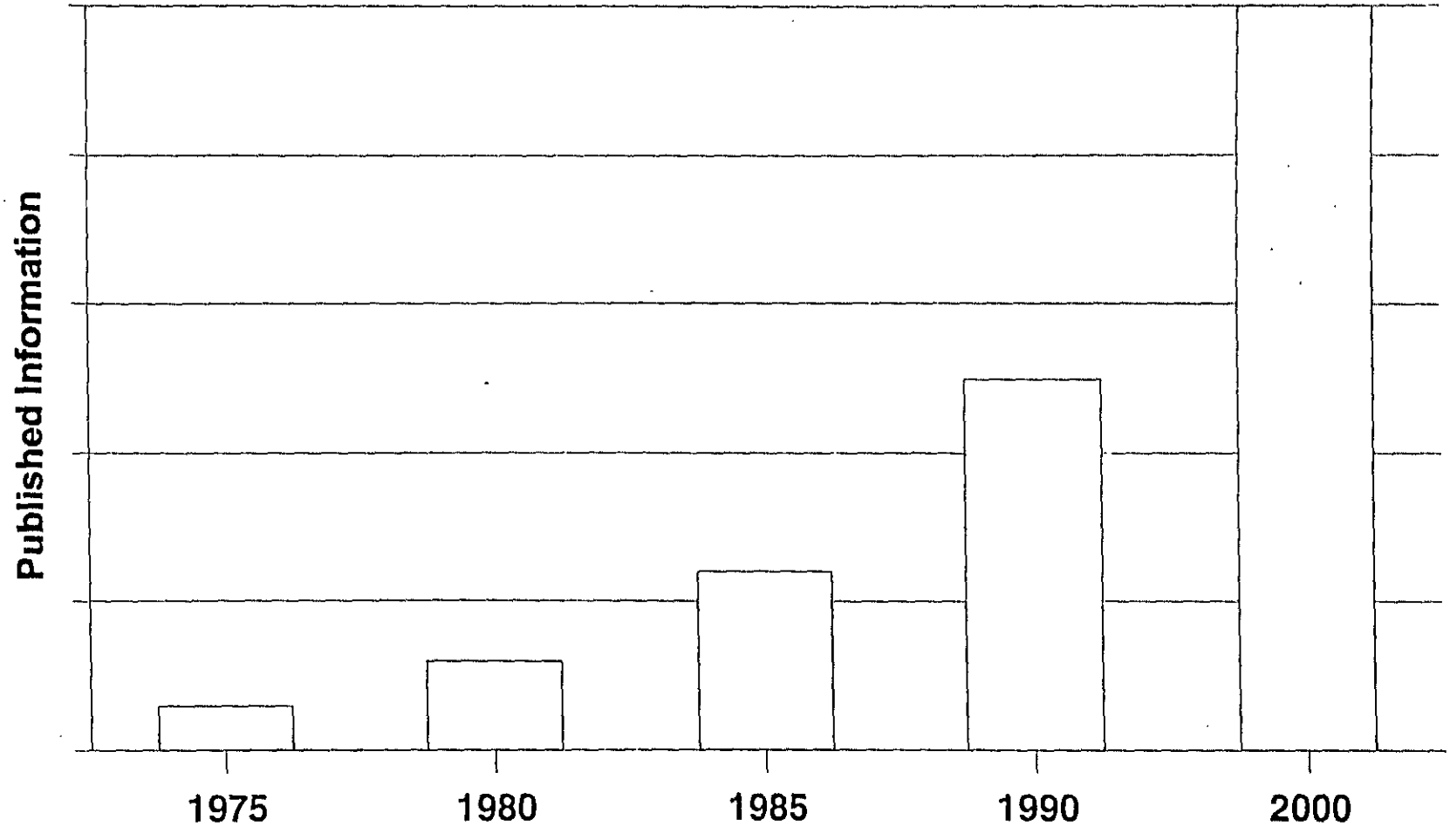
Assignment topic	.....
	1 Scan the Assignment Plan to familiarise yourself with the overall requirements 2 Scan the supplemental resources 3 Keywords 4 Using the prescribed textbook/course notes as information resources 5 Refining your keywords 6 The catalogue search 7 Identify resources 8 Find the resources, evaluate and select 9 Follow new leads 10 Finalise your essay. 11 Do your Bibliography 12 Fill out Assignment Plan 13 Hand in to lecturer



Transparency 2

INFORMATION TRENDS (1)

- It has been estimated that the amount of published information created globally doubles in less than five years

