



Cape Peninsula
University of Technology

**A CONCEPTUAL MODEL FOR A CO-OPERATIVE
EDUCATION MANAGEMENT INFORMATION SYSTEM
FOR TERTIARY INSTITUTIONS
IN SOUTH AFRICA**

by

ANEEN KOCH

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Supervisor : Prof R K Coll (University of Waikato, Hamilton, New Zealand)

Co-supervisor : Prof A Bytheway (e-Innovation Academy, CPUT)

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IN DEDICATION TO MY LATE FATHER AND BROTHER.

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DECLARATION

I, **Aneen Koch**, declare that the contents of this thesis represent my own unaided work, and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

Signed : _____

Date : _____

ABSTRACT

A CONCEPTUAL MODEL FOR A CO-OPERATIVE EDUCATION MANAGEMENT INFORMATION SYSTEM FOR TERTIARY INSTITUTIONS IN SOUTH AFRICA

By

ANEEN KOCH

SUPERVISORS : Prof. R.K. Coll (Waikato University, Hamilton,
New Zealand) & Prof. A. Bytheway
(e-Innovation Academy)

FACULTY : Business Informatics

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In this research all references to *technikons* relate to the present Universities of Technology. Since this study was conducted relating only to courses that offer an experiential learning component, it is to be noted that these courses are offered mainly by the previous Technikon sector, prior to the amalgamation of technikons with certain universities and colleges.

The specific research problem is defined and the background to this problem explained. Both the research problem and objectives are formulated.

No efficient Management Information System for co-operative education based on web-technology currently exists in South Africa. By means of a study based on the present needs of co-operative education practitioners in South Africa, and comparing the latter to certain existing management information systems for co-operative education internationally, the objectives of the research are addressed. Initially some critical activities are identified and used to map out possible sub-systems.

Literature is reviewed relating to technologies relevant to this research, such as the Web, Internet and Intranets. It outlines some information technologies available to organisations and the educational environment. The literature also highlights most of the processes within a management information system. Furthermore, it summarises the initial considerations needed to develop a management information system in this context. To focus more pertinently on the problem a management information system relating to education is investigated.

Various existing management information systems in education in the UK, USA and RSA are reviewed. Specific reference is made to management information systems in general education in Australian schools. These investigations then focus on one element of education, namely co-operative education. Possible co-operative education sub-systems are mapped out from identified critical activities. These sub-systems were instrumental in developing the pilot study and the final questionnaire.

The research methodology and the techniques applied to address the research objective, are discussed. Aspects such as reliability, validity, quantitative vs qualitative research, the final measuring instrument, target population, administering the questionnaire and data capturing, are addressed. The development of the questionnaires and a two-dimensional matrix of the measuring instrument are explained.

The responses to the various elements on each of the questionnaires are reported on and the data is interpreted and grouped to form a synthesis. From the

synthesis, conclusions and recommendations relating to all three sub-systems (students, employers and short courses), are listed.

These results of the questions as reported on and the interpretations recorded are analysed. These relate to each question as well as to all the literature reviewed. The conclusions and recommendations are supported by detailed cross-references to each chapter.

Some comparison of local (South African) and international preferences is included.

The main objective of this study was to develop a scientifically-established model of an adequate management information system for co-operative education, which will comply with the needs of the South African Co-operative Education.

In summary then :

- A survey was undertaken of good international practice, from which a set of desirable "elements", "components" or "sub-systems" was established. Hereafter they are referred to as "**sub-systems**".
- These sub-systems were taken as the foundation for a questionnaire, where in respondents were asked to consider the importance and detail of the sub-systems.
- The questionnaire was reviewed for its effectiveness and completeness, refined, and then deployed to 325 respondents nationally. Internationally 77 delegates responded.
- An analysis of their responses was used to develop a set of desirable characteristics of a co-operative education management information system in South Africa.

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GLOSSARY

SUBJECT SPECIFIC TERMS AND CONCEPTS USED IN CO-OPERATIVE EDUCATION

Since several generic terms are often used in this thesis, the following terms are used in the context as explained.

Accreditation refers to the mutual recognition of the certification of institutions. It is a formal recognition that a qualification/course/module complies with the requisite standard at a specific study level (Jackson & Brewer, 1992:60).

Assessment is a process or processes by which the performance of a student may be identified and evaluated. Assessment refers to the process(es) of collecting evidence of learners' work to measure and make judgements about the achievement (or non-achievement) of specified National Qualification Framework Standards and/or qualifications.

Automation is 'the use of machines that need little or no human control, especially in a place of workers' as defined by the Dictionary of Contemporary English.

Briefing : Any information given to the student about the organisation in which they are to work; the job description; how to approach expected tasks and work; the criteria on which their performance will be judged, etc.

Competence refers to the possession and development of sufficient skills, knowledge, appropriate attitudes or experience for successful performance of life roles; also the ability to use knowledge, product and process skills and as a result, act effectively to achieve a purpose (Davies & Ellison, 1990:270).

Co-operative Education Lecturer (CEL)/Co-ordinator refers to the person ultimately responsible for the planning and the operationalisation of all the elements of co-operative education – also referred to as the co-ordinator. This person is normally an employee of the educational institution and has sound academic as well as relevant industrial/commercial experience (Lamb, 1983:85).

Credit is usually intended to mean recognition for the successful completion of some offering (subject). It may also designate successful completion of an offering. The grounds for successful completion can be an equivalent offering (i.e., exemption) or having successfully completed the same offering elsewhere (institution or programme), (i.e., recognition - also of prior learning). Credit can also mean an offering standing to the credit of a candidate in respect of a particular programme (course) (Jackson & Brewer, 1992:59).

A **database** is a collection of information stored in a computer in a systematic way, such that a computer program can consult it to answer questions.

<http://www.answers.com/topic/database>.

Debriefing is the planned and purposeful opportunity for the student to reflect in a critical way on all that has gone before, so as to learn more effectively from it. The debriefing which occurs when a placement has been completed is the essential final part of a learning cycle called Supervised Work Experience (SWE), which commences with the conception of the placement to be undertaken by a student (Davies & Ellison, 1990:67).

Education refers to the inculcation of knowledge and skills and the development of understanding, insight and independent thought in a variety of fields of study and at various levels such as primary, secondary and tertiary; intellectual moulding (Homer, 1987:66).

Electronic mail (E-mail) : An electronic means for communication in which (a) usually text is transmitted, (b) operations include sending, storing, processing, and

receiving information are performed and (c) users are allowed to communicate under specified conditions.

(<http://www.its.bldrdoc.gov/fs-1037/dir-014/1955.htm>).

Employer refers to the company taking part in the venture of preparing occupational-ready graduates. The company is not necessarily an employer in the traditional sense of the word, but since some remuneration is often a reality, 'employer' is in some cases preferred (refer also to 'Placed').

Experiential learning refers to the non-formal transfer of knowledge and the acquisition of skills with the object of producing a more useful employee, who may be utilised in a particular practice/profession for broader applications than his/her present knowledge/experience of a particular occupation permits. It also reflects the training (for a specific placement) within the organisation, systematically planned and provided by a trainer on the staff internally or by one acting on behalf of the organisation externally (Heineman, 1983:15).

The **Extensible Markup Language (XML)** is a W3C-recommended general-purpose markup language for creating special-purpose markup languages, capable of describing many different kinds of data.

(<http://en.wikipedia.org/wiki/XML>)

Firewalls is a number of security schemes that prevent unauthorized users from gaining access to a computer network or that monitor transfers of information to and from the network.

Information system is a system, whether automated or manual, that comprises people, machines, and/or methods organised to collect, process, transmit, and disseminate data that represent user information.

(http://www.atis.org/tq2k/information_system.html)

Information technology is any technology used to support information gathering, processing, distribution and use. Information technology consists of hardware, software and communications technology.

<http://www.palgrave.com>

Information technology is 'the science or practice of collecting, storing, using, and sending out information by means of computer systems' as defined by the Dictionary of Contemporary English.

Interactive instructional television is a viable alternative for course delivery to students in distant or geographically isolated settings.

http://www.ajde.com/Contents/vol2_2.htm

The **Internet** is defined as 'an electronic communications network that connects computer networks and organizational computer facilities around the world'.

<http://www.slis.ualberta.ca/issues/alg1/global.htm>

The **Internet Protocol (IP)** is a network-layer (Layer 3) protocol that contains addressing information and some control information that enables packets to be routed. IP is documented in RFC 791 and is the primary network-layer protocol in the Internet protocol suite. Along with the Transmission Control Protocol (TCP), IP represents the heart of the Internet protocols. IP has two primary responsibilities: providing connectionless, best-effort delivery of datagrams through an internetwork; and providing fragmentation and reassembly of datagrams to support data links with different maximum-transmission unit (MTU) sizes.

http://www.cisco.com/univercd/cc/td/doc/cisintwk/ito_doc/ip.htm

An **Intranet** is a computer network that uses the same technology and protocols as the Internet but is restricted to certain users.

<http://www.internet-guide.co.uk/intranet.html>

Main activity of a company can also be seen as the core business of a company. Examples of main activities are, manufacturing in heavy engineering, supply of aluminium products, and blanket manufacturers and distributors.

A **management information system (MIS)**, as the term is generally understood, is an integrated, user-machine system for providing information to support operations, management, and decision-making functions in an organisation. The system utilises computer hardware and software; manual procedures; models for analysis, planning, control and decision making; and a database. The fact that it is an integrated system does not mean that it is a single, monolithic structure; rather, it means that the parts fit into an overall design (Davis & Ohlson, 1985:6).

A **markup language** is used to structure text and multimedia documents and to set up hypertext links between documents, used extensively on the World Wide Web (HTML).

The **mentor** is the person, normally employed within the company where a student will do experiential learning. The mentor is the person responsible, on behalf of the specific company, to plan and operationalise the experiential learning programme as agreed to with the co-ordinator (refer to 'Co-ordinator/Co-operative Education Lecturer').

Moderation refers to the process, which ensures that assessment of the outcomes described in the National Qualifications Framework Standards, and/or qualification is fair, valid and reliable. 'Verification' has a corresponding meaning.

NETWorks is a **network** utility software that able users to test and diagnose all common problems from any network (<http://www.capturix.com/>).

Placed : Students are 'placed' at companies to do their experiential learning component. This 'placement' takes on various forms, e.g., with/without remuneration, with/without standard employment procedures (refer to 'Employer') (Gotlieb, 1986:47).

Practical component is that part of the formal education requiring practical work - research, laboratory work, applications - but also including an element of rendering a service; centres around the application of techniques and skills and is therefore indirectly related to experiential learning in practice.

Search engine is defined as a program on the internet that searches for keywords in files and documents found on the World Wide Web (<http://www.123khoj.net/>).

Skill pertains to a specific expertise, competency, etc., that is required for the performance of a defined occupational task; particular skills are associated with certain fields, enterprises and subject matter. As all learning involves some skill or another, skills may be acquired and developed through training. A set of acquired skills makes up a technique used in the performance of a defined task (Peterson & Nelson, 1986:18).

A **System** is a process used to help managers run a company: A system for gathering the financial, production, and other information that managers need to operate a business, especially a system that is computerized.

(http://ca.encarta.msn.com/dictionary_1861693309_1861678256/nextpage.html)

Training programme refers to the agreed programme of work which specifies skills, knowledge and capacities which the student should develop whilst in the organisation (Davies & Ellison, 1990:190).

URL is the address of a web page on the world wide web - uniform resource locator, universal resource locator (Derived forms: URLs).

(<http://www.wordwebonline.com/en/URL>)

A **virtual community** is a group of people communicating or interacting with each other by means of information technologies, typically the Internet, rather than in person. Virtual communities are also known as online communities or computer-mediated communities (CMC) (http://en.wikipedia.org/wiki/Virtual_community).

Virtual reality is a new technology that alters the way individuals interact with computers (<http://www.cybertherapy.info/pages/book2.htm>).

Web page is a document connected to the World Wide Web and viewable by anyone connected to the internet who has a web browser - web page. (Derived forms: webpages, web pages) (<http://www.wordweonline.com/en/WEBPAGE>).

A **Web site** is a related collection of Web files that includes a beginning file called a home page. A company or an individual tells you how to get to their Web site by giving you the address of their home page.

(http://iroi.seu.edu.cn/books/ee_dic/whatis/website.htm)

The **World Wide Web** (the 'Web' or 'WWW' for short) is a hypertext system that operates over the Internet.

(http://www.informationheadquarters.com/Internet/World_Wide_Web.shtml)

In this research all references to technikons imply that reference is made to the present Universities of Technology. Since this study was conducted, relating only to courses which offer an Experiential Learning component, it is acknowledged that these courses are mainly offered by the previous Technikon sector, prior to the amalgamation.

CHAPTER 1

FORMULATION OF OBJECTIVES AND RESEARCH PROBLEM

In this chapter the research problem is defined and the background to this problem explained. The methodology used in this research is reported on and the objectives are listed.

1.1 INTRODUCTION

South Africa has recently (1994) moved out of the Apartheid Era into one where equal *education* (refer to Glossary) and work opportunities are available for all its many population groups. In the Republic, education too is facing many changes, especially in the higher education sector where the landscape is changing.

The previous technikons (now Universities of Technology) are higher education institutions with their focus on providing formative career education and training at a tertiary level, rather than on general educational development.

“Technikons” fall under the Department of Education and were created as new higher education institutions in South Africa in 1979 to cater (Taylor, 2003:19) for “the ever-increasing need and demand for career-oriented, professional and industrially-based courses” (Van Wyk, 1999:72). They arose out of the Amendment Act on Advanced Technical Education (Department of Education [DoE], 1979) and were formally established by the Technikons Act (DoE, 1993). This Act legislated that technikons offer career-focussed, vocation-based higher education programmes. This is largely achieved by following the co-operative education model.

As early as 1993, Koch (1993) reported during a National Conference on Co-operative Education (organised by the South African Society for Co-operative Education) held in Port Elizabeth, the following elements which might determine an administrative *system* (refer to Glossary) for co-operative education at technikons :

- a) The administrative requirements of co-operative education at technikons as determined by the services required by both students and *employers* (refer to Glossary)
- b) A comparative study of the national administrative requirements as well as the administrative requirements as applied internationally
- c) The structuring of a cost-effective administrative system for co-operative education in South Africa (Koch, 1993:2).

The lack of a well planned *management information system* (refer to Glossary) for co-operative education has been identified well over a decade ago. Several individual practitioners of co-operative education, as well as a sub-committee of the Committee of Technikon Principles (CTP) and the Committee for Teaching Matters (CTM) addressed this problem by formulating the elements of such a management information system for co-operative education as dealing with:

- What information is needed?
- How will the information be collected? and

- Where will the information be stored (CTM Standing Committee, 2000:21)?

Engelbrecht reported in 1995 that the Committee of Technikon Principles (CTP) in 1986 documented that they believe it is impossible to simulate all the processes in the laboratory in such a way that the student experiences the industrial environment in the true world of work. The interaction between technikons and the business sector is structured according to the respective needs of the student community and the employers. Technikons, with their emphasis on career-orientated education (vocational education) endeavour to meet the interfaces of the future labour force and national needs through co-operative involvement of the employer, the student and the technikons. To administer the needs/services required by the students and employers, a dedicated administrative system is required (Engelbrecht, 1995:1).

As a preamble to investigate the situation, a telephonic survey conducted during October 2005, revealed that the practitioners of co-operative education at the newly formed universities of technology, still use each their own, stand alone ad hoc system. These systems are not fully integrated into the management systems of the universities of technology.

Tamakoe (2000:28) predicted in 2000 that the practitioners of co-operative education will have to deal progressively more with the design and principle of on-line communities, effectiveness and global competitiveness, developing on-line courses, on-line resources and publishing on-line articles and journals. He also stressed the importance of collaboration of co-operative education professionals with their counterparts in other countries in order to build their own identity, creating their own on-line courses and information systems utilising the *World Wide Web* (refer to Glossary) (Tamakoe, 2000:28-29).

Universities, along with other educational institutions internationally, are taking advantage of the World Wide Web in the design of new systems to communicate information. A mail-out survey conducted as a pilot study for

this thesis, as well as a survey of *Web sites* (refer to Glossary) of universities affiliated to the World Association of Co-operative Education (WACE), revealed a certain tendency : All the universities surveyed (in the United States of America (USA), United Kingdom (UK) and Australia) currently have Web pages about co-operative education programmes, despite there being a considerable variation in the depth of content (<http://waceinc.org>). Co-operative education refers to a career-orientated educational system in which each qualification also incorporates an accredited *experiential learning* component (refer to Glossary). In his survey Erickson (1999:3) found that co-operative education units at seven of the 12 universities he surveyed in the UK and the USA are in the process of redesigning or substantially upgrading their management information systems. A management information system, as the term is generally understood, is an integrated, user-machine system for providing information to support operations, management, and decision-making functions in an organisation. Two other universities, University of Drexel, Philadelphia, USA and University of Waterloo, Canada have also made major changes to their co-operative education management information system in the last few years. Universities with similar co-operative education structures are, in many cases, developing similar types of *information systems* (refer to Glossary) for managing co-operative education. The rate of change in available technology, as well as new demands by end users, may be some of the main reasons for this phenomenon.

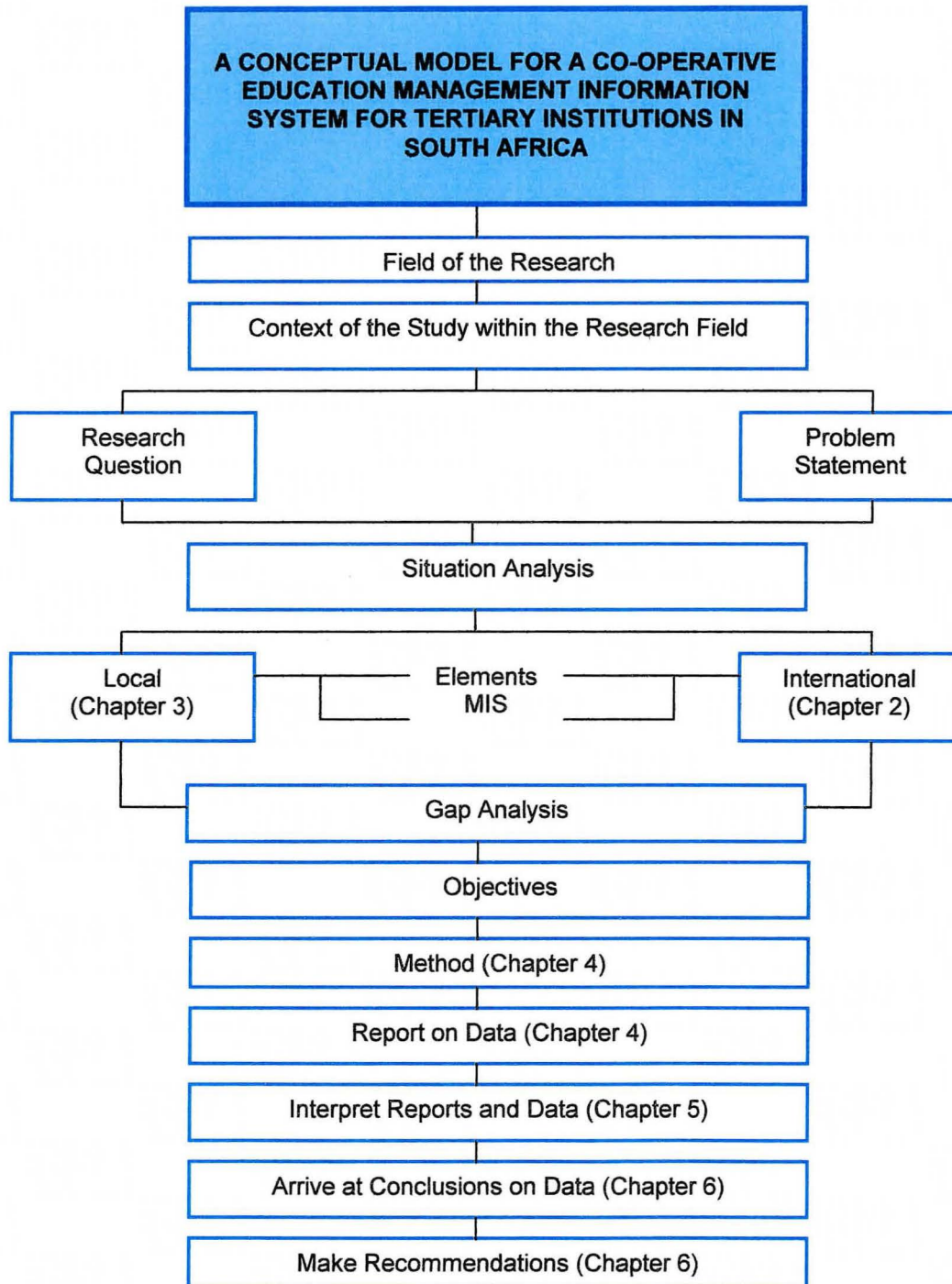
The educational system in South Africa has changed over the last decade. Legislation (specially the Higher Education Act, 1997) to design, develop and implement these changes has been passed. The school educational system up to, and including, the 12th year of schooling, is essentially an "outcomes based education" (OBE). It should be fully implemented by 2006 (<http://www.education.gov.za>). In the tertiary education field several institutions of higher learning have been merged (Government Gazette, Notice no. 23549). As a consequence, the lack of co-operative education management and structures of these newly formed institutions had to be

adjusted and integrated. In the next few years - resources and the related funding issues pose different challenges.