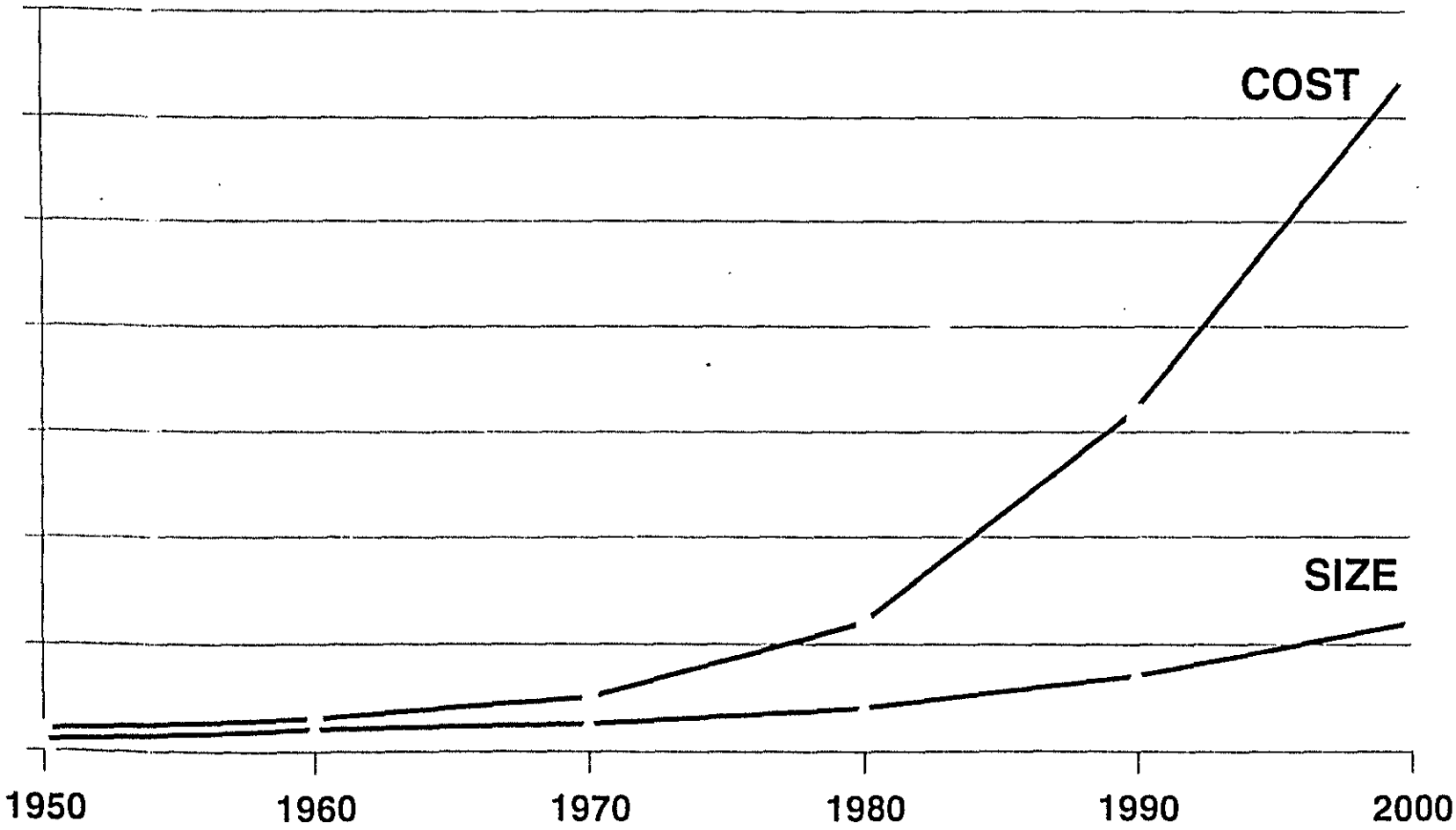


Billiton

Transparency 3

INFORMATION TRENDS (2)

- **Journals from the major science and technology publishers appear to double in size in about 11 to 12 years, and double in price in about half that time** (RUTSTEIN, J.S. 1993. Ownership vs. Access. In: GODDEN, I. Advances in librarianship, Vol 17. Colorado, Academic. p. 37.)



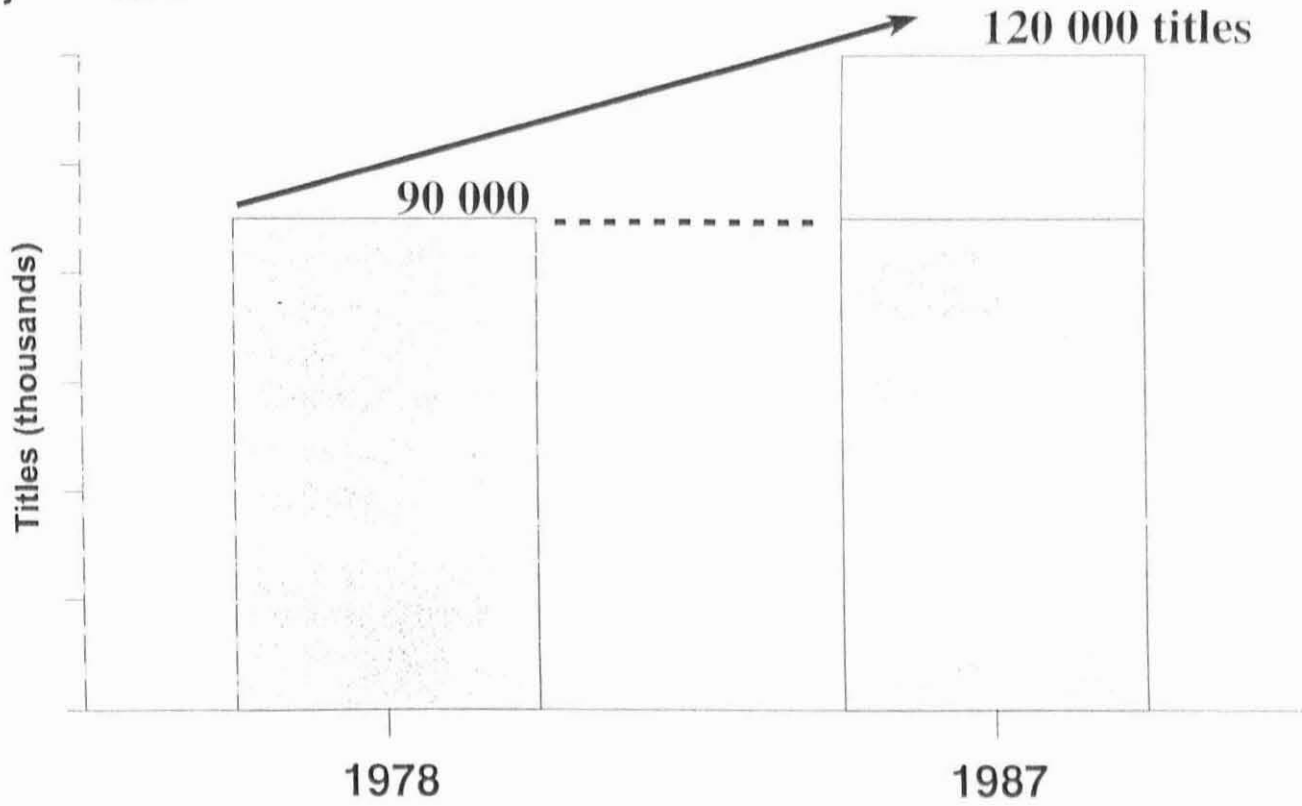
Billiton

Transparency 4

INFORMATION TRENDS (3)

- **Ulrich's database describes close to 120 000 serials (journals) of all kinds produced worldwide, and reports that in the decade 1978 to 1987 over 29 000 new science titles were started.** (RUTSTEIN, J.S. 1993. Ownership vs Access. In: GODDEN, I. Advances in librarianship, Vol. 17. Colorado, Academic. p. 37.)

Note: In 1995 the Library of Congress in Washington subscribed to 197 000 journals.

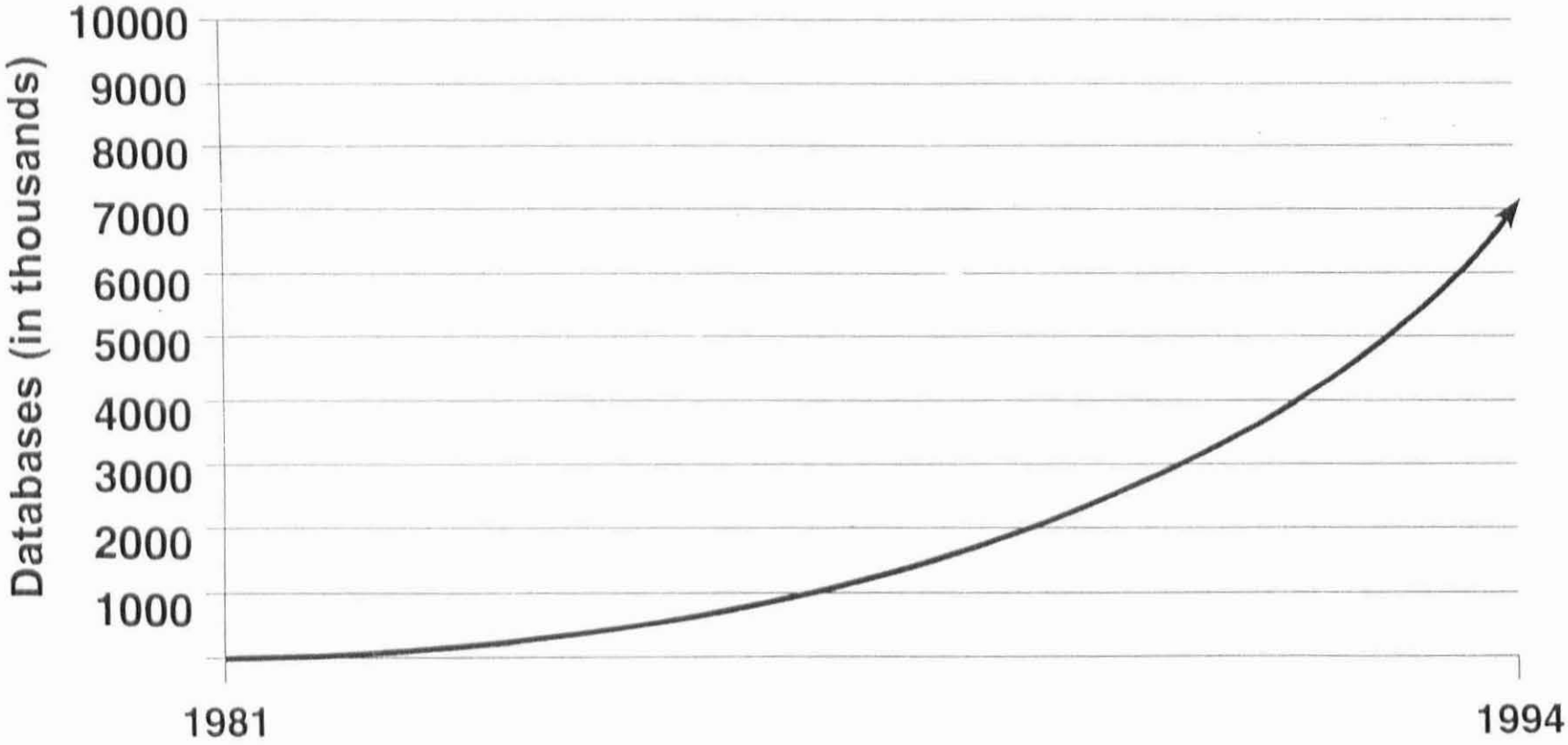


Billiton

Transparency 5

INFORMATION TRENDS (4)

- **We are increasingly living in an electronic age. In 1994 there were 7 000 commercial database publishers compared to 300 just 13 years ago. The databases in 1995 were calculated to hold 4 000 000 000 records**
  (RUTSTEIN, J.S. 1993. Ownership vs Access. In: GODDEN, I. Advances in librarianship, Vol. 17. Colorado, Academic. p. 42.)