Because of financial and resource demands, these new tertiary education structures require more cost-effective management systems throughout the different layers of organisational structures within each institution. Courses that were not formally exposed to the co-operative education principle in the past need now to be accommodated within this educational system. The Skills Development Act No.97 of 1998, in dealing with learnerships, specifies the principle of an academic component plus an "experiential learning" component to constitute a qualification, similar to co-operative education (<http://www.labour.gov.za>). New funding and organisational structures are now available to implement and manage these learnerships. This new development poses new challenges for both the execution and management of co-operative education within the South African context.

As such then, this research process follows a specific format (as specified in Figure 1.1, pg.6). In the broader context the field of research study is identified. The context in which this research study is investigated is explained. From the above the research question and a concise problem statement is formulated in order to clearly identify the purpose of the study. A situation analysis was conducted to determine the elements of co-operative education as well as the management information system for co-operative education which at present exist locally and internationally (refer to Chapters 2 and 3). From the information gathered from Chapters 2 and 3, the gap between the South African system at present and the international systems were identified. From this gap analysis and the research problem statement, more specific research objectives were formulated. These research objectives initialised the research method (refer to Chapter 4). The data gathered from the research was reported and interpreted (Chapter 5) and conclusions and recommendations were arrived at in Chapter 6.

FIGURE 1.1
Flow Diagram of the Research Study



1.2 CONTEXT OF THE STUDY

From personal experience in co-operative education, spanning more than a decade, the lack of a scientific investigation relating to a management information system for South Africa has become evident. As Bartkus and Stull (2004:68) remark, "in the past it is apparent that co-operative education research has focussed on such issues as programme development, administrative practices, benefits ...". This is surely not the case in any of the so-called developing or under-developed countries in Africa. Although co-operative education, in one form or another, (also referred to lately as "learnerships" in South Africa) has been around for some time, rightful recognition for its contributions to education as a whole in South Africa has not been accepted. Several reasons for this can be speculated on but further research into this matter is beyond the scope of this thesis.

Within the South African context, co-operative education is a career-orientated educational system in which each qualification also incorporates an accredited experiential learning component. Career-orientated education comprises the divulging of knowledge, the transfer of *skills* (refer to Glossary), and the inculcating of values and attitudes of a utilitarian nature, particular to careers. It is aimed at preparing a graduate, without additional in-service training, as useful manpower from the very outset of employment. This initial training within the "real world of work" is provided through the experiential learning component of co-operative education.

Experiential learning is an extension of the formal educational component of tuition normally provided by the educational institution. It may assume various forms with the objective to facilitate learning in the real world-of-work. It also extends to the student the opportunity for experiential performance within this environment. Implicit in these concepts is purposeful monitoring. It is thus preferable to include or reflect any achievement(s) attained during experiential learning, in the candidate's final performance evaluation (Pastoré & Korngold, 1987:48; Heinemann, DeFalco & Smelkinson, 1992:19).

Managing this experiential learning, which is not always structured into fixed time periods, prescribed text and rigid syllabi, and which normally takes place outside the traditional academic environment within the ambit of commerce and industry, requires a well-designed management strategy.

The Committee for Teaching Matters (CTM) standing committee of co-operative education formulated the elements of a co-operative education management information system as follows :

- What information is needed?
- How will the information be collected?
- Where will the information be stored (CTM Standing Committee, 2000:21)?

To manage co-operative education both effectively and efficiently, all interdependent elements such as the academic and experiential learning components, should be combined. In order to develop an effective management system, a survey of the various elements of co-operative education is required.

Ricks, Van Gyn, Branton, Cut, Loken and Ney (1990:14) summarise a set of common variables (elements) inherent in the manner in which co-operative education is practised internationally:

- Work (experiential learning) periods are an integral part of the student's academic programme
- To be eligible for, and to continue in the programme, students must maintain specified standards
- Work and study periods are undertaken full-time
- The work (experiential learning) period comprises 30-50 percent of the time spent in the academic programme
- The work (experiential learning) period is developed as a "learning" experience while the student is engaged in productive work

- Work (experiential learning) assignments are determined by competition among students for jobs (placements) and competition among employers for students
- Students are remunerated at market rates of pay
- Students are supervised and evaluated by the *employer* (mentor) (refer to Glossary)
- The work (experiential learning) undertaken by students is related to the discipline of study
- Work-site visits are conducted by the host institution, and
- Faculty (*co-ordinators*) (refer to Glossary) evaluation of student output in work (experiential learning) settings is conducted (Ricks, *et al.* 1990:8).

As might be expected, programmes vary in terms of the emphasis placed on, and adherence to, these elements.

No integrated management information system (MIS) for co-operative education which was developed originally for South African requirements, presently exists in South Africa. At present, each South African technikon uses its own "small" system to manage co-operative education. Through personal experience, the one system available on the open market, "Integrated Tertiary Software", is found to be both user unfriendly and incomplete. Internationally various systems are in use, but the co-operative education models differ significantly with regard to the size of the programmes, the *credit* (refer to Glossary) bearing of the experiential learning component, student career services support available, as well as the pre- or post-graduate levels of study, from those in South Africa.

With the advance of technology, new possibilities are created for administering and managing co-operative education more efficiently. In this thesis the foundation for a new system is developed which will utilise these new technologies to improve the level of efficiency. Cost has been suggested as a possible reason why resources, both person power and physical resources, were undersupplied in the past. Any new system based on the latest

technologies, has a number of advantages such as the possibility of reducing the person power requirements and increasing effectiveness as we strive towards a paperless office. Although some *co-operative education lecturers* (refer to Glossary) in South Africa are able to process their data/information system on programs like Microsoft Access, this same system was referred to in the 1995 Waterloo team report as "an outdated programme" (Erickson, 1999:14).

To develop a new MIS for co-operative education, the focus of this thesis is to reflect both the requirements and the needs of the three key role players namely the student, the employer and the educational institution. To be cost-effective and efficient the most appropriate technologies should be utilised.

1.3 RESEARCH QUESTION

What is the most effective and efficient management information system for Co-operative Education in South Africa?

1.4 PROBLEM STATEMENT

No model of an adequate management information system for Co-operative Education, developed on the basis of scientific research, and which complies with the needs of the South African Co-operative Education system, exists.

1.5 BACKGROUND TO THE RESEARCH PROBLEM

A single coherent management information system which will compile information to manage co-operative education both effectively and efficiently, does not exist for the South African co-operative education environment. The co-operative education key role players in the developed world operate on systems developed for their specific needs. For South Africa to establish itself

as a player of significance in the world arena of co-operative education, a management information system urgently needs to be developed. Quality control of the operational and management functions requires that operational information is accurate and readily available. A worthwhile system will produce timely management information on-line in appropriate formats.

A management information system, as the term is generally understood, is an integrated, user-machine system for providing information to support operations, management, and decision-making functions in an organisation. Such a system utilises computer hardware and software, manual procedures, models for analysis, planning, control and decision-making, and a *database* (refer to Glossary). The fact that it is an integrated system does not mean that it is a single, monolithic structure; rather, it means that the parts fit into an overall design (Davis & Ohlson, 1985:6). As the second phase the international trends are analysed.

1.5.1 Analysing the Problem: International Trends

A Web-based survey (refer to Chapter 2 and Chapter 3 for further detail) revealed the following trends regarding the management and administering of co-operative education in various countries:

- i. **Australia** : Since co-operative education in Australia is decentralised and operates independently out of each academic unit, co-operative education systems are being developed separately and in-house. There is little or no active coordination among academic units.
- ii. **Canada and the United States** : Older systems, which were often created in-house, are being replaced by “off-the-shelf” software or customised commercial products.

- iii. **United Kingdom** : A state-of-the-art program developed with the aid of a government grant will soon be made available, without charge, to UK universities (Erickson 1999:4-6).

1.5.1.1 Web Expansion

Originally, co-operative education Web sites tended to provide general information for students and employers. As Web designers and Web users have become more sophisticated, the documents available on the Web are becoming more specific and detailed at many institutions. For example, some Web sites provide lengthy on-line manuals to help students prepare for co-operative education and to understand how the co-operative education processes operate.

1.5.1.2 On-Line Data Access

Most co-operative education units are creating ways for employers, students and co-operative education administrators to connect to sophisticated co-operative education databases on-line. Restrictions on access and available functions for each group vary from one institution to another.

A random selection of ten universities from the countries mentioned in Section 1.5.1 (pp.11-12) has many of the job descriptions of experiential learning positions available in some type of electronic form (e.g., e-mail, Web or Telnet): Two of the ten co-operative education units at the universities, currently post positions on the Web.

All the participating universities from the selection surveyed, with the exception of the Division of Professional Practice at the University of Cincinnati (USA) and Swinburne University of Technology (Australia), have implemented, or are implementing, systems which will allow students to access job descriptions on-line. Most systems also allow students to post résumés on the system. The

University of Cincinnati's resistance to this trend stems from philosophical and not technical issues, since all final decisions with regard to placement positions rest with the Professional Practice Faculty Advisers (<http://www.uc.edu/propractice>). Older on-line "job" posting systems from first generation systems at the universities investigated, are usually separate from other information systems, such as information about the company, contact persons and student information. Newer systems at these universities tend to be more integrated.

At nine of the ten universities surveyed, employers will soon be able to access student résumés on the Web, but the type of access will not be the same at all institutions. As of February 1999, only three of the surveyed institutions had this function in place. Three universities allow employers to search and sort all student résumés, while nine provide only access to résumés of students who have pre-selected a particular employer. At ten institutions, employers are also able to receive résumés by fax or e-mail if they were to choose that option. The majority of systems currently allow employers to use Web-based forms to e-mail job descriptions to the co-operative education unit, but résumés are still received in paper or fax format. Using password protection, new state-of-the-art systems will allow companies to enter and update information and descriptions on-line.

Currently the small "in-house" systems in use in South Africa do not have any of these facilities available.

1.5.1.3 Enterprise-wide Information Systems Integration

With the exception of universities with completely decentralised co-operative education departments, most management information systems provide a connection between the co-operative education databases and university-wide student records and demographic information. These connections have been established to avoid duplication of data entry, confusion, and problems associated with updating multiple databases. This trend towards building

interfaces with other related systems provides for real-time sharing of information. The small "in-house" systems in use in South Africa do not facilitate such linkages. The duplication of information is thus unavoidable.

One of the major driving forces accelerating the development of new management information systems is a desire for better and more flexible reporting capabilities which are typically not available on systems installed before 1999. Once these are in place, co-operative education modules under development, will allow connection and sharing of information. In the South African context, the dynamic development in the educational field will be able to utilise this to its fullest.

1.5.1.4 Advantages of a Web-based System

Results of the initial survey of ten random selected universities (refer to Section 1.5.1, pp.11-12), suggest that there are many common reasons for moving to newer, integrated Web-based information systems. Summarised responses of these 10 institutions are listed below.

(i) Efficiency of Administration

- Increased efficiency, reduced staff input times, ease of administration, and improved reporting functions are all suggested as reasons for the development of new systems
- Links between registrar's student records and co-operative education data lead to less confusion and fewer updating problems
- Reduction in printing and mailing costs, and
- The Web allows a mix of PC's and Macs.

(ii) Accurate, Timely Information

- The provision of consistent, timely, accurate, detailed information to staff, students, and employers that is easy to access

- Furnishing academic staff with better information
- Meeting employer needs for faster identification of candidates, and easier access to applicant materials, and
- Remaining competitive by staying on the cutting edge.

(iii) Ease of Use

- Focussing on student centeredness makes it easier for students to participate, and
- Increasing student numbers necessitates sharing information.

(iv) Other Benefits

- International co-operative education involvement can benefit from improved information systems on-line because of the distances involved, and
- Collection of data on co-operative education and on learning outcomes can lead to increased support.

It thus appeared logical that a Web-based management information system should be developed for the South African co-operative education practitioners. To do this the various elements of co-operative education in the South African environment should be first clearly identified.

1.6 ELEMENTS OF CO-OPERATIVE EDUCATION

The literature suggests that co-operative education is defined so broadly that it is taken to describe almost any association between educational institutions and the commerce, industry and public sectors, with respect to the provision of education and *training programmes* (refer to Glossary).

Canale and Duwart (1999) report that in co-operative education programmes, student learning is promoted in ways that enhance and complement learning through traditional course and laboratory work. Typically, students work full-time on experiential learning assignments for a fixed time period with no ongoing, formally structured feedback/learning mechanisms during experiential learning periods. Formal reflection often occurs after the work assignment is completed. Distance learning during the work period provides an opportunity to enhance students' cognitive, affective, and behavioural development through continuous reflective dialogue, and through facilitation of dialogue that connects the students' experiences to their academic curriculum. In addition, distance learning links students to the university during their co-op experiences, and is likely to result in higher student retention (Canale & Duwart, 1999:25).

Canale and Duwart (1999) also report that co-operative education learning could be modelled as a 3-phase, cyclical, on-going process of preparation, activity, and reflection. During the preparation phase co-operative education staff work with students to help them develop their placement search skills, identify short-term and long-term goals, conduct self-assessment of their skills, abilities, and needs, develop a professional résumé, and assist them with interviewing skills. This proceeds to an activity phase during which students work full-time during their experiential learning phase. Often no ongoing, formally structured feedback/learning mechanisms occur during experiential learning due to the logistical difficulties created by students being away from the campus. Formal reflection often occurs only after the work assignment is completed (Canale & Duwart, 1999:27).

In the South African context experiential learning often has a specific subject credit value. Co-operative education in the South African context can also be defined as:

- Strategies of applied learning
- A structured programme of academic and placement components

developed and monitored by an educational institution in collaboration with one or more employing organisations

- Placement(s) which consist(s) of relevant work which makes a positive contribution to the operation of the co-operating employing organisations; it (they) comprise(s) a significant proportion of the total course; it (they) is (are) an integral part of that course and a component of the student's *assessment* (refer to Glossary), and
- The programme often commences and terminates with an academic period.

In this thesis, co-operative education refers to an educational system in higher education which is based on two main interdependent and interlaced components: an academic component, and an experiential learning component. Both components are planned and compiled in conjunction with industry and commerce, by the educational institution. The academic component is typically conducted by the educational institution, while the experiential learning component is normally conducted by industry and/or commerce. Through this it is implied that the educational institution, in co-operation with industry (and/or commerce), attempts to provide a specific manpower need within labour market demands. Assessment of experiential learning is performed by both the educational institution and industry (and/or commerce), based on the predetermined learning objectives (outcomes) as defined by the student in consultation with both the educational institution and industry (and/or commerce).

The elements of South African co-operative education thus identified, are: the preparation of students to be *placed* (refer to Glossary); the placement of students; the planned learning taking place during placement; the assessment of learning during placement and the appropriate report structures. These elements each act as various co-operative education management information sub-systems.

1.7 CO-OPERATIVE EDUCATION MANAGEMENT INFORMATION SUB-SYSTEMS

From the above mentioned elements a variety of specifically organised information is required. From the pilot study (refer to Chapter 4, Section 4.2.5, pp.130-136) it was established that a number of singular and less comprehensive management information sub-systems are used at South African technikons, most often on an *ad hoc* basis. These management information sub-systems are also included in the one co-operative education information system being marketed in South Africa. These management information sub-systems are:

- Co-operative employer information
- Student referrals/placements
- Student experiential learning records
- Details of placements and experiential learning records
- Student visits by co-ordinators
- Industry training needs
- Individual employer details
- Nominees for committees
- Placements available
- Students available (profiles included), and
- Various standard letters.

From the above, various "reports" are required to optimise the functionality of co-operative education management information systems.

(i) Reports:

In this thesis reports such as students' reports, employer reports and reports on short courses refer to reports as defined by Meine (1963:614) as early as 1963, as a statement of facts. The reports required may vary among institutions and even qualifications, but the following cover all the possible demands.

- Approved qualifications per employer
- Employer contact persons
- List of employers per geographical area
- Registered students per area
- Students not placed/placed and registered
- Student referrals and placements
- Students placed per approved qualification
- Student experiential learning records and results
- Students visited by co-ordinators
- Students placed but not registered
- Work-stations offered
- Advisory committees
- Industry appointments
- Training needs, and
- History for in-service trainees.

The results from the pilot study confirm the *ad hoc* use of these sub-systems. Although approximately 50% of the respondents viewed these sub-systems as "Very Important or Important", approximately 50% of the respondents preferred not to comment. It can thus be inferred that they did not utilise them.

Laudon and Laudon (1996:18-30) describe six major types of information systems that incorporate information collection with various levels of analysis and decision-making:

- Transaction Processing Systems (TPS) - Computerised systems that perform and record routine daily transactions necessary to conduct the business; they serve the operational level of the organisation
- Office Automation Systems (OAS) (refer to Glossary) - Computer systems, such as word processing, *electronic mail* systems (refer to Glossary), and scheduling systems; these are designed to increase the productivity of data workers in the office

- Knowledge Worker Systems (KWS) - information systems that aid knowledge workers in the creation and integration of new knowledge in the organisation
- Management Information Systems (MIS) - information systems at the management level of an organisation that serve the functions of planning, controlling, and decision-making by providing routine summary and exception reports
- Decision Support Systems (DSS) - information systems at the management level of an organisation that combine data and sophisticated analytical models to support semi-structured and unstructured decision making, and
- Executive Support Systems (ESS) - information systems at the strategic level of an organisation designed to address unstructured decision making through advanced graphics and communication.

Taking all of the above into consideration various objectives seem to be feasible.

1.8 FORMULATING THE OBJECTIVES

The following objectives were derived from the research problem statement and determined the research methodology.

1.8.1 To complete a situation analysis based on

- the needs, and
- demands for a co-operative education management information system both locally and internationally (refer to Chapters Two and Three)

1.8.2 To conduct a comparative study of the alternative, limiting existing data systems such as Microsoft Excel, Access, etc., in use both nationally and internationally, based on the situation analysis (refer to Chapter Two)

1.8.3 To design an instrument to determine the scope as well as perceptions of the importance of the various elements required within a co-operative education management system in South Africa (refer to Chapter Three), and

1.8.4 To develop a conceptual model of an efficient co-operative education management system for co-operative education for South African institutions of Higher Education (refer to Chapter Six).

1.9 RESEARCH METHODOLOGY / WORKPLAN

Various techniques have been employed in the research methodology. To develop an efficient and effective co-operative education management information system the needs and demands for such a system in South Africa dictate the methodology used. Both quantitative and qualitative methods are necessary.

A questionnaire was developed and deployed in a pilot study to determine the scope as well as the importance of the various elements required within a co-operative education management system, based on the set of sub-systems established by the survey. These questionnaires were circulated to participants during a workshop organised at Technikon South Africa in Johannesburg where representatives from all 15 technikons were present. The intention was to discuss the problems that exist with the present system. Respondents were requested orally to complete the questionnaires. From the 41 questionnaires circulated, 21 were returned ($\pm 50\%$). Some technikon representatives completed only one questionnaire per technikon.

The main aim of this pilot study was to determine:

- Whether the questions asked were clear and unambiguous, and
- Whether the list of questions covered all the co-operative education sub-systems.

From this pilot study another four co-operative education management information sub-systems (refer to Section 1.7, pp.18-20) were identified: Various Short Courses, Company Information, Placement Offers, Short Courses on the Intranet, Self-assessment and CV/Résumé Committed to System. In addition, minor semantic adjustments were made to several questions in the survey.