Transparency 6

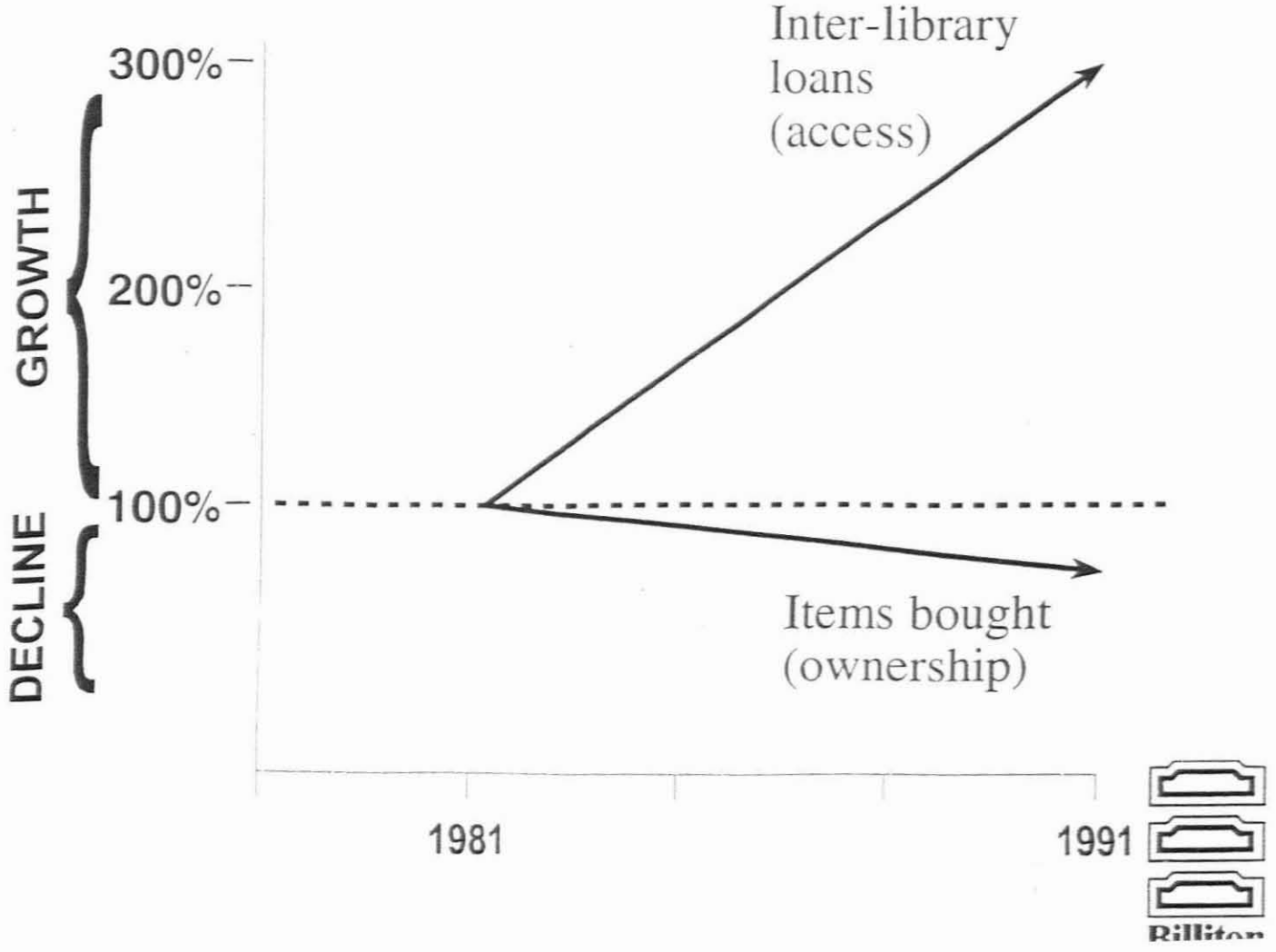
INFORMATION TRENDS (5)

- **Libraries in the USA report that from 1981 to 1991 inter-library loans grew by 206%, while addition of new books and journals declined by about 15%. Access is becoming more important than ownership.**

  (RUTSTEIN, J.S. 1993. Ownership vs Access. In: GODDEN, I. Advances in librarianship, Vol. 17. Colorado, Academic. p. 37.)

Note: In South Africa, where publications are very costly due to import factors, it is very important to be skilled at finding information that can be accessed: owning all the required information is prohibitively expensive.

Note: The resources held in libraries are significant: the replacement value of the collections of the five tertiary libraries of the Western Cape is in the region of R 600 000 000. Scientific and technical information is the life-blood of learning and research. In 1995 the five tertiary libraries in the Western Cape cost the institutions R 50 000 000 to maintain.

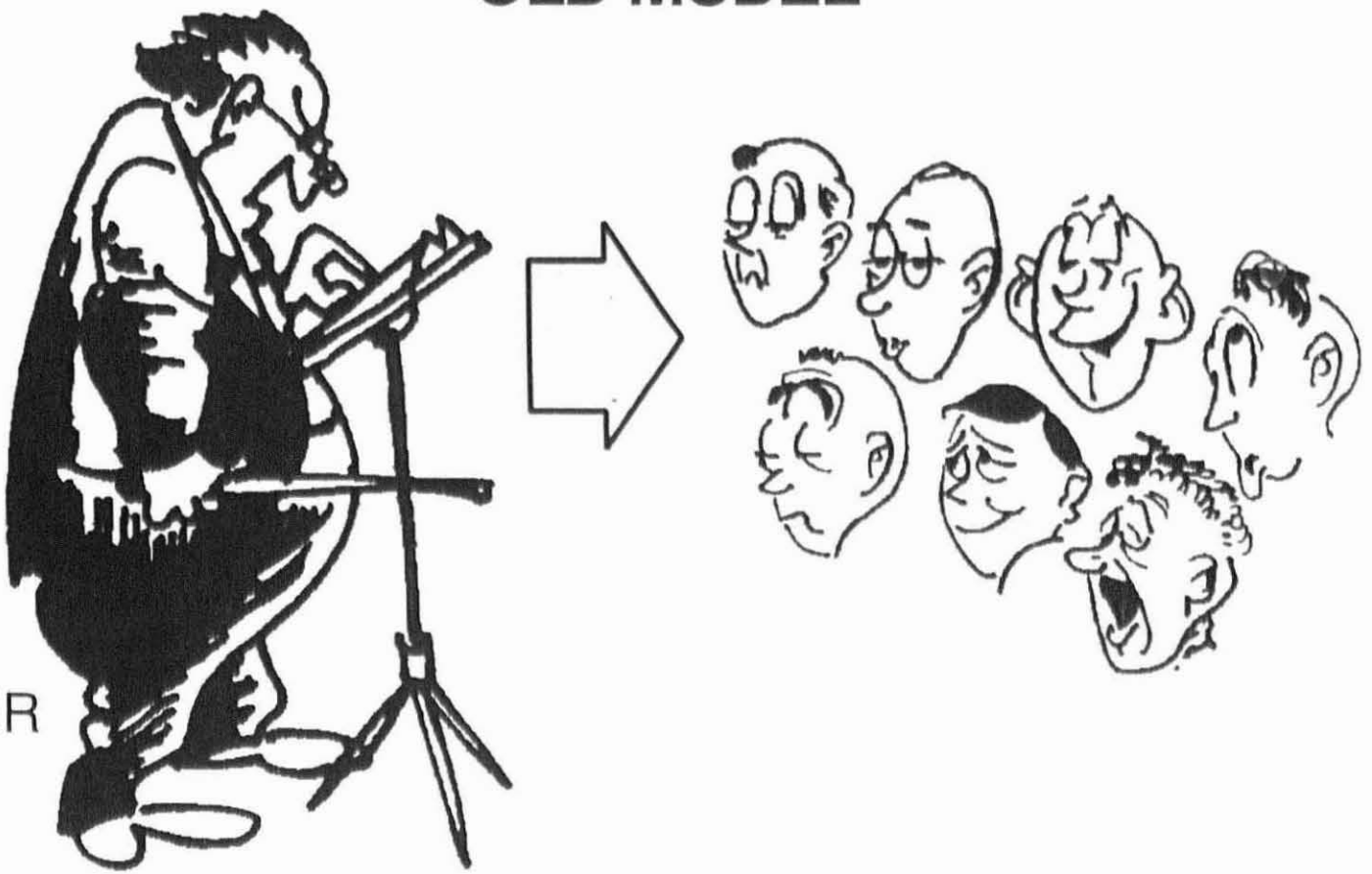


Transparency 7a

INFORMATION AND LEARNING

- There is a world-wide trend, away from the lecture room model of teaching,

OLD MODEL



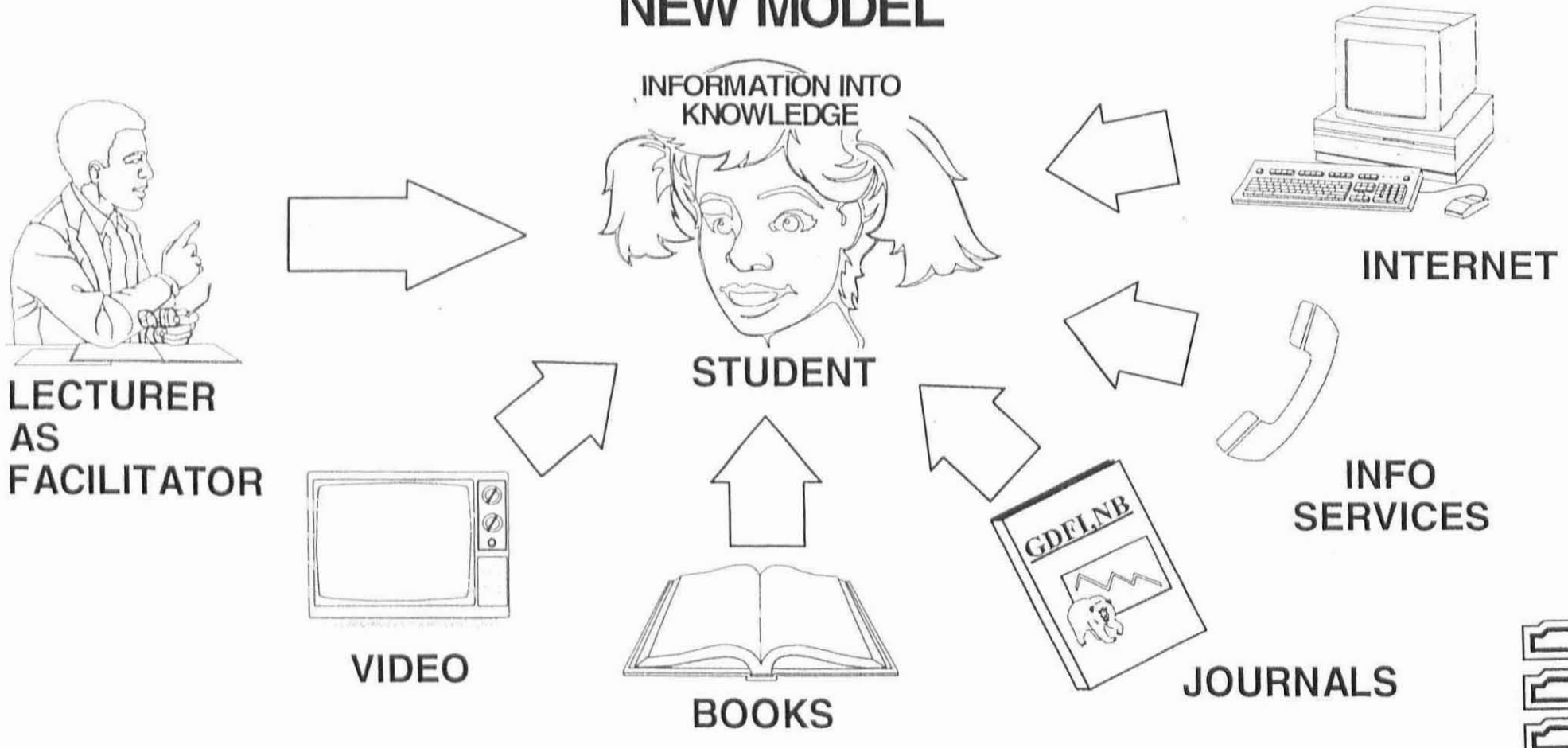
LECTURER

Transparency 7b

towards a model in which the student learns by accessing resources. In this model the lecturer is no longer the transmitter of knowledge but becomes a facilitator, and the student is a self-directed learner, actively creating own knowledge.