1.9.1 Delineation of the Study

In this study, the primary focus has been to identify perceived shortcomings of the present systems nationally, as a means to improving efficiency and effectiveness in the future. Nationally it encompassed all 15 technikons plus a random selection of six colleges from approximately 50 colleges (once the amalgamation process has been completed) that practise co-operative education and internationally a random selection rendering a statistically significant sample of the institutions affiliated to the World Association of Co-operative Education (WACE) was invited to participate in forwarding information on the questionnaire supplied.

1.9.2 Situation Analysis

With the aid of a gap analysis focus has been given to the survey. This required that the current management of co-operative education, as well as the management information systems available, have been established and then compared to the internationally recognised leaders in this field (refer to Chapter Three).

1.9.2.1 The South African Situation

From personal enquiries, as well as a workshop held at Technikon South Africa where all 15 technikons were represented (Annexure A), the need for a management information system was reinforced. From the literature surveyed, it seems clear that no adequate management information system for co-operative education exists at South African technikons. Spreadsheets and

small in-house database programmes are generally used. *Ad hoc* systems used by the various institutions, lead to inadequate service to the employer community at large (refer to Chapter 3, Section 3.4.1, p.110-112, Integrated Tertiary Software).

In order to develop a new management information system for co-operative education, it is necessary to develop a model of a co-operative education management system for the local market. This has been a point of departure to analyse the local situation. The terms of reference were to:

- Conduct an analysis of the strengths, weaknesses, opportunities, and threats for co-operative education in South Africa with a specific focus on the influence of a co-operative education management system
- Consult extensively, seeking the perspectives of staff, students and others involved in, or affected by a co-operative education management system, and
- Design a conceptual model to manage co-operative education for the local market.

1.9.2.2 International

Co-operative education is practised extensively across the world, for example, in the UK, USA and Canada. The management information systems in use vary from those utilised in the sandwich system of the UK, to the virtually paperless office in the co-operative education departments in the USA, to the multiple campus applications of co-operative education in Canadian universities. The South African co-operative education models are different, and an investigation into the situation in these countries at present have been used to set the development targets in the gap analysis (refer to Chapter 3, Section 3.3.3, pp.105-109).

1.9.2.3 Interface with Other Institutions

In both national and international situation analyses extensive use has been made of information posted on existing Web sites. However, personal contact with the administrators/managers of co-operative education and/or experiential learning was regarded as crucial. Although qualitative data is extremely varied in nature, only in-depth interviews were used. In-depth interviews included both individual (one-on-one) as well as group interviews (including focus groups). The data were recorded on audio recording equipment and written notes. Good working relations have been established with these colleagues at all 15 technikons in South Africa, and three colleges (Tygerberg, Western Province and Durbanville) in the Western Cape. Internationally, personal working relationships have been established with colleagues at Drexel University (Philadelphia, USA), Northeastern University (Boston, USA), University of Waterloo (Waterloo, Canada), University of Huddersfield (Huddersfield, UK) and Universidad Autonoma de Madrid (Madrid, Spain).

1.9.2.4 Comparative Study

When the present situation in South Africa is compared to the (likely) situation in the future, the gap analysis will assist in developing the model.

1.9.3 Empirical Study

Using a dendogram, a questionnaire has been developed from the pilot study. This questionnaire has been improved by a review of previous research and investigations, focussing on all the elements of co-operative education and possible best practices of each. The questionnaire has been tested for reliability and validity by a panel of "competent practitioners" of various elements of co-operative education, and revised to enhance its relevance. The instruments have been administered to a random sample of the identified population. Statistical analysis has been performed on the data gathered.

From initial discussions with qualified statisticians, it was suggested that as a point of departure, questionnaires should conform to at least the following basic criteria :

- The demographic component should be uncomplicated in style, and provide data which would assist in establishing and analysing variables
- The demographic data should ensure that the sample and the population can be described
- The collected demographic data should be analysed, using frequency distributions and cross tabulations
- The questionnaire should be self-administering (easy-to-follow instructions)
- The questionnaire should require a reasonable time to administer/complete
- Response scores should be weighted from one to six
- The instrument should measure intrinsic and extrinsic approaches to variables
- Scoring should be relatively easy
- An item analysis should be undertaken by means of the chi-square procedure to validate the items, and
- A pilot study should be undertaken to ensure that the proposed instrument is capable of achieving its prescribed objectives.

A panel of at least 15 members was recruited to evaluate the proposed instrument for its ability to measure the identified variables. These representatives were academics, mentors from industry and/or commerce, as well as students (or alumni) who have completed their experiential learning component. Each had an active association with co-operative education. This panel was requested to render qualitative feedback on a predetermined scale, each level being specifically defined in a covering document. This feedback provided input to design the final instrument by subjecting it to an intense review in a statistical and semantic manner.

1.10 OUTCOMES OF THE RESEARCH

This study investigated various models in which co-operative education management information systems are used locally and internationally. A conceptual model of what constitutes the best co-operative education management system for the South African situation has been developed for all those administering and/or managing the co-operative education programme principle. No such management system is available at present and the development of such a model thus fulfil the major needs of the 15 technikons, as well as all college and university programmes practising the co-operative education model.

In summary :

- Shortcomings in the present systems have been identified.
- A conceptual co-operative education management systems model for tertiary institutions has been devised
- An efficient communication system among students, companies, co-operative education lecturers, classroom lecturers and the administration of the tertiary institutions has been developed
- Areas which require more research has been identified
- A paper focussing on the outcomes of the research at the World Association of Co-operative Education conference will be delivered, and
- Two articles will be published in journals related to co-operative education.

1.11 SUMMARY

In Chapter **One** the research problem has been defined and the background to the problem illustrated. The problem was further analysed with brief references to the local and international systems of managing co-operative education. The research methodology is comprehensively explained in Chapter Four.

From an initial pilot study, several critical activities emerged and are mapped to establish a structure. When further investigated, these activities can be transformed into questions (items) which can be used in the questionnaire (Qualitative survey, refer Annexures B, C & D). These questions (items) are grouped into logical sub-systems (refer to Annexure a(i)). Although these sub-systems are distinguishable entities, they are also mutually interdependent.

Critical activities relating to the preparation of students for placement, such as on-line manuals (refer to p.12), short courses to develop specific skills (refer to pp.16 & 21), planning the placement process (refer to p.17), formal reflection and continuous reflective dialogue (refer to p.16), identified the necessity for a sub-system, short courses available on the intranet.

The employer sub-system was identified mostly through critical activities relating to the placement - and experiential learning processes, as such. Examples of these are: industry training needs and placements available (refer to pp.17 & 18), job descriptions (refer to pp.12 & 13), employer information (refer to pp.13 & 18) and details of the experiential learning situation (refer to pp.18, 19 & 21).

Several critical activities relate to the student sub-system. Examples are: student information, that is, referred and placed (refer to pp.13 & 19), data on outcomes, assessment of learning, appropriate reporting and student experiential learning records (refer to pp.14, 17, 18 & 19).

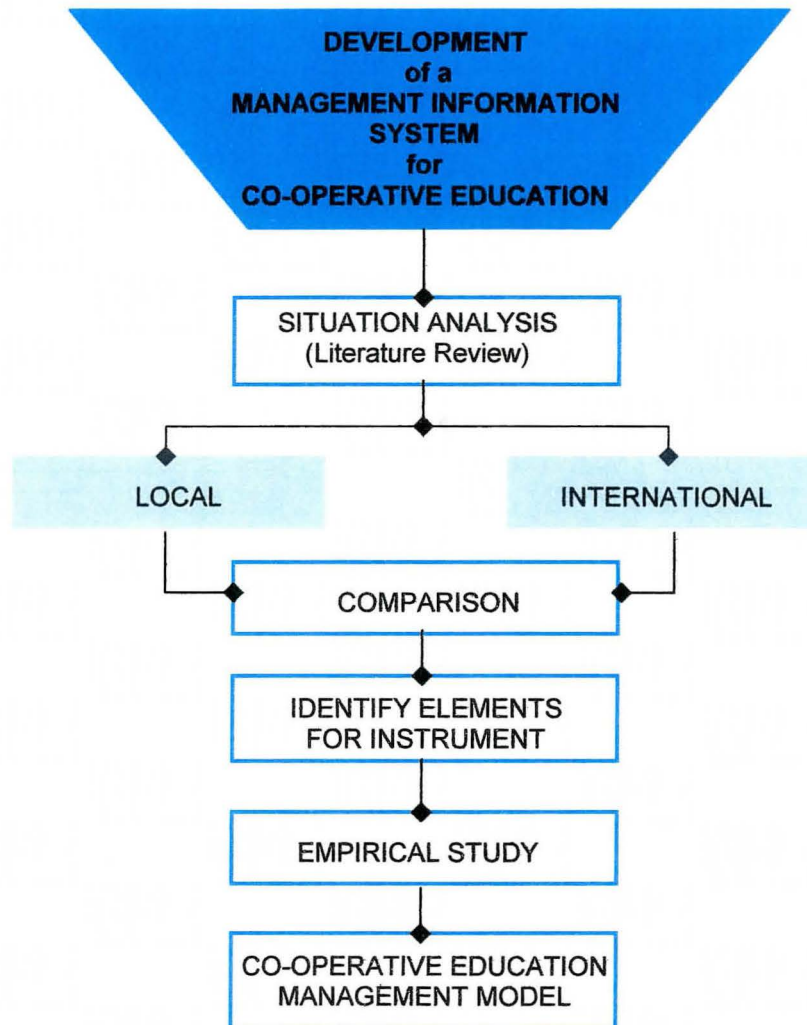
Some of the critical activities highlight the mutual interdependence of the sub-systems. One example of this is the interaction between the student sub-system and the employer sub-system with critical activities such as : Students available (with profiles) (refer to p.18), students referrals and details of placements (refer to p.18), visits by co-ordinators (refer to p.18), better and more flexible reporting systems, accurate timely information (refer to p.14) and ease of use (refer to p.15). The critical activity, increased efficiency (refer to p.14) links all three sub-systems.

These critical activities are further investigated in Chapter 3. From this investigation in Chapter 3 the standard procedure of compiling a questionnaire to conduct quantitative research, is followed.

Chapters **Two** and **Three** further investigate the research topic. Chapter **Two** investigates the utilisation of Web sites, *Internet* (refer to Glossary) and the Intranet in systems to manage information systems. The challenges and basic elements of such systems are investigated. While Chapter **Three** focuses more on the co-operative education system and its various elements. Chapter **Four** outlines the systematic and orderly procedure of the study, research methodology and the techniques applied to address the research objective. The results of the survey are reported and analysed in Chapter **Five**. Chapter **Six** reported on the conclusions of the study and specific recommendations.

The following chart Figure 1.2 "Summary of the Research Process", summarises the research process.

FIGURE 1.2
Summary of the Research Process



CHAPTER 2

LITERATURE STUDY : DEVELOPING AN INFORMATION MANAGEMENT SYSTEM

This chapter reviews the literature relevant to the research. It outlines some information technologies available to organisations and the educational environment. The literature also highlights most of the processes within a management information system. Furthermore, it summarises the initial considerations in developing a management information system.

2.1 INTRODUCTION

As early as 1997, Wharton (1997) believed without a doubt that we are in the "information age", since computer sales for both office and home were booming. She claims that information dominates our society and the way we do business. She describes organisations as being networked together into a "global village", which uses electronic mail (e-mail) to communicate with clients worldwide. She further states that *Internet* (refer to Glossary) and World Wide Web (WWW) sites are flourishing with information accessed at amazing speeds across worldwide links (Wharton, 1997:7). In general, web-based information systems are often referred to as information systems which are based on web technology, integrated with information systems such, amongst other, databases.

Tamakoe (2000) makes the unchallenged statement that for the future challenges of co-operative education in the new millennium will deal with the design and principles of online communities. They will aim at enhancing the

effectiveness and global competitiveness of the client organisation by creating and refining tools for new technology (Tamakoe, 2000:1).

Due to the development and availability of these new technologies, co-operative education programmes are now able to offer coursework and work placements to students at great distances from the campus (refer to Chapter 6, Section 6.3.4 pp.281-283). Co-operative education professionals have to share knowledge and collaborate in developing new Internet applications: online courses, on-line resources, image databases, on-line chat sessions, video teleconferencing and publishing of on-line articles and journals. In professional fields, developing the pre-requisite skills for work placement is an essential responsibility of the instructors in pre-placement courses. As early as 1999 Stuart (1999) believed that *Interactive Instructional Television (IITV)* (refer to Glossary) offers an instructional tool that is "the next best thing to being there" for enhancing skill development through demonstrations and feedback. It requires careful planning and forethought to deliver a course through IITV that has a differential impact on students' learning (Stuart, 1999:16). This approach is supported by Chapman (1999). He concludes that one of the most promising technologies being used for campus recruiting and selection is the videoconference system. Videoconference technology transmits interactive video, sound and data between two or more geographical areas. According to Chapman (1999) many systems are connected with telephone lines, special dedicated data lines, or modified cable systems which can transmit data fast enough to reduce or eliminate video lag (Chapman, 1999:35-41). These technologies are put to great use on Intranets.

Broadly speaking, the aim of information management is to promote organisational effectiveness by enhancing the capabilities of the organisation to cope with the demands of its internal and external environments in dynamic as well as stable conditions. Fairer-Wessels (1997) concludes that information management is viewed as the planning, organising, directing and controlling of information within an open system. This can be applied in various fields with a multiplicity of interdependent variables, such as in co-operative education

(Fairer-Wessels, 1997:93-102). Co-operative education, as practised by educational institutions, has a variety of variables. To be able to link these variables, educational institutions frequently have their own dedicated Websites and management information systems to handle, for example finances, information relating to staff as well as the academic information of students.

Chen and Heath (2001) and others assert that Web-based information systems (WIS) are information systems (IS) that are based on Web technology and they are likely to be tightly integrated with conventional IS such as databases and transaction processing systems (Chen & Heath, 2001:385-396; Isakowitz, Bieber & Vitali, 1998:78-80). This "Web-based" concept refers to a Web page that is built on a *HyperText Mark-up Language (HTML)* (refer to Glossary) foundation, and is able to display a wide variety of content to visitors: text, graphics, images, multimedia, sounds, animation etc (<http://www.intensedevlopment.net/website-design-W.html>). As such, it can then be seen as a set of interconnected Web-pages, usually including a homepage generally located on the same server, and prepared and maintained as a collection of information by a person, group, or organisation (<http://www.mcmaster.ca/cis/ctl/glossary.htm>). Information systems based on Web-page technology are continuously developing, and as such seek to enhance the efficiency and effectiveness of the users.

Hudson, Keasey and Littler (2000) and others, conclude that a WIS enhances competitiveness of organisations by lowering their transaction costs, allowing them to focus on groups of customers, or differentiating their products and services (Hudson, et al. 2000:3-16; Lederer, Mirchandi & Sims, 1998:94-95). Press (1999) states that WIS have recently become one of the most important issues in IS development because of the increasing importance of electronic commerce. Technically, WIS share the common global information infrastructure and standardised communication protocols (particularly TCP/IP today), but allow organisations to put *firewalls* (refer to Glossary) around their private *networks* (refer to Glossary). Since they possess many new and interesting features,

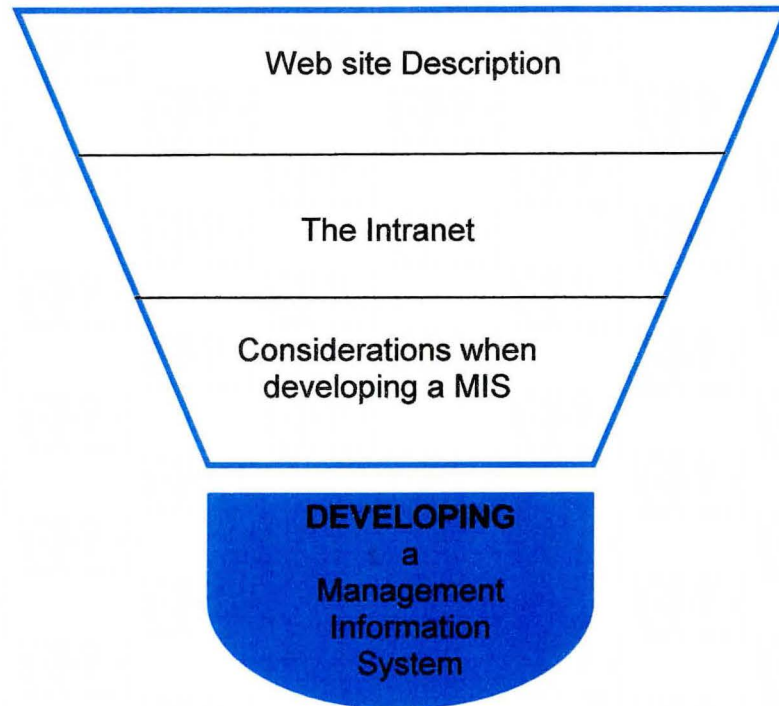
WIS are being considered the next generation of business data processing (Press, 1999:13-16).

A WIS operates to support networked organisations in the integration of specialised Web sites into a common set of tasks for them. Organisational computing network properties are the major focus of WIS. There is a clear difference between a set of Web pages and a WIS, in that a WIS supports business processes and is usually tightly integrated with other IS. Since WIS and conventional business IS (i.e., data processing systems, management report systems, and decision support systems) have normally overlapped, the general components of ordinary IS such as structured data (databases), models (model bases), and groupware for decision-making, can also serve as general components of a WIS. Due to the variety of reports required from an extensive database to influence decision-making support systems, education and especially co-operative education, are ideally placed to utilise a WIS.

The culture to utilise these new technologies has been established to some extent in institutions of higher learning as well as in industry and commerce. The Intranet system is being used extensively in many educational institutions. As such, an Intranet can be seen as, "A set of interconnected Web-pages, usually including a homepage, generally located on the same server, and prepared and maintained as a collection of information by a person, group or organisation" (<http://www.mcmaster.ca/cis/ctl/glossary.htm>). To enhance the scope of applications of these technologies within co-operative education, a master plan should be established.

The overview in Figure 2.1 structures the literature study in Chapter Two.

FIGURE 2.1
Overview of Chapter Two



2.2 WEB SITE DESCRIPTIONS

The new millennium of co-operative education needs a clear institutional plan and policy for integrated technologies as well as support mechanisms that include practical, non-bureaucratic and cost-effective models for integrating the World Wide Web and other technology tools into teaching and research.

Most educational organisations are aware that potential applicants visit their Web sites to obtain information about them (location, facilities, courses, finances, etc.). Many educational institutions invest in impressive sites that contain comprehensive information for potential applicants. Chapman (1999) illustrates the use of comprehensive Web-sites, using the example of McKinsey & Company, Booz Allen and Hamilton and other consulting firms in the USA.

These companies provide profiles of new consultants, have junior consultants write descriptions of a typical working day, and give detailed information about the history and practices of the firm. This information allows potential consultants to determine their Person-Organisation (P-O) fit (Chapman, 1999:36-38). Students who investigate possible placement positions need this information.

Stuart (1999) reports that the advent of interactive technology in education and co-operative education brings the active, dynamic aspects of learning into the student's educational experience. It puts us in the midst of a paradigm shift from the "talking head" of canned videotapes and massive reading lists of correspondence courses, into methods of instruction that allow and encourage regular student involvement. This encourages the incorporation of interactive technology into the development of relationships within virtual classes "attended" by learners physically distant from the instructor (Stuart, 1999: 16-24).

(a) Human-Computer Interaction

Co-operative Education needs to be transformed in order to identify and explore new markets. This study have to identify and target technologies and products that electrify and integrate Internet technologies into courseware and courses. Quality product and quality service should be the priority as systems are being integrated and new systems developed in order to provide flexible architecture for building and supporting the clients.

Wang (2001:387) explains that a central part of WIS is the presence of Web sites for users on the Internet. From the viewpoint of human-computer interaction, Web pages actualise the computer-user interface of the WIS, and specify the dialogue between users (clients) and the WIS. Presentations of information to massive numbers of users and handling requests for input from users are the two aspects of Web sites from the WIS side. The Web page development language HTML provides high-level

interface implementation functions to allow easy development of a variety of interface formats for the Web sites. With the *extensible mark-up language (XML)* (refer to Glossary), the implementation of the linkages between the Web pages and the associated business processes and knowledge presentation is much easier (Wang, 2001:385-396).

2.2.1 Behavioural Intention and Limitations of Using Web Sites

Studies by Lin and Lu (2000:206) investigated the perceptions of users about a Web site from the perspective of IS quality in terms of information quality, response time and system accessibility. Findings indicated that perceived usefulness of a Web is significantly affected by the quality of information provided by the Web site, and the amount of time that the user spends waiting for a response from the Web. The availability of the on-line system and its response time, on the other hand, affect the user's perception of how easy it is to use the Web site. Hence, practitioners seeking to facilitate the adoption of the Internet, should emphasize the quality of the Web site content and the efficiency of the Web site. This implies that Web page providers not only have to make the content informative and timely, but they also need to design a speedy Web page by not putting in unnecessary data which may jeopardise the display time.

Although they have limited access to the total set of factors governing the academic institution, they got a rather comprehensive access to factors relating to their academic development. Although they may be physically far from the specific educational institution, they still form part of the greater student community of their educational institution.

The participants should be made aware of the new "real-virtual" environment. Although they do not physically experience the on-campus environment, it does exist. There exists a "real-virtual" community, with everyone studying in a "real-virtual" classroom. On-line short courses relating to various topics/elements within the co-operative education environment, lends itself to this method of

learning/working by several groups living/working/studying apart – as virtual communities (refer to Chapter 6, Section 6.3.4, pp.281-283). Fieldwork – as a specific type of experiential learning experience – can be one project being completed at several locations, by several students, at the same time, to achieve one common goal. Together this group of students form a *virtual community* (refer to Glossary).

2.2.1.1 Virtual Communities

Fernback and Thompson (1999:1) state that the on-line world of computer mediated communication (CMC) is one of those new ways for humans to relate to one another, and it is growing rapidly. The activities of people on screen seem almost real, and the experience of a simulated event is so close to the experience of the real event that the feeling of 'being there' of the users of the Internet is referred to as "virtual" and people within this environment are people in a virtual community. From the researcher's own experience in higher education, it is evident that learning can also be perceived as a particular type of co-operative work, that is, people co-operate to reach a common goal. This educational philosophy becomes evident when one assigns group projects which are designed to encourage synergy among the group members. In this study, the concept of "virtual classrooms/communities" should be visualised from the perspective of the co-operative education principle in general, and the experiential learning component in particular. As a methodology of learning through co-operative work, collaborative learning is intended to be a learning process which emphasises co-operative or group efforts among faculty members and students. Active participation and interaction on the part of both students and instructors can lead to new knowledge, which emerges from the lively dialogue of those who are sharing ideas and information (Bouton & Garth, 1983:7; Whipple, 1987:3-7). Ideally, the student is a functioning member of a learning community, but also one who proceeds to explore, learn, and understand on an individual basis, independently of the rate of progress of other learners in the group.

(a) Contributions of Virtual Communities to Education

Hagel and Armstrong (1997) are of the opinion that educators can benefit from the recasting of traditional methods of association, to take advantage of the opportunities which virtual communities offer to the educational inputs, process, and outcomes. Virtual communities provide educational institutions with the chance to enhance the learning process by improving access to special simulations and demonstrations, to a variety of knowledge databases and experts, to continuous contact with those who can contribute to the learning process and to opportunities for better exploration and utilisation of learned material. These contributions can be divided into at least three related areas, such as **inputs, process and outcomes**.

(i) Inputs

A primary contribution which virtual communities can make to the educational process is the expansion of the learning dialogue through increased resources and participants. While the exchange of course information might be important, there are other resource needs such as experiential learning case studies which might lead a student to become affiliated with a virtual community (Hagel & Armstrong, 1997:87).

Wachter, Gupta and Quaddus (2000) report that on a regular basis educational entities cultivate relationships with and between students, by establishing peer and mentoring services for freshmen, associations and clubs for academic disciplines, chat or discussion groups for classes, and alumni centres and programmes for graduates. The goals of these programmes are to provide peer-to-peer learning, mentoring, and a sense of ownership, community, and inclusion (Wachter, et al. 2000:478).

Educational institutions can use the virtual community as a medium through which the same objectives can be accomplished, but on a scale which would not have been possible in a physical environment. For

instance, schools and educational institutions already possess a huge community of people with a vested interest in them - their former students. Alumni are likely employed in a variety of positions and professions and live in very dissimilar environments. By using virtual communities to link former and present students, the educational institutions can offer a great resource to its constituencies. Students can experience aspects of mentoring which would be very difficult to achieve if physical contact were required (Wachter, et al. 2000:479).

Similarly, student internships (also known as experiential learning/work integrated learning, etc.) have long been recognised as important adjuncts to formal education. However, Bowen and Laurion (1994:12) found that students sometimes enter internships with unrealistic expectations, encounter harassment at the internship site, endure a poorly designed internship experience, and have difficulty relating classroom material to on-the-job problems. Wachter *et al.* (2000) comment that : "Often there is little direct supervision of the internship and no regular contact with those who could assist in the aforementioned situations". To overcome this problem of linking "real life working environment" with academic studies, a virtual community of other interns, faculty members, professionals, and staff personnel can provide interns with the necessary support structure within the process to overcome difficulties that they may encounter, and to improve the quality of the experience (Wachter, *et al.* 2000:479).

(ii) Process

According to Jorn, Duin and Wahlstrom (1996), students can fulfil their needs by the manner in which they direct their level of involvement in community activities. One of the benefits of the technology used to implement virtual communities is the variant level of interactivity which it provides. Unless required to participate by an instructor, students may simply react passively to the information which is provided in the community. While not desirable, such uninvolved behaviour is common.

Students can also be proactive in their use of the connections to the community to get information or services. Mutual interaction occurs when students mingle with the community by generating content for discussion groups and chat rooms. Finally, constructive interaction, with focussed outcomes, takes place if students begin to form their own sub-communities and content (Jorn, *et al.* 1996:183-191).

(iii) Outcomes

Turoff (1995:1-13) notes that by the facilitation of continuing dialogue, virtual communities can promote several modes of learning. Benefits derived from both directed and undirected collaborative learning can be achieved. Kuehn (1994) states that directed collaborative learning can take place through the introduction of faculty-directed or faculty-sponsored interaction. Undirected collaborative learning can occur through the discussion and interactive sessions put forth by the students themselves. Moreover, the many avenues for interaction (e.g., simulations or virtual tours) provide the opportunity for discovery-based learning. As long as the content serves the needs of members in some fashion, one would anticipate more involvement by the student and an increase in the retention of learned concepts (Kuehn, 1994:184-191).

The classroom may still reign supreme. However, the Internet is forcing us to change our precepts about teaching and learning. A more structured virtual environment than the virtual community is the focussed virtual classroom.

2.2.1.2 Virtual Classrooms

This study claims that students are scattered amongst several placement positions for their experiential learning. Whether they are scattered amongst a group of smaller companies or within a large multi-national company, communication amongst them and also the educational institution are available. The co-operative education lecturer can still visualise them as the same group

of students who attended a lecture at the same time in the same venue on campus. Now they are in a "virtual classroom" and each will attend to the information in his/her own timeslot. Virtual classrooms and – communities are as such then a very important paradigm shift as it is in a specific sense the reality of the experiential learning situation.

Dibbon (2000) states that technology has had a minimal impact upon education and learning. While the educational content has been altered dramatically, the educational and instructional methods have remained unchanged. As the educator's knowledge of technology improves, computer penetration in education rises, access to Internet increases, and bandwidth ceases to be a significant issue, Internet-based learning (e-learning) will become an attractive alternative. E-learning will be attractive to both students in schools and universities as well as members of the corporate community, because it will provide learners with increased choices in their learning options. E-learning is defined as "the asynchronous or synchronous (real-time) delivery of training and education over the Intranet to an end-user's computer or Internet appliance" (Dibbon, 2000:1-3).

Wachter *et al.* (2000) say we have witnessed a rapid expansion of the application of technology towards the support of processes in human communication during the past decade. The utilisation of electronic tools in education has focussed on methodologies by which groups of instructors and students can carry out the learning process in an environment which replaces the physical classroom with a virtual presence (Wachter, *et al.* 2000:473-474).

Computers can be used to combine various media – print, visual, and audio - to create whole new virtual worlds and real experiences. *Virtual Reality (VR)* (refer to Glossary) has great potential for extending the learning environment and experience both in breadth and space. VR is a medium where a virtual world (a synthetic 3-D environment in colour and with stereo sound) can be explored and examined continuously from any perspective in real time (Srisa-an, 1998:152-154).

Massetti and Lobert-Jones (1997) believe that the electronic implementation of collaborative learning, results most often in the development of a virtual classroom, a place where students and instructors participate by using personal computers at home or at work. Tools, which are used in the physical world to facilitate classroom discussion, to provide feedback, and to distribute material, find their analogy in electronic space. Electronic bulletin boards, mail, grade books, quizzes, and lectures are all components of the virtual classroom (Massetti & Lobert-Jones, 1997:68-75).

Wachter *et al.* (2000), however, note that Internet-based mechanisms such as Web pages make it possible for instructors to publish and distribute course notes, assignments, and study guides electronically. Instructors create on-line bibliographics by "linking" their course work presentations to related themes at other Web sites. Computer-based conferencing systems have been designed specifically to support classroom-like experiences; especially group discussions and joint projects. Electronic discussion groups and "chat rooms" extend the reach of the classroom beyond the physical campus. Over 2000 virtual classes are available presently over the "Net" (Wachter, *et al.* 2000:474).

From the above, the importance of Internet applications and more specifically, the utilisation of e-learning in the academic field, is evident. It thus seems important to utilise the Internet and e-learning in the experiential learning component of co-operative education. This should be considered in the design of a management information system for co-operative education (refer to Chapter 6, Section 6.3.1, pp.272-275).

(a) Limitations of Virtual Classrooms

Wachter *et al.* (2000) also note that in spite of the progress which has been made in the area of virtual classrooms, there is a tendency to view the Internet in education simply as a more efficient way to access and distribute information. This philosophy often prevails during the design and implementation of electronic instructional space. Inherent limitations in this conceptualisation

affect the inputs to, process of, and outcomes of the educational experience (Wachter, *et al.* 2000:475). As for the contributions of virtual communities to education, the limitations of this type of learning can be discussed in the same areas of **input, process and outcomes**.

(i) Inputs

According to Turoff (1995:1-13), the literature describes virtual classrooms in terms of the interactions between students in the class (either at the same or at other educational facilities) or between students and instructors. Wachter *et al.* (2000) also report that the inclusion or exclusion of a particular resource in a class occurs at the discretion of the instructor. If students desire information or a typical type of interaction beyond the provided resources, it is their responsibility to seek this. In a physical setting there are many avenues a student may pursue. Absent from many virtual classrooms, however, is the ability for the student to create or access sources other than those for which the instructors have made provision. For example, it would be difficult for students to consult alumni in the context of a virtual classroom unless forums for interchange were specifically provided (Wachter, *et al.* 2000:476).

(ii) Process

Jorn, Duin and Wahlstrom (1996) conclude that the purpose of most virtual classrooms is to reproduce (albeit with enhancements) the traditional course offering, including its time-frame. Since course units have a beginning and an end, they inherently lack longevity. This impermanence is transmitted to students, since they understand that they are merely temporary residents of the virtual classroom. Not surprisingly, students tend to become engrossed in the performance demands placed upon them. Generally, they view interaction as a tool for the acquisition of a grade. They possess little notion of the construct of community. In their experience, some researchers report, even though one poses questions on a "listserv" (an automatic message

mailer) to generate discussion and build relationships, students quickly revert to task-oriented communication. The rituals surrounding the short-lived class session make task accomplishment the only goal worthy of concern. Furthermore, once the immediate class objectives are achieved, the carefully cultivated interaction and learning in the virtual classroom disappears (Jorn, et al. 1996:183-191).

(iii) Outcomes

Jorn *et al.* (1996) found that virtual courses and the classrooms in which they are conducted, exist - as do traditional courses - to accomplish particular learning objectives. However, if an objective of education is to encourage a student to take his/her learning experience beyond the specific material of a course, or to encourage lifelong learning, then one must provide a broader range and type of content for this purpose. For instance, students seem to resent required electronic interaction when they feel that they have nothing new to say or learn. The messaging forum, which they used for communication in the limited virtual context, fell into disuse soon after the term expired (Jorn, *et al.* 1996:187).

2.3 THE INTRANET - A COMPONENT OF STRATEGIC INFORMATION MANAGEMENT

2.3.1 Introduction

Major companies (and also educational institutions) are focussing their attention increasingly on the potential value of Intranets in terms of rapid transmission of up-to-date information, improved communication flows, knowledge enhancement, sharing of best practice in context, and encouragement of innovation. An intranet is a private network with an in-house Web site that serves the employees of the enterprise. Although Intranet pages may link to the Internet, an Intranet is not a site accessible by the general public

(<http://www.park-meadow.org/computer.terms.htm>). Feeney and Willcocks (1998) highlight the importance of core IS capabilities that determine an organisation's future capacity to exploit IT successfully; an important issue when adopting new technologies such as needed for an intranet: without the right capabilities, such a venture can easily fail. These capabilities of leadership, informed buying and making technology work, relate directly to the business and IT vision, the delivery of IS services and the design of the IT architecture. Hindrances to optimisation may well arise in the form of inconsistent development, poor updating and obsolete information, a lack of awareness and resistance to change, and difficulties in accessing and retaining information (Feeney & Willcocks, 1998:9-13). To try and prevent inconsistencies and build a sustainable framework, Ross, Beath and Goodhue (1996) argue that companies must build and sustain three key assets:

- A strong IT staff
- A reusable technology base, and
- A partnership between IT and business management (Ross, et al. 1996: 31-42).

From the researcher's experience gained during unstructured liaison with co-operative education lecturers' nationally and internationally, the following untested perceptions are evident. It seems as if :

- Maximising the potential of Intranets is a strategic issue.
- In co-operative education today, educational professionals are striving to demonstrate their vision, mission, aspirations and dreams to re-think and even predict the future of distance education.
- Many Co-operative education professionals believe that a more eclectic approach spanning teaching, learning, delivery, and administration is needed to deliver instruction, assignments, projects, assessment, evaluation and tracking down learners' progress at a distance.
- As Co-operative professional educators we need to take advantage of the computer's particular capabilities and not to waste them. We need to look towards the future positively and use virtual technology for delivery, teaching, learning and feedback.

- We need to prepare learners for the future by considering the technological skills they will need in the rapidly changing marketplace.

It seems that Curry and Stancich (2000) as well as Cusac et al. (1999) also support this view.

Like any other information system, they must be well managed and planned and not allowed to merely evolve in an *ad hoc* manner, which all too often can be the case. Feeney and Willcocks (1998:9-21) comment that the IS components in business solutions must be constructed rapidly and effectively despite the massive changes in IT and business operating conditions. Intranets also require a structural and behavioural change in work patterns, such as IT personnel at all levels developing strong, ongoing partnerships with line managers (Rockart, 1996:45) and focussing on work process rather than on work output (Pinsonneault & Rivard, 1998:287-311). Information and the way it is used can sustain a competitive edge in business, but there must be a shift in the perception of time spent looking for learning, and best practice as unproductive; a willingness has to emerge to foster a networking, information-sharing culture, which inevitably has to be a part of organisational culture. Using the Intranet has to become part of everyday working life without engendering a feeling that such use is a waste of time and does not constitute "work". Cusack, Gurr and Schiller (1999) found that both Intranets and Internets are increasingly becoming a normal part of work in schools, especially in the support of the teaching and learning programme. Some schools have now progressed to the point where they operate Web-based Intranets as a key component of the delivery of their teaching and learning programme. This means that school leaders have had to become knowledgeable about the development and maintenance of networks. They have not had to be network experts, but they have had to ensure that their school is developing appropriate networks (Cusack, *et al.* 1999:2).

Wang, Lee, Pipino and Strong (1998:95-105) make it clear that information is not just a by-product and that Web sites should be regarded as "information products" with site visitors being the "information consumers". The information

needs of these consumers require careful management, which involves providing access to well-integrated information sources.

Curry and Stancich (2000:250) believe that to consider the potential of the Intranet as a strategic tool, it is useful to take a strategic approach, in other words, to first evaluate the current situation and then assess the development possibilities. It is important in this context to acknowledge both areas that have been tried and tested and are working well, and to highlight areas of potential improvement - areas that are perhaps more challenging to manage and which require more attention.

Cusack *et al.* (1999) believe that educational leaders are also experiencing change in their own work with respect to information management. The introduction of sophisticated MIS, and the powerful Intranets and Internets that are becoming more common, mean that the proficient use of a range of information and communication technologies (ICT) is now seen as a normal work requirement. The work setting has thus changed to such an extent that it no longer makes sense to compare the present with the past. Educational leaders are now working in a very different environment to that of a few years ago, with many new challenges (Cusack, *et al.* 1999:4).

2.3.2 Intranets as Useful Tools

Generations of Intranet development have been identified as: the publishing of information, development of applications and the introduction of group working (Mansell-Lewis, 1997:11). Goles and Hirschheim (1997) suggest four "waves" of Intranet development :

- Information publishing applications (what most organisations are currently implementing)
- Informal collaboration applications (such as Web-enabled groupware, bulletin boards)
- Transaction-oriented applications, and
- Formal collaboration applications (similar to Lotus notes).

The research organisation Meta Group suggests that a significantly higher return on investment arises from the development of Intranet-based applications, but the majority of companies implementing Intranets tend to focus on the publishing of internal information (Mansell-Lewis, 1997:12). This brings us to the issue of merging the business and IT organisations to create a more effective information culture, dedicated to a specific homogeneous group of inter-related users. For this purpose the broad based Internet has been adapted for an "Intranet".

Curry and Stancich (2000) report on the white paper produced by Goles and Hirschheim (1997) in explaining Intranets. Intranets are private computing networks internal to an organisation, allowing access only to authorised users. They may include an internal "Web" along similar lines to the World Wide Web, with multiple Web sites and Web pages, electronic mail, newsgroups, on-line meeting facilities and any number of applications. Web browsers are used to navigate across information on the network and, whilst authorised users can cross into the Internet, those outside the organisation cannot cross into the Intranet. As the distribution of information is not restricted by time or geographical location and can be viewed by any employee within an organisation, the Intranet "provides global communication within the corporate environment internally rather than externally" (Curry & Stancich, 2000:250).

From the researcher's experience, the reading and evaluating of large volumes of résumés and application forms are daunting tasks. In order to cope with these tasks, many employers are asking applicants to e-mail their résumés or fill in standardised application forms on their Web site. Computers using criteria established by the hiring organisation can then screen application forms. Similarly, résumés can be screened for keywords, and responsible managers can generate a short list of candidates for further scrutiny. A host of computer programs have been designed to assist with this process. Viewing information on the Web enables potential applicants to self-screen before they become part of the applicant pool. This can save considerable time and resources for the

organisation and allow students to make informed choices about potential employers.

Universities such as the University of Waterloo have been working on a management information system to place all the co-operative education positions, companies and applicants on-line. Applicants can search the Web for information about the company, its history, culture, products and services, and even view profiles of current employees. This information is very helpful in enabling applicants to identify whether they feel their own background, skills and attitudes match the attributes of the organisation. This concept of Person-Organisation (P-O) fit has been extensively researched: the reported benefits of establishing P-O fit include reduced turnover, higher job satisfaction, and enhanced productivity. This accentuates the value of Intranets as useful tools (<http://www.cecs.uwaterloo.ca>).

2.3.3 Intranets and Information

Whilst publishing information is an important part of any Intranet, close attention must be paid to the volume and relevance of the information published. Information overload is a significant problem and information has to be timely, up-to-date, maintainable and cost-effective. An Intranet is only as good as its content (Mansell-Lewis, 1997), with the key to this being the need to ensure that information publishers retain both the ownership, and the responsibility for the information they publish. Clear advantages of Intranets are the reduction in duplication of information, reduction in paper/video/audio copying and distribution costs, and faster, more direct access to information.

Curry and Stancich (2000:252) agree with Schachtman (1998:49) that the problem of information as a useful management tool is not solved by Intranets unless there is an attendant cultural shift to information sharing. Many managers are still not in favour of openness and prefer to control access through password-protected information. A further problem arises from the

perception of Intranets as “media devices” for mass communication, rather than as a business tool to manage information and promote interaction.