- Information and library skills are becoming increasingly important for a student to succeed, not only in studying, but also as essential skills in the workplace.

NEW MODEL

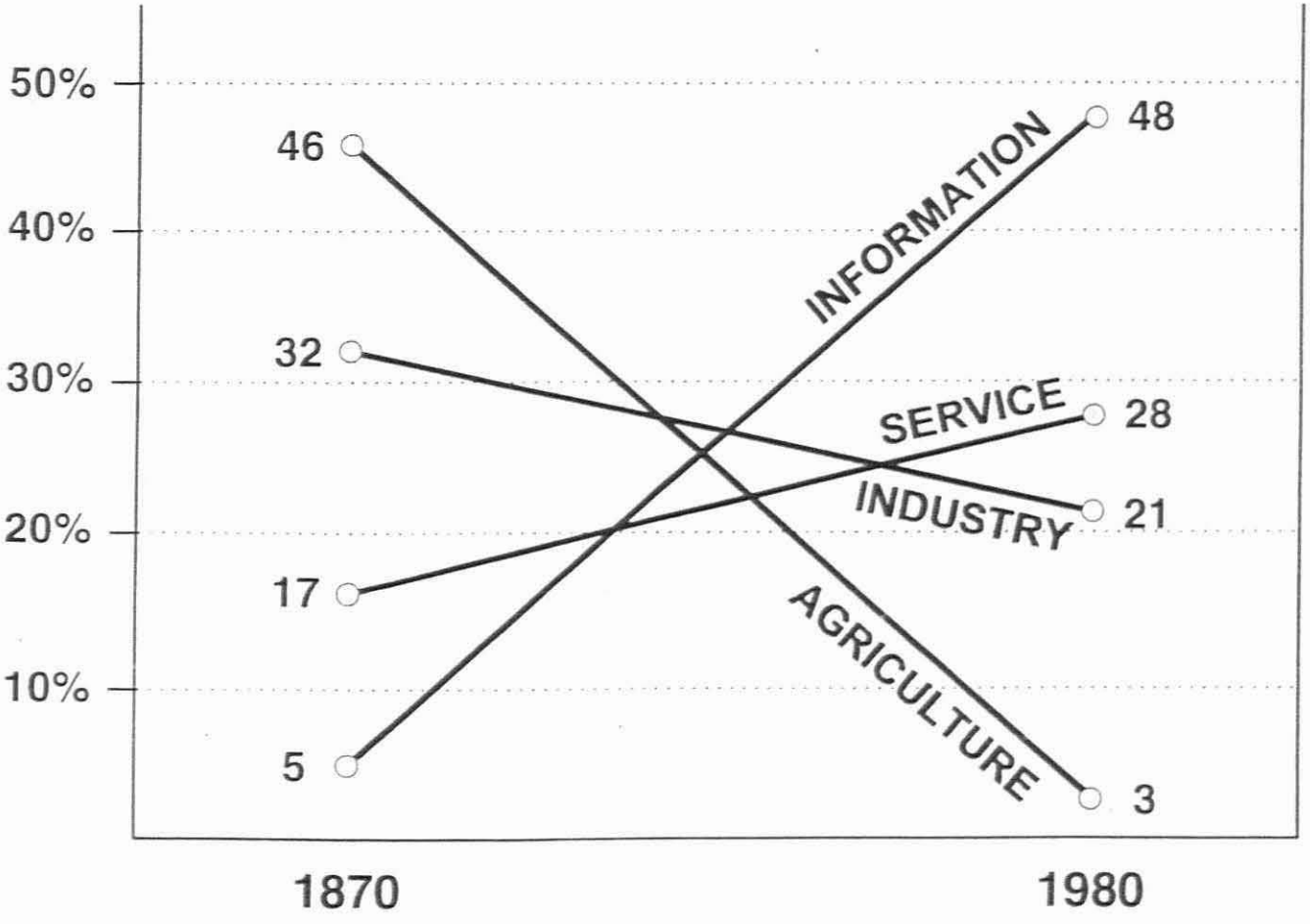


Billiton

Transparency 8

INFORMATION AND WORK

- When breaking down the economy into four major sectors, changes in the workforce over the period 1870 to 1980 are significant. The following graph (summarised from Marchand, D. A. and Horton, F. W. 1986 Infotrends. New York, Wiley. p.7. illustrates the changes:



Note: In 1950 already, almost 50 % of the US workforce formed part of the information sector in the economy. Then came the microcomputer revolution, which made information skills an even bigger part of those jobs, and of many jobs which fall outside the information sector.

Note: SA lags behind, but there is no doubt that information skills are very important to virtually all employers.

Transparency 9

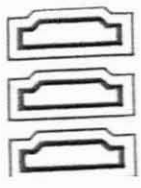
INFORMATION IN THE JOB

- All jobs, to lesser or greater extent and at some time or another, deal with
  - information conduits (transferring information)
  - information content (conveying a meaningful message)
  - information products (commercially created products), and
  - information services (information-related assistance)

Transparency 10a

EXAMPLES OF INFORMATION IN THE WORKPLACE

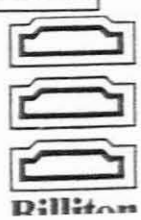
- company correspondence
- engineering drawings
- medical records
- supplier databases
- video production
- evaluation of information sources
- lists of class marks
- filing systems
- minutes of meetings
- advertising
- cost records
- robotics
- cash register systems
- computer aided design
- computer assisted manufacture
- records of accidents
- flowcharts
- client mailing lists
- helplines
- geographic information systems
- databases of images/slides
- environmental pollutant monitoring



Transparency 10b

EXAMPLES OF INFORMATION IN THE WORKPLACE

- company financial statements
- patents
- government gazettes
- legal advice services
- industrial automation
- company public relations
- business form design
- work schedules
- paging services
- configuration control
- inventory control
- data privacy
- information distribution lists
- marketing publications
- Beltel
- telephone directories
- computer networks
- file transfer
- hotel booking systems
- software configuration
- newsletters
- desktop publishing
- research and development
- surveillance systems
- copyright
- compact disk resources



APPENDIX C

INTEGRATED FIRST YEAR EXPERIENCE - INTERVIEW PROTOCOL

INTRODUCTION: (initial contact over telephone?)

Allow me to tell you a little bit about the aim of the interview ...I am currently evaluating the information literacy module of the Integrated First Year Experience Program (IFYE) for Mr George Savage and Prof. P. Parsons. In February I sent out a survey to find out which modules have been or plan to be implemented. In the survey you reported that you had used the infolit module and I would appreciate it should you be willing to answer a few questions about the information literacy module. Could we arrange a time when it is convenient for you ?

1. Before we start I would just like to make sure that I have the correct details,

- You are ...(full name),
- Which subject do you teach the first year students ...(subject)
- (Make sure that you know which school this is part of).

The idea of teaching information literacy:

1. Information literacy - how important do you think it is for first year students to become information literate?
- Why?

2. What is your understanding of the term "information literacy"?

3. How do you feel about the idea of teaching information literacy?

- should it be the responsibility of lecturers to make students information literate?

4. When did you implement the infolit module?

Method of implementation:

5. How did you implement the module,

- integrated into first year subject content?

Which part of the module did you implement?

- lecture
- which transparencies did you use? **(SHOW TRANSPARENCIES)**
- assignment plan: - did students have to hand it in with the assignment?
  - how useful did you find it to be?
  - how did you use with questions at the end of assignment plan (back to the library)?
- would you use it again?

6. Can you remember the topic of the assignment used?

Ease of implementation:

7. How difficult/ time consuming was to implement the module/ assignment?

8. How did you find it, are there any

- specific advantages
- specific disadvantages with using the module?

Interviewee's perception of students benefit:

9. How do you think the students found it,

- any feedback from students on value of module (assignment plan)?

10. Do you think the students improved their skills (psychomotor), attitude (affective), confidence (cognitive) in using the library?

11. Is there any improvement in the academic performance after implementation compared to previous years?

General:

12. Are there any other benefits from using the module?

13. Are there any suggestions/ comments/ changes that you would like to add regarding the information literacy module?

Notes:

APPENDIX D

INTEGRATED FIRST YEAR EXPERIENCE (IFYE)

INFORMATION LITERACY

Prepared for the Cape Technikon by the Education Development Resource Centre (EDRC)

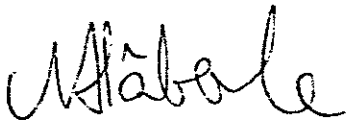
Dear Student

The IFYE is a programme designed by the Cape Technikon and it is aimed at helping all first year students improve their study skills. One of these study skills is information literacy. An information literate person is one who knows when they need information and has the skills to access, analyse and evaluate information from various sources, in order to enhance learning, solve problems and generate new knowledge *(Calico: Infolit, 1997: 27).*

In order to make the information literacy module work for you, we would be grateful if you would give the following questions your serious attention. It should not take more than a few minutes of your time. There are no right or wrong answers to the questions so please put down what you feel is right for you. You will notice that there is no space to fill in your name and so your reply will be absolutely anonymous.

Thank you for your co-operation.

Yours sincerely



(N. Häberle)
Module Evaluator

INFORMATION LITERACY QUESTIONNAIRE

For office use

Faculty or School code: ☐☐ (4 - 5)

Subject code: ☐☐ (6 - 7)

For office use

1. ABOUT YOURSELF

This section asks for some details on yourself which will help us classify your answers. Ignore the small numbers in the blocks, they are for data processing and office use only.

Please place a tick [✓] in the appropriate box:

1.1 Gender: Male [1] Female [2] ☐ (8)

1.2 Racial Classification. By "racial classification" we are referring to those categories previously identified by the population registration acts. Although the Cape Technikon does not consider the race of a person during selection, we kindly request you to complete the following for the purpose of statistics.

Black [1] White [2] Coloured [3] Indian [4] ☐ (9)

Place a tick [✓] in the most appropriate box.

For office use

1 = once per **week** or more often

2. = once per **month** or more often

3. = once per **semester** or more often

4 = **never** or hardly ever.

		Your rating				
2.1	Used the short **loan/reserve** collection in the library to find required readings	1	2	3	4	☐ (14)
2.2	Used the **open shelves** to find relevant readings	1	2	3	4	☐ (15)
2.3	Used **abstracts, indexes** or **bibliographies** to find required readings	1	2	3	4	☐ (16)
2.4	Looked for **other readings** from references found in articles that you may have read	1	2	3	4	☐ (17)
2.5	Used the **card catalogue** in the library	1	2	3	4	☐ (18)
2.6	Used the **computerised** catalogue in the library	1	2	3	4	☐ (19)
2.7	Used **CD -ROM's** in the library	1	2	3	4	☐ (20)
2.8	Asked a **librarian** for help	1	2	3	4	☐ (21)
2.9	Found useful/ relevant material that was **not specifically prescribed**	1	2	3	4	☐ (22)
2.10	While at the Cape Technikon, used information sources **outside the library** to find material related to your course work. Please specify	1	2	3	4	☐ (23)

1.3 On **average**, what kind of student do you consider yourself to be?

Below average < 50%	Average 51% - 69%	Above average 70% <
1	2	3

For office use

☐ (10)

1.4 Have you attended a library orientation session at the Cape Technikon?

Yes	No
(1)	(2)

☐ (11)

1.5 What is your first language? *Please tick [✓] one box only.*

Afrikaans	1	S. Sotho	5	Xhosa	9
English	2	Swazi	6	Zulu	10
Ndebele	3	Tsonga	7	Venda	11
N. Sotho	4	Tswana	8		

☐☐ (12-13)

Other 12 Please specify .....