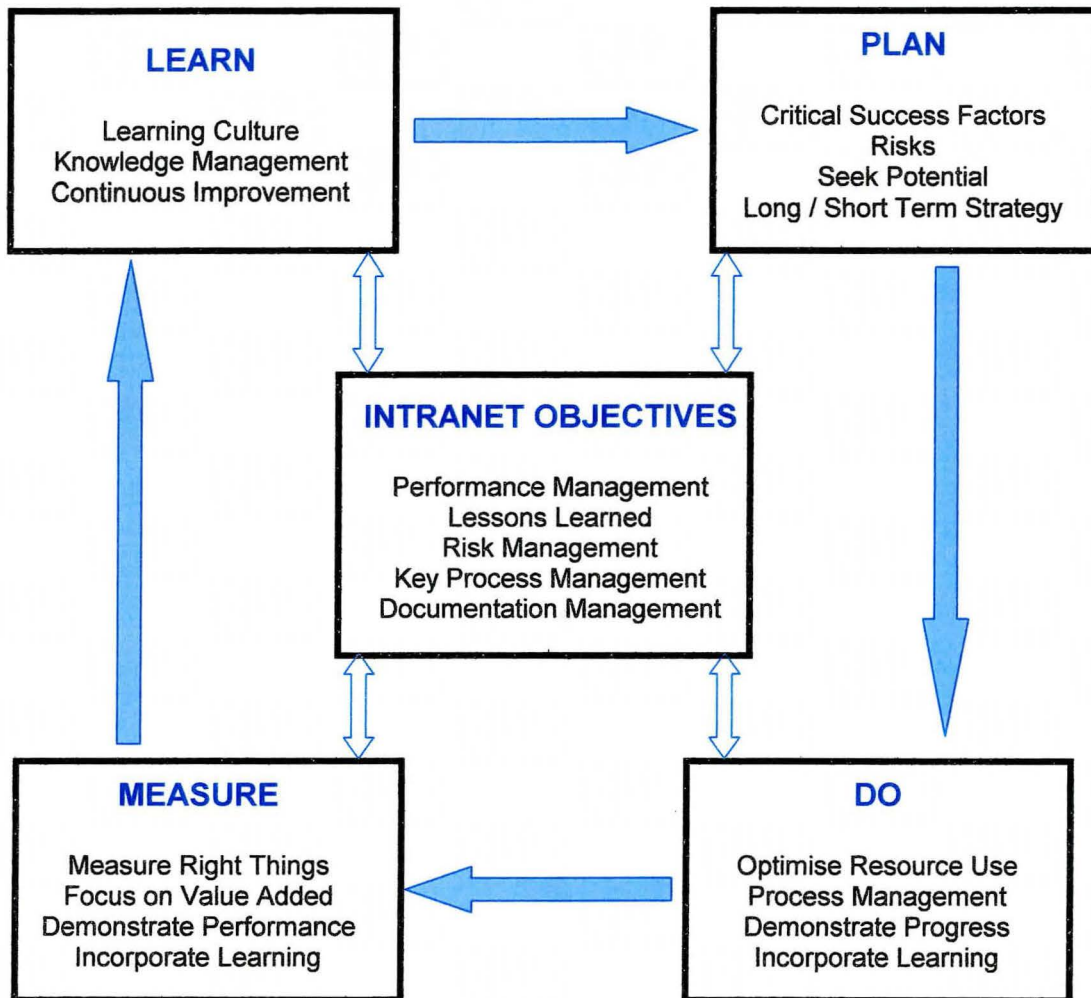
As their complexity increases, Intranets require a high level of commitment to systems management. Internet and Intranet technologies tend to be easy to start with, but become difficult to sustain beyond a certain size, involving the maintenance of large volumes of data and complex network typologies (Betts, 1997:16).

2.3.4 Intranet Strategy Development Model

Curry and Stancich (2000:264) state that a good starting point for defining a way forward is to consider a potential mechanism that draws together the important strands of the organisation’s performance and strategy. If an Intranet is to serve as a strategic tool, its development cannot be carried out on a piecemeal basis. One possible model for undertaking this task is to link Intranet development to the organisation’s quality system on the basis of Deming’s “Cycle of Continuous Improvement” (refer to Figure 2.2, “Intranet Strategy Development Model”).

The purpose of this model is to clarify the strategic perspective, and is therefore both high level and generic, permitting appropriate interpretation rather than being prescriptive. The five spheres of the model each contain its own objectives and deliverables, and generic processes can be defined to attain these. The four blocks of *Plan, Do, Measure, Learn* all interact with the *Intranet Objectives* block in the centre of the model, reflecting the principal aim that the Intranet should become the centrepiece of the organisational strategy if it is to create additional and substantial value.

FIGURE 2.2
Intranet Strategy Development Model



Adapted from Curry and Stancich, 2000

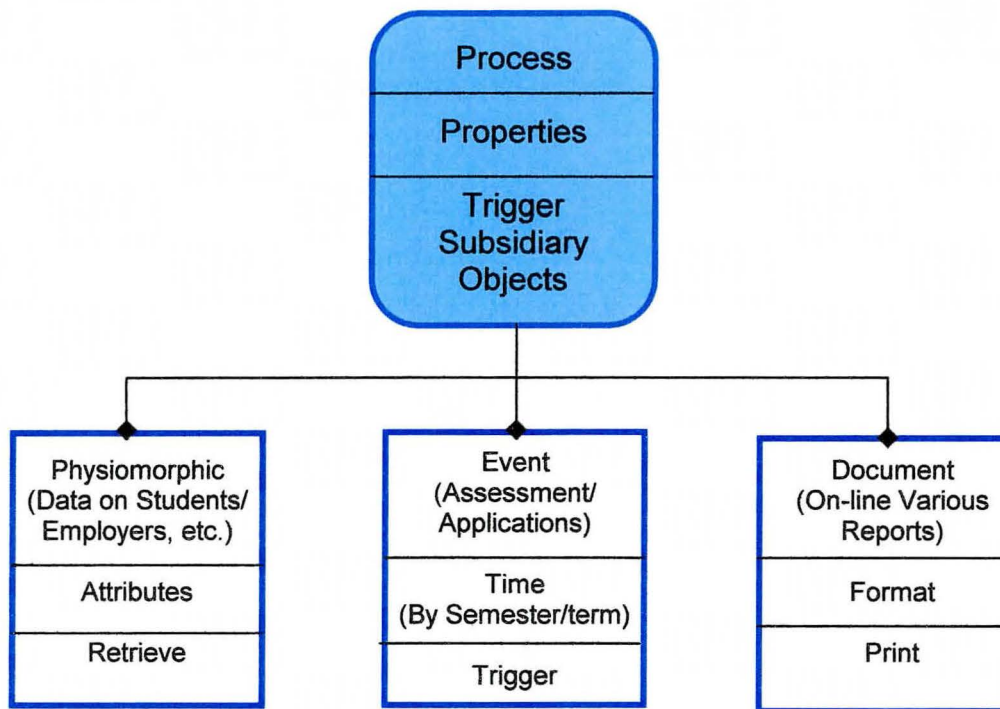
Curry and Stancich (2000:265) highlight the fact that it is important to introduce a quality system for the maintenance and development of Intranets. An optimum level of quality and functioning needs to be defined for an Intranet, relating to updates, links, presentation and quality of content. Development of Intranet guidelines and update processes needs to be accompanied by systematic measurement and appraisal, to ensure that errors and sub-optimisation of the Intranet are minimised. On-line training also allows users

the flexibility to progress at their own pace, saves on the costs of training, and boosts awareness of the Intranet, thereby heightening its potential value.

2.3.5 On-line "Business" Process Descriptions

A business process can be modelled by using three fundamental types of object classes: physiomorphic, event, and document objects (Wang, 1999:34). Physiomorphic objects exist as physically entities (e.g., data on students/employers, course content as well as various other physical forms of information). Physiomorphic objects represent the structured data in WIS. Event objects represent events of routine operations (e.g., assessment/applications, etc.) or decision activities (e.g., credit approving). In the object-oriented paradigm, event objects explicitly describe the system timing dynamics. Document objects are information entities that enter the system (e.g. electronic order applications), or that are produced by the system (e.g., on-line reports and student/employer/co-ordinator side scripting HTML documents). A general structure of business process descriptions is shown in Figure 2.3 "Business Process Objects".

FIGURE 2.3
Business Process Objects



Adapted from Wang, 2001

2.3.6 Behavioural Intention and Limitations to Using an Intranet

Because of Intranets' character of interactivity, successful customer-oriented (students/employers) marketing is now possible. With the use of an Intranet, many traditional business concepts need to be reformulated. Therefore, it is vital to examine the user's perceptions about an Intranet site; since these perceptions may give a clue as to how to manage the sites effectively. In considering such an issue, Lin and Lu (2000:97), note that the information system (IS) quality (which includes the perceived information quality, response time, and accessibility of the site) is a highly influential factor in determining the user's beliefs of usefulness and ease of use of an Intranet site.

The most frequent use of the Intranet systems for selection purposes is for conducting employment/recruiting interviews with university applicants. Imagine the potential of interviewing five applicants at five different universities without ever having to leave your desk. Benefits for the organisation include cost savings, access to more and better applicants, and the opportunity to display technological prowess. Of these benefits, perhaps most attractive is the large cost saving achieved by using technology. In addition to being used as aids in an interview setting, computers can be programmed to actually conduct interviews (Janz & Mooney, 1999:4). Applicants can be seated at a specially designated PC or be linked to a company Web site via an Internet. The computer then generates either text or audio/voice questions which the applicant responds to with verbal responses, or alternatively, the use of a keyboard. The content of these responses is subsequently screened and scored by the computer, or they can be coded and scored by trained human resource practitioners.

2.3.7 Organisations' Information Infrastructure Descriptions and Objects

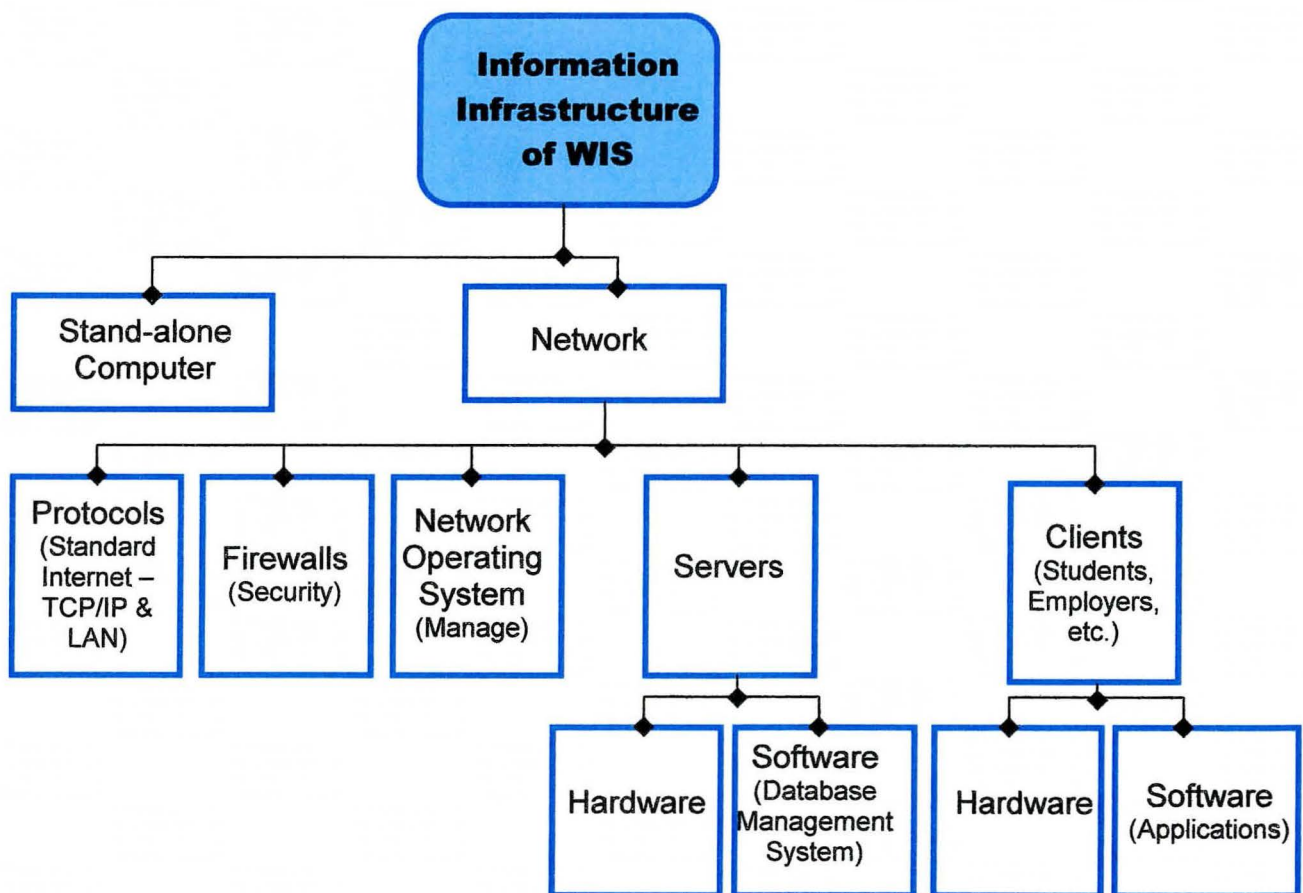
Information infrastructure is one of the most important issues in contemporary information resources management. Research by Strader, Lin & Shaw, (1998:75-94) has proposed a framework of information infrastructure for electronic commerce. The research of Strader *et al.* (1998) contributes to the step from the conceptual framework to the generic object-oriented structure for WIS. The information infrastructure of a WIS can be represented by a structure of objects, as shown in Figure 2.4: "Information Infrastructure Objects of a Web-based Information System". The networks are the major components of the information infrastructure in WIS.

Five elements are considered essential for networks: protocol, firewall, operating system, server, and client. Protocols in WIS include the standard *Internet protocols (TCP/IP)* (refer to Glossary) and LAN protocols. Firewalls have become the inevitable components for the security of WIS. The network operating system manages the network. It is able to detect new servers (e.g.,

new employers and organisations) and clients (students, existing employers and administrators) and help the system administrator to install them. “Client-server” computing plays the central role of data processing in WIS. Computer hardware and server software (e.g. database management systems) are the two elements of a server object, and *hardware* and *applications* are the two elements of a client object.

Wang (2001:390) stresses that a WIS in electronic commerce has its information infrastructure defined by this object structure (refer to Figure 2.4) and each of these objects has association with other objects, for example, Web sites, business processes and knowledge.

FIGURE 2.4
Information Infrastructure Objects of a Web-based Information System



Adapted from Wang, 2001

2.3.8 Advantages of a Web-based Information System

Erickson (1999) reports from the results of a survey on technology and co-operative education that there are many reasons for moving to newer, integrated Web-based information systems. The outcome of the responses of Erickson's (1999) survey can be divided into various categories such as, efficiency of administration, accurate and timely information, ease of use and other situation-specific benefits.

2.3.8.1 Efficiencies of Administration

According to Erickson (1999), the smooth operation of any administrative environment depends on various factors (refer to Chapter 6, Section 6.3.1, pp.272-275):

- Increased efficiency, reduced staff input times, ease of administration, and improved reporting functions are all suggested as reasons for the development of new systems
- Links between registrar's student records and co-operative education data which lead to less confusion and updating problems
- Reduced printing and mailing costs, and
- The Web allows a mix of PC's and Macs.

The efficiency of administration is dependent and further advanced by making information available accurately and timeously (Erickson, 1999:4).

2.3.8.2 Accurate and Timely Information

Erickson (1999) further stated that to enhance a Web-based information system it is imperative that information should be made available in good time. The following factors will enhance the efficiency of the system (refer to Chapter 6, Section 6.3.1, pp.272-275):

- Providing consistent, timely, accurate, detailed information to staff, students, and employers that is easy to access
- Furnishing academic staff with better information

- Meeting employer needs for faster identification of candidates and easier access to applicant materials, and
- Remaining competitive by staying on the cutting edge (Erickson, 1999:4).

With regards to efficiency, accuracy and timely information, Callahan and Epting (1999) report from the Mississippi State University (MSU) that the student referral/placement process requires an intense effort and disproportionate amount of time in a programme focussing on high quality. This problem is magnified as students are currently placed in several states/provinces/countries and it thus requires a significant infrastructure for support. Previously student referrals were done primarily by phone, and submission of résumés and employer applications via the office of the co-operative education co-ordinator. Again efficiency, accuracy and speed of execution could be jeopardised by this basic “paper system”, compared with a Web-based information system (refer to Chapter 6, Section 6.3.1, pp.272-275). It became apparent that professional staff was spending considerable time as “interview administrators” for an increasing number of employers coming to the campus to interview a growing number of prospective students. In some situations a considerable time lag between the on-campus interviews, and the outcome thereof, occurred. This created a problem for students, employers, and the academic staff (Callahan & Epting, 1999:42).

2.3.8.3 Ease Of Use

Although the information is timely and accurate, Erickson (1999) found that the system should be user friendly towards staff, students and employers (refer to Chapter 6, Section 6.3.1, pp.272-275).

- Focussing on student centeredness makes it easier for students to participate in the total placement process (making CV available, selecting placement positions, scheduling interviews and obtaining results of interview outcomes) (refer to Chapter 6, Section 6.3.2, pp.275-278)
- Increasing student numbers leads to the need to share information (Erickson, 1999:5).

An Internet-based experiential learning curriculum, allows for the flexibility demanded by various programme areas (e.g., civil engineering has several areas of focus such as, roads/construction/design office, etc.) Each module can easily incorporate examples, exercises, references, and outcomes that are discipline-specific. Students in any programme area can be guided through any number of links throughout the Web site, which have been specifically developed by their co-ordinator. Using an electronically based experiential learning curriculum allows for much easier future adaptation. Changing one document and re-launching it on the Web is far easier, faster and cheaper than printing and distributing text updates (McRae, 1999:51).

2.3.8.4 Other Benefits

Web-based information system has benefits, which are more situation-specific:

- International co-operative education involvement can benefit from improved information systems on-line because of the distances involved, and
- Collection of hard data on co-operative education and on learning outcomes can lead to increased support in the development of better educational programmes (Erickson, 1999:4-6).

2.3.8.5 Concluding Remarks

From the above it can be construed that the proposed object-oriented WIS structure (refer to Section 2.3.8, pp.56-59) has several advantages. First, it employs a simple object-oriented technique and facilitates communication (between academics, students and employers) in the course of WIS development. Second, the technique integrates the five components (the Web site, business processes, knowledge, the information infrastructure, and software agents) of WIS into a single object-oriented diagram. The purpose of the detailed modelling diagrams includes system planning, system analysis and implementation, user training (staff, students and employers), and system

evaluation. Finally, most importantly, this model would make it possible to build in a management system within the physical WIS. When changes to the business process, information infrastructure, Web sites, and software agents are made, the management system will be able to provide information about the impact of these changes on the WIS.

2.4 MANAGEMENT INFORMATION SYSTEM CONCEPT

As early as 1985, Davis defined a management information system as an integrated, user-machine system for providing information to support the operation, management, and decision-making functions in an organisation (Davis & Olson, 1985:22). Such a system typically utilises computer hardware and software, manual procedures, models for analysis, planning, control, and decision-making, and a database. An MIS can thus be seen as an evolving concept. Rather than just a single large system, an MIS is a federation of loosely integrated sub-systems which can be developed separately and integrated through a database (refer to Chapter 6, Section 6.3.1(b), p.272). Rather than being distinct from data processing, a MIS is an orientation, which guides the development and operation of data processing systems. The three concepts incorporated into the MIS orientation are the decision support systems, information resource management, and end user computing (Davis & Olson, 1985:22)

Different classes of users of management information systems will use it differently. The major users of a computer-based information system are presented in Table 2.1:

TABLE 2.1
Major Uses of Computer-based Information Systems

USER	USES
Clerical Personnel	<ul style="list-style-type: none"> • Handle transactions, process input data and answer inquiries
First-level Managers	<ul style="list-style-type: none"> • Obtain operations data. Assist with planning, scheduling, identifying out-of-control situations, and making decisions
Staff Specialists	<ul style="list-style-type: none"> • Information for analysis. Assistance with analysis, planning, and reporting
Management	<ul style="list-style-type: none"> • Regular reports • <i>Ad hoc</i> retrieval requests • <i>Ad hoc</i> analyses • <i>Ad hoc</i> reports • Assistance in identifying problems and opportunities • Assistance in decision-making analysis

A MIS may also be described in terms of its operating elements. The physical components are hardware, software, database, procedures and personnel. The management information system processing requirements are to process transactions, maintain master files, and produce reports, process inquiries, and process interactive support applications. The outputs for users are transaction documents, pre-planned reports, pre-planned inquiry responses, *ad hoc* reports and inquiry responses, and user-machine dialogue responses. These provide management and other decision makers with monitoring information, action information, and decision support.