2. USING THE LIBRARY

This section is to find out how often you use the various information sources in the library. Please rate how many of the following you have used or done at the library in your institution according to the following scale:

Place a tick [✓] in the most appropriate box.

For office use

1 = once per **week** or more often

2. = once per **month** or more often

3. = once per **semester** or more often

4 = **never** or hardly ever.

		Your rating				
2.1	Used the short **loan/reserve** collection in the library to find required readings	1	2	3	4	☐ (14)
2.2	Used the **open shelves** to find relevant readings	1	2	3	4	☐ (15)
2.3	Used **abstracts, indexes** or **bibliographies** to find required readings	1	2	3	4	☐ (16)
2.4	Looked for **other readings** from references found in articles that you may have read	1	2	3	4	☐ (17)
2.5	Used the **card catalogue** in the library	1	2	3	4	☐ (18)
2.6	Used the **computerised** catalogue in the library	1	2	3	4	☐ (19)
2.7	Used **CD -ROM's** in the library	1	2	3	4	☐ (20)
2.8	Asked a **librarian** for help	1	2	3	4	☐ (21)
2.9	Found useful/ relevant material that was **not specifically prescribed**	1	2	3	4	☐ (22)
2.10	While at the Cape Technikon, used information sources **outside the library** to find material related to your course work. Please specify	1	2	3	4	☐ (23)

For office use

3. YOUR FEELINGS ABOUT THE LIBRARY

These questions explore your attitude to the library.

Please underline the statement that most closely represents your opinion.

For example:

Students should have longer holidays. *Yes/ No*

3.1 Libraries should be small. ☐ (24)

Yes/ No
(1) (2)

3.2 When I am doing research for an assignment, I am grateful that the library is well organised. ☐ (25)

Yes/ No
(1) (2)

3.3 I don't like using OPAC (computerised catalogue system). ☐ (26)

Yes/ No
(1) (2)

3.4 I have to improve on using OPAC (computerised catalogue system). ☐ (27)

Yes/ No
(1) (2)

3.5 I need to improve my library research skills. ☐ (28)

Yes/ No
(1) (2)

3.6 I feel I should be using libraries more. ☐ (29)

Yes/ No
(1) (2)

3.7 Is it appropriate to ask the librarian how to find information on personal problems? ☐ (30)

Yes/ No
(1) (2)

For office use

3.8 It is exiting to find needed information. (31)

Yes/ No
(1) (2)

3.9 I can pretty much find on my own whatever I need in the library. (32)

Yes/ No
(1) (2)

3.10 I hate it when I have to look up the same subject heading in several annual volumes of a periodical index. (33)

Yes/ No
(1) (2)

3.11 Libraries are too difficult to use because there are too many fields of study. (34)

Yes/ No
(1) (2)

3.12 It is unfair to make people look up things themselves. The librarians should do it for the students. (35)

Yes/ No
(1) (2)

3.13 I appreciate the floorplan maps placed around the library. (36)

Yes/ No
(1) (2)

3.14 I feel that I am bothering the librarian when I ask a question. (37)

Yes/ No
(1) (2)

3.15 The library is the heart of the academic and scientific community. (38)

Agree/ Disagree
(1) (2)

3.16 Library research should not be required to get a qualification. (39)

Agree/ Disagree
(1) (2)

3.17 It is important to continue to learn new ways of searching for information throughout life. (40)

Agree/ Disagree
(1) (2)

For office use

3.18 To a great extent finding information that I need is controlled more by chance than by systematic searching. (41)

Agree/ Disagree
(1) (2)

3.19 I like being in the library. (42)

Almost always/ Almost never
(1) (2)

3.20 The library is too big and impersonal (43)

Almost always/ Almost never
(1) (2)

3.21 The library is too frustrating. (44)

Almost always/ Almost never
(1) (2)

3.22 When I am doing research for a paper, I feel that I am wasting a lot of my time. (45)

Applies to me frequently/ Applies to me sometimes
(1) (2)

3.23 Learning how to find information will help me in my future career. (46)

Definitely applies to me/ Does not apply to me
(1) (2)

3.24 When I have to go to the library I put it off as long as I can. (47)

Applies to me/ Does not apply to me
(1) (2)

3.25 When I leave the library, I feel that my intellect is expanded. (48)

Sometimes/ Never
(1) (2)

3.26 I am frequently embarrassed to ask a librarian a question when I should already know the answer. (49)

True/ False
(1) (2)

3.27 I still do not feel confident using the library. (50)

Sometimes/ Never
(1) (2)

For office use

4. YOUR RATING OF THE INFORMATION LITERACY PROGRAMME

These final questions explore your attitude to the information literacy programme.

Please place a tick [✓] in the box that most closely represents your opinion.

4.1

How much did you learn:	learnt extremely little	learnt a little	learnt a bit	learnt a lot	
...from the lecture on information literacy.	1	2	3	4	(51)
...from the transparencies used in the lecture on information literacy.	1	2	3	4	(52)

4.2 Did you do the assignment on information literacy? Yes (1) No (2) (53)

If you did *NOT* do the assignment, please move on to question 4.5.

4.3 In the table below, please rate **how much you learnt** during the **assignment** in the information literacy programme.

Please place a tick [✓] in the box that most closely represents your opinion.

How much did you learn:	learnt extremely little	learnt a little	learnt a bit	learnt a lot	
...about identifying keywords during the assignment.	1	2	3	4	(54)
...about using the prescribed textbook/course notes as information resources during the assignment.	1	2	3	4	(55)
...about refining and finding further keywords.	1	2	3	4	(56)
...about using the computerised catalogue system (OPAC).	1	2	3	4	(57)
...about identifying resources (books, journals, videos).	1	2	3	4	(58)
...about finding and selecting the information sources.	1	2	3	4	(59)
...about following new leads.	1	2	3	4	(60)
...about doing your bibliography.	1	2	3	4	(61)