2.5 INITIAL CONSIDERATIONS IN DEVELOPING A MANAGEMENT INFORMATION SYSTEM

The literature thus suggests that proper information management is crucial to ensure productivity during the development of information systems (IS). One factor that has greatly impacted on productivity is the dynamics of the environments within which an IS operates (Seilheimer, 2000:289). Information, as such, is data that has been processed into a form that is meaningful to the recipient, and is of real or perceived value in current or prospective actions or decisions.

Significant problems exist concerning proper information management to ensure the productive development of information systems (IS). The main impediments to keeping pace with state-of-the-art *information technology (IT)* (refer to Glossary) and matching it to business needs, are the rapid rate of change in IT, the high cost of new technology's, senior management computer illiteracy, and the lack of time in IS departments to devote to new technologies (Nath, 1994:441). For the preceding, both Seilheimer and Nath use the terms "management information system" and "information system" interchangeably to refer to this broad framework.

2.5.1 Technology-driven Change

Cabrera, Cabrera and Barajas (2001:246) agree with earlier research that successful IT implementation requires organisations to adopt an integrated approach to organisational change in which people and technical factors are viewed as inextricably linked and interdependent. In this sense, senior managers must take full responsibility in developing a long-term strategic view of change, and project managers must be given responsibility for managing change, by paying full attention to human and organisational issues, and, more concretely, for actively considering how the new technology may affect the way in which work is organised and jobs are designed.

According to Cabrera *et al.* (2001), technology and people, however, are only two of the several “inextricably linked and interdependent” sub-systems which are at work within the organisation and which together define its performance. In order to understand the interconnections between technology and people, we need a bigger picture which lays out the relationships between these two and other important sub-systems such as organisational structure, business and management processes, and strategy (Cabrera, *et al.* 2001:246).

2.5.2 Organisational Culture

Cabrera *et al.* (2001) notes that organisational culture comprises a set of social norms that implicitly define what are appropriate or inappropriate behaviours within the boundaries of the organisation and this is not necessarily homogeneous across all areas of the organisation. While some of the norms will permeate the entire organisation, different groups within the organisation might develop their own sub-cultures. Although the results of the research of Cabrera *et al.* (2001:248-249) indicated six main dimensions of cross-organisational variables, only the four more prominent dimensions linking more directly to this study are discussed.

- (a) **Process vs. results orientation** refers to whether an organisation is more concerned with the means and procedures that must be followed to carry out the work, or with the goals that are pursued with that work. Process orientation is typical of mechanistic or bureaucratic organisations rich in rules and procedures, whereas results orientation is typical of organic, risk-taking organisations, in which mistakes are tolerated and innovation valued.

- (b) The **employee vs. job orientation** reflects whether the organisation is more concerned with the well-being of the person or with getting the job done. Groups or committees often make the important decisions in employee-oriented cultures, and an effort is made to help new members adjust. In contrast, job-oriented cultures tend to rely on individual, top-down decision making.

- (c) The **parochial vs. professional** dimension reflects the weight that is given to the occupational cultures of the members of the organisation. In parochial organisations, employees identify strongly with their organisation, whereas in professional cultures, employees identify more with their profession. In hiring new employees, parochial organisations rely on social and family background information, whereas professional cultures hire on the basis of job *competence* (refer to Glossary) alone.
- (d) An **open or closed** system refers to the communication climate within the organisation. In open system culture information flows easily through the organisation, whereas closed cultures are more secretive (Cabrera *et al.* 2001:247-249).

Once the organisational cultures are established, the strategy of setting up the master plan should be developed.

2.5.3 Strategy: Setting up the Master Plan

Cabrera *et al.* (2001) refers to the early work of Porter (1980), when outlining a strategy. The point of departure in setting up a master plan is to understand the main variables governing the strategic positioning of the organisation in its market. Some questions as suggested by Cabrera *et al.* (2001:253) that may be useful to ask in order to reach a sufficient understanding of these issues are the following :

(a) Positioning

What distinctive value is the educational institution trying to offer to its customers and how is it going to manage to survive to do so? For example: Are the courses offered aimed at satisfying the specific needs of the companies eventually employing their alumni? Does the educational institution primarily focus on maintaining low costs, on providing a differentiated service, or on excelling in a particular niche? Knowing the

general positioning of the educational institution, can inform us about the educational institution's priorities, about what it expects from investments in technology and, hence, about how success will be measured.

(b) Perspective on Innovation

Educational institutions vary in the way they face innovation. Three types of approaches are discussed, namely defenders, prospectors and analysers. **Defenders** are educational institutions that focus primarily on improving the efficiency of their operations without actively searching for new market opportunities. They compete by maintaining lower costs (efficiency) than their competitors. On the contrary, **prospectors** are educational institutions which are constantly innovating, experimenting, and trying out new products and services that give them a "first-to-market" advantage - privileges associated with offering unique products and services. Finally, **analysers** are educational institutions that maintain a stable position in their core business while keeping an eye on competitors and rapidly trying to adopt those innovations that appear to have the greatest potential. Knowing where the educational institution stands with respect to innovation can also reveal important information about what the educational institution may expect from its investments in technology.

(c) Current Corporate Plans

Are there any ongoing or upcoming corporate plans to expand or reduce services or client base? Corporate plans, which may appear to be unrelated to the core business, might actually have a great impact on the chance of success. For example, an upcoming merger with another educational institution may cause prior systems integration efforts to become redundant or even counterproductive. Geographic expansions may have implications for networking and communication requirements. Outsourcing plans may limit the interest in investing in certain types of systems. Because an educational institution's capacity to assimilate change may be limited, the

educational institution needs to make sure that the changes imposed by new technology are not too overwhelming (Cabrera, *et al.* 2001:253).

Not surprisingly, finding satisfactory answers to these questions is not straightforward. Strategy is often only tacitly embedded in the actions of the educational institution, and official documents and plans rarely capture the reality of what the educational institution is actually trying to accomplish (Cabrera, *et al.* 2001:249).

2.5.4 Concluding Remarks

Cabrera *et al.* (2001:260) conclude that the following recommendations regarding technology-led change can be made:

- Changes in technology have effects that go beyond the technology arena. A new technology can unbalance other key educational institutions or organisational sub-systems. Successfully assimilating a new technology requires that these other educational institutions or organisational sub-systems absorb these disruptions and adapt to a new equilibrium. Failing to achieve a new equilibrium will most likely result in a frustrating waste of time and resources. This equilibrium must be viewed along both vertical and horizontal dimensions.
- Vertical fit refers to the alignment between the new technology, the capabilities of the educational institution or organisation, and its strategy. There are no universally good technologies. A technological innovation will add value to the educational institution/organisation if, and only if, it can contribute to generating the capabilities that are necessary for the educational institution/organisation to achieve its objectives.
- Horizontal fit refers to the integration between the social and technical sub-systems of the educational institution/organisation. For an educational institution/organisation to be able to successfully adopt a new technology, it

will have to adapt its structure and its human resource architecture in a way that allows the new technology to be used by the right people, in the right way, and at the right times.

- As far as educational institution/organisational structure is concerned, changes in the educational institution's/organisation's core technology will often challenge existing procedures and decision-making policies, and will force the modification of existing jobs and job assignments.
- In relation to the people sub-system, Cabrera *et al.* (2001:260) argue that : "The concept of culture, understood as the norms, values and basic assumptions shared by the people in the educational institution/organisation, can provide a valuable medium to assess and manage change. There are three main sources of culture at work: national culture, occupational culture and educational institution/organisational culture".

Once cognisance has been taken of all the different levels the impact technology may have on various fields of an educational institution and the problems relating to planning an information system based on a technology-based environment, needs to be addressed.

2.5.5 Major Information System Planning Problems

Teo and Ang (2001) report on research that shows that knowing what problems to expect in an IS planning exercise, enhances the probability of a successful outcome. The major IS planning problems are associated with the three phases of IS planning: the launching phase, the plan development phase, and the implementation phase. In all the three phases, failing to secure top management support for the IS planning effort is the most serious problem. Not having free communication flow, and not being able to obtain sufficiently qualified personnel are the other two major problems in the planning phase (Teo & Ang, 2001:457).

Ang, Shaw and Pavri (1995:469) state that educational institutions are increasingly relying on information technology (IT) to remain profitable in markets which are becoming more and more competitive. An effective information systems plan is important because it shapes and changes the way an educational institution does its business.

Ang, Quek, Teo and Lui (1999:549) note that IS planners must work to deliver the kind of systems support that organisations need, and not what they think the organisation should have. Organisations fail to recognise that to realise significant IS planning benefits, they must understand and resolve the problems encountered during launching, developing, and implementing the IS plan.

Teo and Ang (2001:458) suggest that IS planning problems have been widely discussed and have been classified in terms of input, process and output problems; organisational, commitment/contractual, outcome/expectations, expertise/technical and implementation problems; leadership, implementation and resource problems; database, hardware and cost problems. Understanding these problems is important because such problems can result in wasted resources, lost opportunities, duplicated efforts and incompatible systems. The three IS planning benefits categories are: method concerns, implementation concerns, and process concerns (Teo & Ang, 2001:458).

Teo and Ang (2001:460) list the following major problems in launching, developing and using the strategic IS plan (refer to Table.2.2) :

TABLE 2.2
Information System Planning Problems

PROBLEMS IN LAUNCHING THE /S PLANNING EFFORT
<ul style="list-style-type: none">• Failing to get top management support for the planning effort• Not having free communication and commitment to change throughout the organisation• Being unable to obtain sufficiently qualified personnel to do a proper job• Delegating the planning responsibility to an individual without sufficient experience, influence, or time to do a thorough job• Not investing sufficient "front-end" time to ensure that all planning tasks and individual responsibilities are well understood• Not having a steering committee that is highly committed• Not having a clear-cut corporate plan to guide the information systems planning effort• Failing to anticipate new developments in information technologies (IT) which might affect the strategic IS plan• Ignoring the people and politics side of planning• Not being in sufficient control of systems development and computer operations performance to have credibility with users• Deciding on too long a planning horizon• Underestimating the need for a clear, concise, formal planning procedure• Not viewing planning as a learning process for users• Deciding on too short a planning horizon

PROBLEMS IN DEVELOPING THE STRATEGIC /S PLAN
<ul style="list-style-type: none">• Failing to involve top management sufficiently• Ignoring business goals• Failing to translate goals and strategies into action plans• Failing to involve users sufficiently

PROBLEMS IN DEVELOPING THE STRATEGIC IS PLAN

- Relying exclusively on user “wish lists” for application ideas
- Neglecting a realistic assessment of internal weaknesses of the IS group in determining capabilities to carry out the recommended strategy
- Not performing a top-down analysis to identify critical functional areas that the IS plan has to support
- Failing to consider and explicitly evaluate alternative IS strategies in order to give top management a meaningful choice
- Failing to review the strategic IS plan with all managers concerned so as to obtain support and co-operation for its implementation
- Requiring too much formality so as to restrain creativity on the part of the planners and users in defining information requirements

PROBLEMS IN USING THE STRATEGIC IS PLAN

- Difficulty in securing top management commitment to implement the IS plan
- Neglecting to adjust the IS plan to reflect major environmental changes
- Ignoring the IS plan once it has been developed
- Consistently making intuitive decisions which conflict with the approved strategy
- Not using the IS plan as a standard for measuring managerial performance
- The IS plan is not comprehensive

The authors conclude by claiming that strategic IS planning is an important exercise because corporate success depends on its successful execution. IS planners will be greatly helped if they appreciate the nature of the planning problems so that they can think them through and come up with solutions that suit the organisational context.

2.6 CONCLUSIONS FROM THE LITERATURE

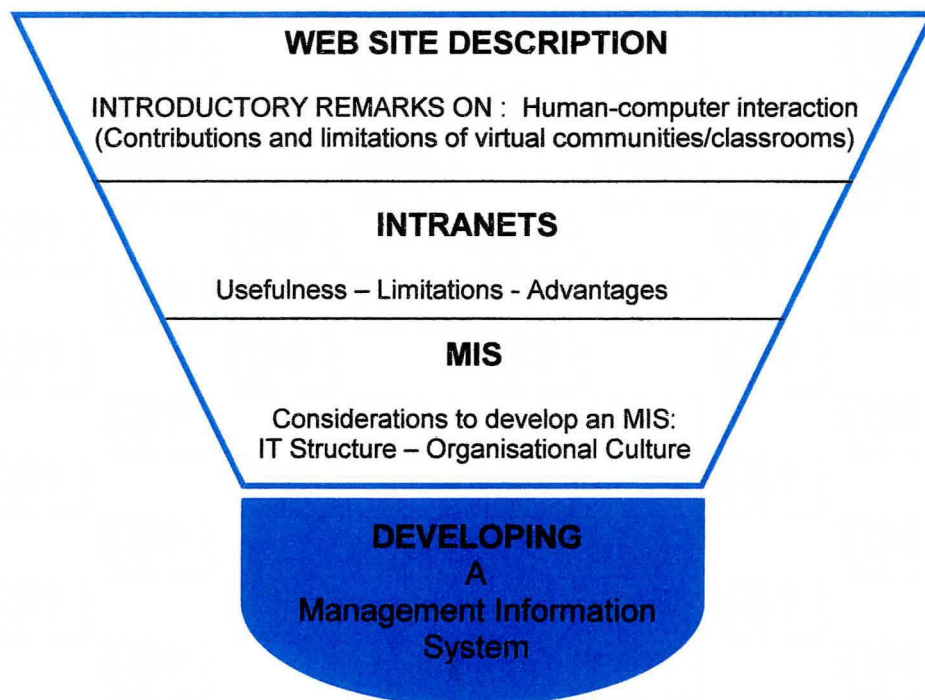
Addressing the problems of IS planning before they precipitate into insurmountable obstacles is a critical component of the IS planning process. Every IS planning process must be viewed as an exercise in forestalling the problems, as well as learning experience. IS planners should seize every opportunity to become fully informed and knowledgeable about all facets of IS planning, including its attendant problems.

In Chapter Two the utilisation of Web sites and Intranets, in general, have been outlined. In educational institutions Web sites and Intranets are in use and are being upgraded – not all according to the same frequency and degree of availability IT (refer to Figure 2.5, "Summary of Chapter Two", p.71).

The extend to which these newer web-based technologies are utilised internationally in institutions practicing co-operative education, needs to be investigated. Nationally limited utilisation exist, but the extend to which it is utilised should be clarified to be able to identify the (possible) "gab" which exists between the national and international management information system for co-operative education.

Since Chapter Two focussed on the utilisation of web-sites and intranets in general, Chapter Three will focus on the use of these "tools" as an important element in developing and utilising an effective MIS – also for educational institutions. The development of an MIS, as influenced by the change in IT and the organisation culture, needs serious consideration (refer to Figure 2.5, "Summary of Chapter Two").

FIGURE 2.5
Summary of Chapter Two



Chapter Three will focus on a selection of universities in the USA and UK which utilise a Management Information System based on information technology. The elements of Management Information System under consideration will focus on one element of a Management Information System of each institution, namely the co-operative education component.

CHAPTER 3

LITERATURE STUDY : BEST PRACTICE IN MANAGEMENT INFORMATION SYSTEM FOR CO-OPERATIVE EDUCATION

This chapter reviews some general aspects of management information systems, and their use in education in Australia, the UK, USA and RSA. Specific reference is made to management information systems in general education. These investigations focus on one element of education, namely co-operative education. Furthermore, possible co-operative education sub-systems are identified.

3.1 INTRODUCTION

Thach and Woodman (1994) believe that when organisations implement information technology (IT), they not only increase process efficiency, but also change the locus of knowledge. Managers may believe this equates to changing the locus of power; however, if implemented in its most productive fashion, IT provides line employees with the data to perform their duties more efficiently. In addition, IT reduces the time delay of many communication networks that cross multiple time zones, and as such then increase the impulses of turnaround time of production and feedback data. This, in turn, can provide employees with considerably more information on a more frequent basis (Thach & Woodman, 1994:30). IT in itself, thus, makes information available faster and in an more organised manner. To manage this information efficiently through manipulation, a system is essential. A management information system (MIS) is thus an integral part of information management.

Information processing, for example, might be viewed as manipulating information to arrange it into a new format, such as subjective knowledge, differently arranged information, or summary information. The following are types of information processing:

- Classification of data
- Rearranging/sorting data
- Summarising/aggregating data
- Performing calculations on data, and
- Selection of data.

How the information is processed, is mainly determined by the purpose of the information management system, as dictated by its users.

Alon and Cannon (2000) comment that learning information management skills and Internet-based technologies is extremely important for success in today's information-based society (Alon & Cannon, 2000:349). As in commerce and industry, various pressures lead to increased development and use of management information in educational institutions offering co-operative education. Information and communication technology is thus potentially the key to the increased reliance on, and use of, management information systems in education internationally.

Gurr (1997) believes that in all types of organisations there is an increase in the development and use of management information systems (MIS), with the aim to inform the decision-making processes. This is also true for educational organisations, with both schools and school systems (at various development levels), using MIS for monitoring, improvement and accountability purposes. This also relates to the needs in managing co-operative education (Gurr, 1997:1).

Internationally, various systems to administer and manage the co-operative education programmes are in use, but co-operative education models

internationally differ considerably from those in use in South Africa. The key role players in the developed world operate on systems developed for their specific needs. Whatever the system to control quality requires that operational information is accurate and readily available. This system must produce management information on-line as, and how, it is required. As technology develops faster in any given time, no system can be regarded as finally complete.

Gurr (1997) argues that within most of the various elements of managing and practising co-operative education, there is an explicit connection between information technology developments and social change, suggesting that the developments in technology will impact on the whole educational institution and not simply at the level of management information. For example:

- Connectedness in the curriculum, e.g., electronic networking will allow students to access relevant information from related, but different subjects
- Work/learn transformation, e.g., changes when learning takes place in the composition of the workforce and in the type of work/learn situations associated with learners
- Globalisation of educational offerings, e.g., changes in the structure and place where learning occurs
- Professionalism in presenting teaching/learning opportunities, e.g., increased role for the "professional" teacher, change in the profile of the learners (age, diversity of previously mastered skills, demographic background, etc.), and greater use of the latest development in technology to enhance learning experiences derived from the subject leaders in the area
- Teams and pastoral care, e.g., greater use of group work for students that require inputs from various sub-disciplines and subsequently more specific mentors to assist in the learning and work. This amounts to a greater need for pastoral care of students
- Cyber-policy, access and equity, e.g., the lack of information technology-related policy will need to be addressed, and both access to, and equity in,

the use of technology will need to be planned for, and

- Virtual communities, classrooms and even virtual institutions. Virtual institutions will have many of the characteristics found in virtual organisations, with the associated dependence on information technology.

Within such a wide range of variables, it is not surprising that practitioners may choose to place more emphasis on some variables than others (Gurr, 1997:8-9).

Davies and Hase (1994) describe a model for co-operative education that involves joint ownership of programmes between universities and the workplace. It is taken to include: the provision of student placements in the workplace for practical experience the inclusion of individuals from professional bodies or the workplace on course advisory committees; joint appointments; contracting to provide or jointly develop educational experiences; and partnership arrangements that involve a significant sharing of resources. While programmes are accredited towards qualifications of the university, they are also based on analysis of the needs of the workplace partner (Davies & Hase, 1994:33,34). This illustrates certain varied elements that need to be administered and managed within a co-operative education MIS.

As early as 1991, Donovan and Jackson (1991:213-217) described how management information systems are not simply part of the organisational decision-making processes, but have a complexity of functions with various purposes. These include:

- Housekeeping - basic elements such as payroll and fiscal accounting that lead to increased efficiency of the day-to-day operations of the organisation (refer to the later discussion of the information contained in the Computerised Administrative Systems Environment for Schools (CASES) system (refer to Section 3.2, pp.78-81)
- Problem identification - systems designed to guide performance
- Management support tool - including housekeeping, budgetary and fiscal

control and/or planning

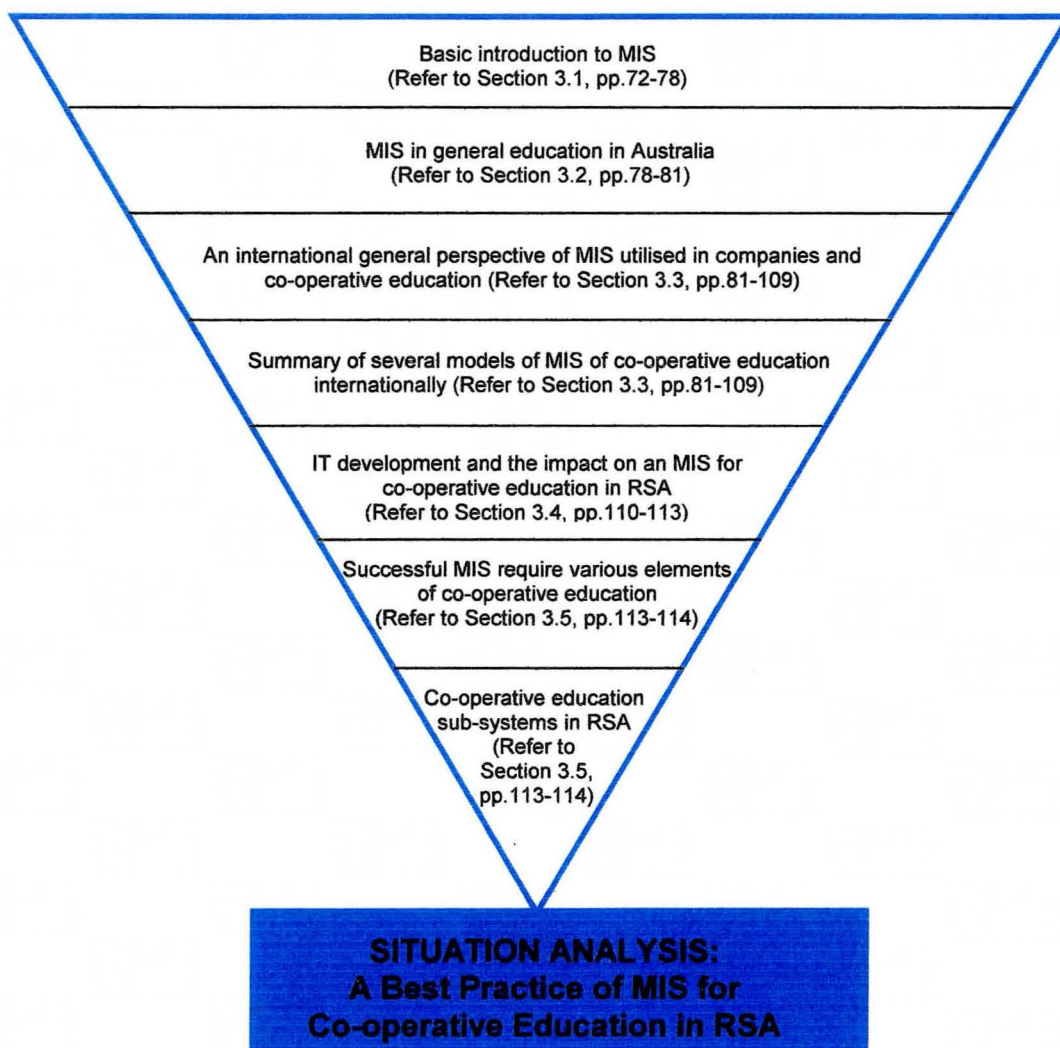
- Political and public relations - these may be peripheral to the core function of the organisation and can create what appear to be irrelevant demands on organisational members
- Provision of different types of information to different organisational levels, and
- Multiple purposes and use of the same set of information.

As technology advances, new possibilities to administer and manage co-operative education more efficiently can be created through an MIS. This new system for institutions in South Africa that use the co-operative education system, can utilise these new technologies to improve the level of efficiency. Cost has been seen as a possible reason why resources - both person power and physical resources - were under-supplied in the past in South Africa. This new system, based on the latest technologies, reduces person power requirements and increases effectiveness as we strive towards a paperless office. Although some co-operative education co-ordinators in South Africa are now proud to show their data/information system on a variety of spreadsheet-based systems, these were referred to in their 1995 report by the Waterloo team as "outdated programmes" (Erickson, 1999:14).

It is stating the obvious somewhat to say that developments in information and communication technologies (ICT) are impacting upon educational organisations. From pre-school to tertiary settings, ICT are increasingly being used in teaching and learning, and in administration. Leaders in educational settings are thus experiencing, and taking the lead in changes in work practices, due to the introduction of new technologies.

To deal more comprehensively with all aspects identified in the above (Introduction), the remaining part of Chapter 3 is illustrated in Figure 3.1 as "An Overview of Chapter Three".

FIGURE 3.1
An Overview of Chapter Three



In the broader sense, Meine (1963:236) defines education as the act (art) of developing and cultivating various physical, intellectual, aesthetic and moral facilities. As such then, education has several sub-disciplines. Once the management information system for general education has been reported on, some models of a management information system for co-operative education are investigated.

To establish the impact of information technology on information exchange, a well-established management information system in general education is investigated. This general education can be used as a point of departure to

develop an understanding for the specific needs within co-operative education, as a related element of general education.

3.2 THE DEVELOPMENT OF A MANAGEMENT INFORMATION SYSTEM IN GENERAL EDUCATION IN AUSTRALIA

In visualizing a possible MIS for co-operative education in South Africa, the MIS in use in Australian schools might highlight various features within a MIS. As a point of departure then, these features may point to the basic structure required for such an MIS for co-operative education in South Africa.

Gurr (1997) in his study of the school system in Australia, suggests that to facilitate the collection and analysis of data used in the operation of the accountability framework and in the day-to-day operations of an institution, the management information system should include the following components:

- KIDMAP (a commercial product designed by Mercator, Western Australia)
- Computerised Administrative Systems Environment for Schools (CASES)
- CASES Management Information System (CMIS)
- Education Management Information System (EMIS).

(a) KIDMAP (a commercial product designed by Mercator, Western Australia)

KIDMAP is a programme that allows teachers to record student information that can be linked directly to the CASES system. Used to its full capabilities, KIDMAP not only provides assessment and recording, but also allows teachers to analyse and profile student progress/needs (refer to Chapter 6, Recommendation 6.3.2(c), p.276), prepare reports for parents, and access teaching resources (refer to Chapter 6, Recommendation 6.3.4(a), p.281). It also allows schools and school systems to access student data and to analyse and interpret this in a variety of ways (Gurr, 1997:15).

KIDMAP can be seen to be a powerful information management tool that operates at the classroom, school or system level. Referring to Laudon and Laudon's (1996) framework, it provides information to at least the MIS level in that teachers can access summary reports of student progress (principals and senior staff would access aggregate summaries through the CASES/CMIS system, rather than through KIDMAP). It is particularly useful at the Knowledge Worker System (KWS) level in so far as teachers can access visual summaries of the data. (Gurr, 1997:15)

KIDMAP is a commercial product designed by Mercator (a Western Australian based company) and adapted to the Department of Education (DoE) requirements (<http://www.mercator.com.au>). In designing a management information system for co-operative education in South Africa the benefits/challenges of third-party designer should be decided on (refer to Chapter 6, Section 6.5.1, p.289).

(b) Computerised Administrative Systems Environment for Schools (CASES)

From the Directorate of School Education document (DSE, 1995a) Gurr (1997) states that the Computerised Administrative Systems Environment for Schools (CASES) "is a strategic information technology platform which provides a standard administrative system for Schools of the Future with electronic links to Directorate of School Education (DSE) corporate information". CASES stores and processes a range of data including student records (often from teacher input via KIDMAP), and financial, physical and human resource data (Gurr, 1997:16). Since the co-operative education management information system for the South African situation must be an integral part of the general administrative system of the education institution, it should be developed as an interrelated system (refer to Chapter 6, Recommendation 6.3.1(g), p.273).

(c) CASES Management Information System (CMIS)

Gurr (1997) quotes from Griffiths (1997) that the CASES Management Information System (CMIS) is designed as a management tool to enhance "...the value of the information recorded and maintained in CASES." (DSE, 1995b). CMIS is thus an "add-on" software package to make better sense of CASES for management purposes. It provides a range of summary reports (e.g., student progress, etc.) (refer to Chapter 6, Recommendation 6.3.2(c), p.276); often presented graphically which have been developed in consultation with schools and central personnel. CMIS is thus clearly at the MIS level (Gurr, 1997:16).

(d) Education Management Information System (EMIS)

EMIS is the Education Management Information System used as a management information system by central office and regional personnel of KIDMAP. Since the MIS in this study aims to establish an MIS for South African requirements, it needs not to function on the Internet but on an Intranet. Some of the information collected through the CASES system is available through EMIS (mainly demographic data) (refer to Chapter 6, Recommendation 6.3.2(b), pp.275-276), and it is anticipated that other data, such as school annual reports, will eventually be accessed electronically by the central office. EMIS includes a decision support system (DSS) that provides information up to the DSS level of the Laudon and Laudon (1996) framework (Gurr, 1997:17).

Management information systems are extensively used in international institutions of higher education that offer the co-operative education option. In these management information systems the demographic, academic and other information is linked to the various elements dictating the experiential learning (work integrated learning) component (refer to Chapter 6, Recommendation 6.3.1(g), p.273). Some of the more established international management information systems

need to be noted, and these management information systems are now described in turn.

3.3 INTERNATIONAL CO-OPERATIVE EDUCATION SYSTEMS

3.3.1 Introduction

The growing popularity of the Internet has resulted in exciting opportunities for companies and institutions to reach out to customers/clients with very little additional cost. In order to communicate with the potential customers through the WWW effectively, a well-designed Webpage is needed. Several universities developed in-house management information systems for co-operative education, but these systems can be adapted to suite a variety of applications relatively easily. Five of these universities are now described in turn.

To decide which universities to investigate, specific criteria which would render meaningful information, have been decided on. These criteria are :

- History of involvement in co-operative education
- Specific model of co-operative education management in use
- How recent their management information system for co-operative education has been updated.

Although several other universities were investigated during personal visits to Germany, Hong Kong (and China), Ireland, Jamaica, Scotland, Spain, Thailand, The Netherlands, they were not included due to their specific model of co-operative education in use. The following five universities do have systems which could be "adapted" partially to suit the South African requirements.

It stands to reason that Northeastern University, Boston, USA, whom officially started their co-operative education programmes as early in the second decade

of 1900, be included. They also manage the co-operative education on an integrated model – a system which is used at some institutions in South Africa.

The universities of Drexel, Philadelphia, USA and University of Waterloo, Canada are both established universities in their utilisation of a management information system for co-operative education. They have a mutual agreement to continuously upgrade their systems. Although the staff of Drexel University do the upgrading, it is often due to the new developments required by the University of Waterloo. The University of Waterloo is situated in a small town in Canada; it is a reasonable sized university (for Canada, but large for South Africa) and place and monitor their students throughout Canada (20% of their students are placed throughout the USA).

The Huddersfield University, UK, was selected because they are operating their management information system for co-operative education system at the cutting edge of development. They are progressing to achieve the optimum point of a paperless system.

The George Washington University, USA, was selected due to their long history in co-operative education, their newly developed management information system and their integrated system of managing co-operative education. Their co-operative education is managed as an integral part of their student career services.

3.3.2 Utilisation of MIS in Co-operative Education Educational Institutions Internationally

Internationally, especially in the United States of America (USA) and the United Kingdom (UK), institutions of higher learning utilise IT systems to manage their co-operative education programmes. Due to the constant upgrading of available technology, they are now using advanced generation MIS. The following commercial management information systems for co-operative education are now described.

3.3.2.1 MaPPiT (Mapping the Placement Process with Information Technology) Developed by Huddersfield University, United Kingdom

The MaPPiT system was developed to promote good practice in integrating the supervised work experience into the curriculum by capturing and modelling processes within Placement Units using Business Process Design methods, refining them to allow tailoring, electronic documentation to ISO 9000 standards, piloting, and dissemination via a Webserver (<http://www.hud.ac.uk/hubs/placement/index.htm>).

Although the MaPPiT project (as funded by the Higher Education Council in the UK) finished some time ago, the product which came out of MaPPiT is still in everyday use within the United Kingdom at for example the universities of Derby, Greenwich, Huddersfield, Northumbria, Sheffield Hallam and Staffordshire. The product is used to manage all placement activities (refer to Chapter 6, Recommendation 6.3.4(b), p.281). Students can interact with the system 24 hours per day via the Internet and be informed of available jobs or the contact details of others out on placement.

MaPPiT has grown and continues to be developed with the involvement of the people undertaking placements (co-operative education). Based on the Lotus Notes platform, it has also been linked with the underlying database to Microsoft Access, allowing the flexibility to pull off all the various reports which might be needed. Using Lotus Notes allows the user to keep a variety of data types in the database; for example, any letters sent to students are kept on their profile as word documents, with references also held within the database. There is a document part to the system where standard letters used at various times of the year are kept. The document part for students also promotes items to the Web automatically, so that users can make information available to learners easily without having to learn hyper text mark-up language (HTML). The system can be used as a stand-alone, over a local area network (LAN) by

many users, and over the Web. The system, however, requires a dedicated server for LAN and the Web (refer to Chapter 6, Recommendations 6.3.1 (a),(b)&(q), pp.272&275).

MaPPiT has a number of key features that helps it to manage work effectively rather than just act as a memory store. When the developers undertook the design of the system, they spent time analysing the way co-operative education units managed placements, acquainting themselves with certain key aspects worthy of note. These are built into the operation of the system and how it presents its information. Mail messages are used to remind people of tasks that need to be undertaken. Progress is shown by stage (e.g., all companies with outstanding CV's) or by date (e.g., which company has been in the system showing no progress for the longest period, or by date scheduled for the next task) (refer to Chapter 6, Recommendation 6.3.1(p), p.275; Section 6.4, pp.283-287). Each person has a "To Do" list that shows - in date order - the tasks for which he is responsible. As such then the system aims:

(a) To promote good practice in integrating the supervised work experience (SWE) into the curriculum (refer to Chapter 4, Section 4.2.5 (c)(i), p.135; Chapter 6, Recommendation 6.3.4(c), p.281)

(b) To provide effective, useful materials to support institutions in:

- i. Liaising with placement providers (refer to Chapter 4, Section 4.2.5(b)(i)&(iii), pp.132&133; Chapter 6, Conclusion 6.2.2, p.266; Recommendations 6.3.3(a)(d)&(e), p.279)
- ii. Preparing students for placement (refer to Chapter 6, Conclusions 6.2.3, p.266; Recommendation 6.3.2(g), p.276; Recommendations 6.3.4, pp.281-283)
- iii. Planning the placement programme (refer to Chapter 4, Section 4.2.5 (a)(iii), p.132; Chapter 6, Conclusion 6.2.1, pp.265-266; Recommendations 6.3.2(f),(h)&(i), pp.276-277)
- iv. Monitoring the placement (refer to Chapter 4, Section 4.2.5 (a)(ix)&(x), p.132; Section 4.2.5 (b)(v)&(vi), p.133; Chapter 6, Conclusion 6.2.1, pp.265-266; Conclusion 6.2.2, p.266; Recommendations 6.3.2(j),(l),(m),(n)&(p), pp.277-278)
- v. Finding and vetting placements (refer to Chapter 4, Section 4.2.5(b)(ii)&(vi)&(vii), p.133; Chapter 6, Conclusion 6.2.2, p.266; Recommendations 6.3.3(b)&(g), p.279)
- vi. Matching students to placements (refer to Chapter 4, Section 4.2.5 (b)(vii), p.133; Chapter 6, Conclusion 6.2.2, p.266; Recommendations 6.3.3(f),(g)&(i), pp.279&280)
- vii. Helping employers to supervise and appraise the placement (refer to

Chapter 4, Section 4.2.5 (b)(iv), p.133; Chapter 6, Conclusion 6.2.2, p.266; Recommendations 6.3.3(k)&(n), p.280)

- viii. **Equipping students to reflect on and analyse the placement learning** (refer to Chapter 4, Section 4.2.5 (c)(xi), p.135; Chapter 6, Recommendation 6.3.4(l), p.282)
- ix. **Assessing/accrediting the placement achievements** (refer to Chapter 4, Section 4.2.5 (c)(xi), p.135; Chapter 6, Recommendation 6.3.4(l), pp.282&283).

(c) With this system it is possible to:

- i. **Manage deadlines** (refer to Chapter 4, Section 4.2.5 (c)(ix), p.135; Chapter 6, Conclusion 6.2.3, p.266; Recommendations 6.3.4(j)&(n), pp.282; Section 6.4, p.283)
- ii. **Track placement progress** (refer to Chapter 4, Section 4.2.5 (a)(iii), p.132; Chapter 6, Conclusion 6.2.1, pp.265-266; Recommendations 6.3.2(f),(h),(i)&(j), pp.276-277)
- iii. **Collect student CV over the Web** (refer to Chapter 6, Recommendation 6.3.1(j), p.274)
- iv. **Advertise jobs over the Web** (refer to Chapter 6, Recommendation 6.3.1(f), p.273)
- v. **Track student problems (counselling)** (refer to Chapter 6, Recommendation 6.3.1(i), pp.273-274)
- vi. **Supply support documentation via the Web** (refer to Chapter 6, Recommendation 6.3.1(i), pp.273-274)
- vii. **Hold latest copies of documentation** (refer to Chapter 4, Section 4.2.5 (a)(x), p.132; Chapter 6, Conclusion 6.2.1, pp.265-266; Recommendation 6.3.2(p), p.278)
- viii. **Search facilities on all data** (refer to Chapter 4, Section 4.2.5 (a)(x), p.132; Chapter 6, Conclusion 6.2.1, pp.265-266; Recommendation 6.3.2(p), p.278)
- ix. **Obtain students placement preferences** (refer to Chapter 4, Section 4.2.5 (c)(v), p.135; Chapter 6, Recommendation 6.3.4(f), pp.281-282).

Students interact with the system via the Web. Students seeking placements can submit their CV, see which companies have been dealt with over the years, apply for jobs which are placed into the database, and check details of those to whom they have applied. In addition, students can keep their personal details up to date. Students on placement can submit their assignments, update their contact information, and view details of other students (if said students have agreed to make them public): if marked as private only, the CEL in the placement can view them (refer to Chapter 6, Recommendation 6.3.1(b)&(c), p.272).

The placement unit also tracks any problems that arise, thus ensuring a full audit trail on all actions. While this may add a little time, the placement unit is already into the habit of doing this on paper, since it may be required to present such information to exam boards, or in the case of occasional appeals. The system automatically logs who enters the comments, the date and time, and keeps a history of events in chronological order (refer to Chapter 6, Recommendation 6.3.1(d), p.273).

Lotus Notes provides a good level of security. Students have to log in using their password and only they can change their details. All the details in the site are only accessible to relevant students. Placement unit staff can give students access simply by adding them to the MaPPiT database (Downs, 2001:3) (refer to Chapter 6, Recommendation 6.3.1(b), p.272).

The Process Model covers all aspects in relation to placements - it is extensive in both the activities it addresses as well as the detail.

The model breaks down everything in which the co-operative education unit is involved, into cohesive sets of activities that are called processes. These processes are divided into three groups: core, management and support as reflected in Table 3.1 "Placement Unit Process".

TABLE 3.1
Placement Unit Process (MaPPiT – Huddersfield University,
United Kingdom)

Core Processes	<p>...are the key activities which a Placement Unit should undertake, and represents the main focus of their work. Core processes themselves fall into 2 classes - "Secure a Placement" and "Develop and Monitor a Placement".</p>
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Management Processes	...include activities which help the unit to be strategic in the development of the department, as well as reviewing and monitoring its own work.
Support Processes	...highlight areas where other people could be involved to assist the placement activity.

The model is available through the MaPPiT Website and is user-friendly.

(d) Using the MaPPiT Model

The developers of this MIS suggest that people interested in acquiring and using this MIS, start with the Core Processes (helping them to understand what they currently do) and either improve their own approach by using ideas presented here, or by adopting the approach as detailed. Incrementally one can then select other processes to take on board. It is not recommended that anyone should take the entire model and try to implement everything. In addition, there are other documents (elaborations) that contain very specific details regarding the processes. These will not be made available as it is envisaged that the specific process details will differ between Placement Units.

The model has been designed for a placement unit that has access to all necessary resources. It is acknowledged that institutions seldom have such resources and so have marked processes as essential, desirable and optional. This then leaves the choice to the individual unit (<http://www.hud.ac.uk/schools/comp+maths/mappit/home2.htm>).

3.3.2.2 The Drexel CMC System, University of Drexel, Philadelphia

Drexel University's Career Management Center (CMC) strives to be state-of-the-art in the delivery of experiential learning, lifelong career skills, and systems technology. They provide service in the classroom, in the office and through the Internet (<http://www.drexel.edu/cmc>).

The CMC focuses on integrating co-operative education experiences and academic programmes: teaching and prioritising effective career management that empowers clients with skills essential for students' future careers and lives. Career Services offer career counseling to graduating students, graduate students and alumni for vocational testing, career planning workshops, and compilation and distribution of career information.

First-time co-operative education students are required to participate in a course designed to develop expertise in the area of professional résumé writing and interviewing skills. Students practice these skills by developing their résumé and participating in a simulated interview (refer to Chapter 4, Section 4.2.5(c)(vi)&(viii), p.135; Chapter 6, Recommendation 6.3.4(g)&(i), p.282).

Students also learn the policies and procedures of the entire co-operative education process, from searching and applying for jobs, through to the post-co-operative education experience review (refer to Chapter 4, Section 4.2.5(c)(ii), p.135; Chapter 6, Recommendation 6.3.4(d), p.281). Having an overview of the entire process is seen as vital to the students' success in their transition from college to work. Increasing enrolments and changing technology over the past several years created the opportunity for the CMC to change business processes to meet the demands of their clients and facilitate job hiring. The CMC uses a one-of-a-kind Web-based system to facilitate the hiring process.

Several programmes and services are available in the system:

- Co-operative education for undergraduate students participating in the co-operative education programme
- Career Services for permanent hire, full-time positions for graduating students
- Direct Apply: a job-posting service for current undergraduate and graduate students, and
- Employer-Directed Résumé Search for graduating students and alumni.

Learners and employers complete the entire placement/hiring process on the Web using the “Direct Apply” and “Employer-Directed Résumé Search” services. The CMC monitors the process using the system and a separate reporting tool to extract information from the database.

(a) As such then:

- i. Employers post their positions and all the details associated with the position (refer to Chapter 4, Section 4.2.5(b)(vii), p.133; Chapter 6, Recommendation 6.3.3(g), p.279)
- ii. Learners search the positions and submit their résumé as an interview request (refer to Chapter 6, Conclusion 6.2.2, p.266; Recommendation 6.3.1(i), pp.273-274).
- iii. Employers select the interview candidates and arrange their on-campus interview schedule (refer to Chapter 6, Recommendation 6.3.3(j), p.280)
- iv. Learners view the results and sign up for interviews (refer to Chapter 6, Recommendation 6.3.1(i), pp.273-274)

(b) For co-operative education placement, the following steps are also provided by the Web-based CMC application:

- Employers rank the students who were selected for interviews (refer to Chapter 6, Recommendation 6.3.1(k), p.274)
- Learners who were ranked by employers, rank positions (refer to Chapter 6, Recommendation 6.3.1(l), p.274)
- The Optimal Pairing process runs. This is an algorithm designed to maximise the number of students and employer matched. Employers can view the results on-line. Students come to the CMC to pick up their results. If they were not paired with an employer, they receive dates for the next process and a list of workshops designed to improve their résumé and/or interviewing skills (refer to Chapter 6, Recommendation 6.3.1(n), p.275).

Reported benefits of this placement system include:

- Improved efficiency
- Increased access for students and employers, and
- Control and responsibility for students and employers.

Even though the current system is a technological advancement, there are still some unmet needs. It is a stand-alone product written by a third party vendor. Separate processes, both programmed and manual, are required to maintain the data. Several departments in the University of Drexel have teamed up to develop a new system that is being written in-house, integrates with the student system SCT Banner and is customised to meet business processes. The team has written and approved functional specifications and technical specifications. The screens have been developed and approved, and programming has just begun. The latest developments focus on:

- Data being maintained in one system, not two
- Fewer data entry errors
- Improved ease of use
- In-house support, and
- Increased functionality.

In addition to facilitating the hiring process, the new system incorporates functionality for processes that are related to the services, but not necessarily part of the hiring process. Examples include assigning students to co-ordinators based on the student's major, student evaluation of co-operative education experience, and employer evaluation of student performance (refer to Chapter 6, Recommendation 6.3.1(h), p.273; Recommendation 6.3.2(o), p.278; Recommendation 6.3.3(n), p.280).

Drexel University's Career Management Centers is one of the USA's leading higher education career centers. The office works conscientiously to provide leading edge services and technologies to students and employers so that co-ordinators can provide counselling services to clients who need guidance and assistance and employers who are looking for these skills (Host, 2001:5).

3.3.2.3 The System at the University of Waterloo

The system in use at UW is quite extensive. The following details a section of the system in use. Further detail is available from their Website, <http://www.cecs.uwaterloo.ca>.

The administration of the UW system is operated from the University's Co-operative Education and Career Services (CECS). The following is a summary of some of the operational features:

(i) How CECS Communicates with Students

(a) Student Access System

Students who are going through interviews use the computer network to access information relevant to the interview process. Once logged in, they are able to view the job descriptions of participating employers, employers' scheduled interview dates and times, employers' special instructions and other features (refer to Chapter 4, Section 4.2.5(c)(ii), p.135; Chapter 6, Recommendation 6.3.1(j), p.274); Recommendations 6.3.4(d)&(m), pp.281&282). The **Student Access Users' Guide** explains how to get into and use the **Student Access System**. It also answers most questions they may have. If students need help or have any questions about the **Student Access System**, they can e-mail a message to the system administrator (refer to Chapter 6, Conclusion 6.2.3, p.266; Recommendation 6.3.4(d), p.281).

(b) Bulletin Boards

Notices, job postings, interview schedules, and so on are posted on the Co-operative Education bulletin boards at several strategic locations.

(c) By Telephone

A student's local telephone number is of utmost importance. Systems are in place to capture or update telephone numbers (refer to Chapter 6, Recommendation 6.3.2(b), pp.275-276).

(d) By e-mail

Instances in which CECS cannot reach students by telephone, CECS use e-mail as another method of making personal contact. Should the student use an e-mail address from another source such as "hotmail", the settings in the university e-mail account need to be adjusted in

order for messages to be forwarded to the most frequently used e-mail address, or important information from CECS could be missed (refer to Chapter 6, Recommendation 6.3.2(b), pp.275-276).

(e) Via the Internet

There are useful and important sections of the CECS Website such as the **“Co-operative Education Student Reference”**.

(ii) Arranging their Own Placement

CECS assumes that all new students will be taking part in the interview process, so their status on the records will indicate this. However, should students wish to arrange their own placement external to the process, they must inform their Programme Administrator as soon as possible - but **prior to the start of the placement application process** - requesting permission to leave the interview process and to discuss whether a placement would qualify for credit. If permission is granted, **their co-operative education status will be changed** on the records of co-operative education lecturers (CELS).

(iii) Interviews During Study Week (Mid-term Break)

If a student plans to take part in the term's employer interview process arranged by CECS, they **must** be available on campus for any interviews for which they are scheduled. This happens in Study Week. Students may not contact participating employers to re-arrange interview dates.

If students intend to be away from UW during the study week, they may not apply for placements in the interview process until the **“Continuous Phase”** begins later during the term.

3.3.2.4 The George Washington University (GWU) Career Centre

The GWU service is based primarily on two files, Employer Services and Student Services. This is available on their Website,

<http://www.gwu.edu/~career/empsvs.or/stusvc>.

The GWU Career Center works to build relationships between employer organisations and GWU students/alumni, providing access to qualified, skilled candidates for full-time, part-time, co-operative education and internship positions. The Center is comprehensive and centralised, serving the needs for recruiting students and alumni from GWU's various programmes.

(1) Employer Services

There are 10 primary services available at the GWU Career Center to provide direct access to GWU students and alumni. They are as follows:

(a) On-campus Recruiting Programme (OCR)

The Center's on-campus recruiting programme is designed for employers interested in hiring full-time, professional candidates following graduation. The interview periods during the academic year run from September through to November and February through to April. If employers wish to participate, arrangements need to be made six weeks prior to the desired interview date (refer to Chapter 6, Recommendation 6.3.3(c), p.279).

For additional information about recruiting GW students for full-time, professional positions following their graduation, an e-mail address and telephone number of a contact person is supplied.

(b) Career Fairs at GWU

The Career Center sponsors five career fairs annually. During the fall semester, GWU hosts a comprehensive Career Fair for business and

technical positions, which includes employers who are recruiting for full-time, part-time, co-operative education, and internship opportunities. Each spring semester, GWU holds a Spring Career Fair, geared more towards the non-profit and public sectors, and "Summer in the City", a summer job fair for employers seeking summer help. More information is available on the same Website, or additional information can be obtained by telephone or e-mail.

(c) Résumé Referral

Through the Center's Referral Service, employers can match student/alumni résumés with their specific hiring requirements. Further information is available by phone or e-mail (refer to Chapter 6, Recommendation 6.3.1(n), p.275).

(d) Job Listings

If employers are interested in making GWU students and alumni aware of vacancies (full-time, part-time, internship, summer) in their organisation, they may select from the following options to list positions with the Career Center:

- (i) On-line Access** for part and full-time placements and internships is provided through JOBTRAK, the Center's on-line service partner. This option enables GWU students and alumni to view the listing 24 hours per day, seven days per week through the Internet (refer to Chapter 6, Recommendation 6.3.3(h), p.280).

The first listing of an employer with JOBTRAK is free; subsequent listings are fee-based.

If the employer is interested in the on-line service, JOBTRAK can be called directly at a number supplied, informed of the employer's GWU status and a customer service representative will be available to assist. The job description may also be keyed in

manually via their Website. This option allows an employer to see the listing exactly as it will appear to students.

(ii) **Binder-Only Access** is an option for employers who do not wish to use JOBTRAK. With this selection, the Career Center places a copy of their listing in "binders" (specific files), arranged by career field in their Career Resource Room for students and alumni to view during regular business hours. Binder-only listings include full-time and part time jobs, summer jobs, and internships. To list a position through the Binder-only option, the employer must send a copy of the position for the attention of one of the following:

- Full-time Jobs - Binder-only
- Part-time Jobs - Binder-only
- Internships, and
- Summer Jobs

This can be faxed or e-mailed to the Center.

(iii) **QuickBucks Listings** are for temporary positions of 30 days or fewer. These positions are advertised to a group of pre-registered students via e-mail, enabling employers to receive a quick response to their short-term needs. Again a student telephone number and e-mail address is provided to gain further information.

(e) **Work-Study**

The University's work-study programmes present a means for employers/organisations to employ current GWU students under highly specific terms for part-time work.

There are eligibility requirements for the Federal Work-Study Programme (FWSP). This initiative is a part of a student's financial assistance package. Eligible employers are only responsible for a

portion of the student's wages while his/her award is active. A telephone number (only) is supplied for further information.

(f) Co-operative Education (Co-op) at GWU

At GWU, co-operative education is seen as an educational programme integrating academic study with related, paid work experience open to undergraduate and graduate students. For the employer it is intended to provide a ready source of motivated, temporary employees at a low cost. The flexibility this programme creates for employers suggests that it makes good business sense to hire co-op students.

To learn more about co-op or to inquire about becoming a co-op employer, a contact telephone number (only) is supplied.

(g) Campus Visibility

A variety of strategies can be implemented to enhance the visibility of an organisation at GWU. This marketing plan includes activities such as strategic advertising, outreach to faculty and student groups, and participation in various programmes and events on campus.

A contact number is supplied to develop a plan that will best utilise the resources of the employer to target and attract GWU students and alumni.

(h) Events

The Career Center sponsors various programmes and events throughout the year in which employers are encouraged to participate. During Career Week, which is held annually in February, employers can contribute to panel presentations on a variety of topics. In addition, they critique student résumés during the "Résumania" events. Résumania is held once in the fall semester and again in the spring during Career Week. Involvement with such activities is a great

way to enhance the organisations' recruiting efforts at GWU. Additional contact details are supplied.

(2) Additional Student Services

Through various programme and services, the Career Center helps students develop a career plan, form a strategy appropriate for their individual job search, and connects them with prospective employers. Whether they are a first year, a senior, or a graduate student, the Career Center can provide the means to help them increase their career awareness and secure placement or career experience (refer to Chapter 4, Section 4.2.5(c)(x), p.135; Chapter 6, Recommendation 6.3.4(k), p.282).

The following services listed in Table 2.2 are available at the George Washington University :

TABLE 3.2
Additional Student Services at the George Washington University, USA

<p>48-hour Résumé Critique (refer to Chapter 6, Recommendation 6.3.1(i), pp.273-274)</p>	<p>A current résumé or cover letter may be submitted for critique by a career consultant.</p>
<p>Career Campaign (refer to Chapter 6, Recommendation 6.3.4(c), p.281)</p>	<p>Annual programme designed to introduce GW students to the services of the Career Center.</p>
<p>Career Week (refer to Chapter 6, Recommendation 6.3.4(k), p.282)</p>	<p>The Center sponsors a week-long series of career-orientated programmes each February.</p>
<p>The Career Center Information Network (refer to Chapter 6, Recommendation 6.3.4(c), p.281)</p>	<p>Subscription-based e-mail list delivering information about Career Center programmes and related community events.</p>
<p>Colonial Connection</p>	<p>Alumni contact information is available in the Career Resource Room. Participating alumni volunteer as career resources for students.</p>

Credentials Service	A confidential file service for the collection of references, transcripts and résumés appropriate for admission to graduate or professional schools or to apply for jobs.
Mock Interviews	Simulated videotaped interviews with a career consultant.
Networking Nights	Annual networking events are held during the winter break in New York and Philadelphia.
Reciprocity	The Center processes a formal request that enables the use of services of other universities' career centers.
Summer in the City	Annual summer experience fair for students who wish to stay in DC for the summer.
Workshops	To assist with developing effective career decisions, the Career Center offers a number of workshops.

3.3.2.5 Northeastern University (NEU), Boston, United States

The primary mission of the Department of Career Services at Northeastern University is: "To assist all students, alumni and members of the Northeastern University community to plan and implement successful careers" (<http://www.careerservices.neu.edu>). The Department houses a collection of career development and job search information and has computers which provide students access to the on-line job database and other Internet resources. Successful career management depends (also) on successful placement for experiential learning. The placement process for experiential learning at NEU moves through four steps, all with successful career management as the ultimate goal. A summary of this placement process is shown in Figure 3.2.

anticipate and prepare for change (refer to Chapter 6, Recommendation 6.3.4(n), p.283; Annexure D, (c) (10))

- **Self-assessment:** The student evaluates his/her skills, values, personality and interests. Lifestyle preference as well as personal and family commitments are considered (refer to Chapter 4, Section 4.2.5(c)(v), p.135; Chapter 6, Recommendation 6.3.4(f), pp.281-282; Annexure D, (c) (4))
- **Career Exploration:** The student researches a variety of careers and learns about the changing workplace. He/she also learns about resources available on the Internet (refer to Chapter 6, Recommendation 6.3.4(k), p.282; Annexure D, (c) (9))
- **Decision-making/Goal setting:** The student analyses his/her self-assessment and occupational information to determine a career direction. Long and short-term career goals and the specific steps necessary to achieve them are identified (refer to Chapter 6, Recommendation 6.3.4(f), pp.281-282)
- **Job Search:** The student develops résumé writing skills, refines interviewing skills, and identifies and implements effective job finding strategies (refer to Chapter 6, Recommendation 6.3.4(i), p.282; Annexure D, (c) (7)).

The division for career services at NEU offers additional services for the co-operative education students which includes the following (refer to Table 3.3) :

TABLE 3.3

Additional Student Services at Northeastern University

<p>HuskyCareerLink (HCL)</p>	<p>Provides on-line access to many services, e.g., finding out what seminars and workshops are being offered, reviewing sample résumé styles, finding out which employers are coming to campus to give information sessions about their organisation, and applying on-line for positions posted by employers. Graduating students can also use HCL to access the “On-campus</p>
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	<p>Recruiting Programme” (refer to Chapter 6, Recommendation 6.3.1(e), p.273).</p>
<p>Career Counseling</p>	<p>Career counselling is available to help the students to make sound career decisions. Depending on the individual needs, career counselling might include: planning a career or career change, choosing a major, developing effective job-search strategies or participating in videotaped mock interviews (refer to Chapter 6, Recommendation 6.3.4(f), pp.281-282)</p>
<p>Courses</p>	<p>Taking one or more career development courses, e.g., “Exploring Careers, Choosing a Major or Internship for Career Decision-Making”, is an excellent way for students to develop the skills needed to manage their career over their life span (refer to Chapter 6, Recommendation 6.3.4(k), p.282)</p>
<p>Seminars</p>	<p>Year-round seminars are offered during day and evening hours. Topics include: job search strategies, résumé writing (refer to Chapter 6, Recommendation 6.3.4(g), p.282), interviewing techniques (refer to Chapter 4, Section 4.2.5(c)(viii), p.135; Chapter 6, Recommendation 6.3.4(i)&(m), p.282), etc.</p>
<p>Walk-in Hours</p>	<p>Walk-in hours are offered on a first-come first-served basis specifically for résumé and cover letter critiques (refer to Chapter 6, Recommendation 6.3.1(i), pp.273-274)</p>
<p>Career Expos</p>	<p>Several Career Expos with over 200 employers are offered each year to meet informally with prospective trainees/employers (refer to Chapter 6, Recommendation 6.3.1(e), p.273).</p>
<p>On-campus Recruiting</p>	<p>All students qualifying for placement for experiential learning, or students receiving a degree in the current academic year, are eligible</p>

	to interviews with employers recruiting on campus (refer to Chapter 6, Recommendation 6.3.1(m), p.274).
Jobtrak	The department has entered a partnership agreement with Jobtrak, an on-line listing service. Over 200,000 employers worldwide list their openings with Jobtrak. Students and alumni can access Jobtrak through the university's Webpage to view positions targeted for Northeastern University students/graduates.

(a) On-line Database (refer Annexure B, (c)(3); Chapter 4, Section 4.2.5(c)(iii), p.135; Chapter 6, Recommendation 6.3.4(e), p.281)

MyNEU COOL is Northeastern University's on-line database of co-op jobs which students can access through the co-op section of the self-service Website (<http://www.myNEU.neu.edu>). This system makes it easier for the student to get connected to their co-op faculty, upload their résumé, and find the right experiential learning placement. Some highlights of the database include:

- i. To schedule an appointment or to view the specific co-op faculty coordinator's walk-in hours (refer to Chapter 6, Recommendation 6.3.1(i), pp.273-274)
- ii. To search and sort experiential learning positions based on the student's major, interests, and skills, and build a preference list of positions that interest the student (refer to Chapter 6, Conclusion 6.2.3, p.266; Recommendation 6.3.1(j), p.274; Recommendation 6.3.4(m), p.282)
- iii. To post a résumé for the co-op faculty coordinator to review (refer to Chapter 6, Recommendation 6.3.1(i), pp.273-274)
- iv. To submit his/her job preferences to the co-op faculty coordinator, who will review the options, refine the list, and refer the students to selected employers
- v. To track his/her placement process (refer to Chapter 6, Recommendation 6.3.1(o), p.275).

(b) Employers' Involvement

The employers are actively involved in various activities and processes at the Division for Co-operative Education at NEU, the details of which are shown in Table 3.4 :

TABLE 3.4
Employer Activities and Processes at NEU

i. Posting of job openings/positions	Employers can make use of the on-line job database, eRecruiting, to advertise full-time, part-time or co-operative education job opportunities. The eRecruiting system is powered by Experience.com and is known to the students as HuskyCareerLink (see also Table 3.3, pp.100-102). (Refer to Chapter 6, Recommendation 6.3.3(h)&(j), p.280).
ii. Participation in on-campus recruiting	The On-Campus Recruiting programme is held during fall and winter, and uses eRecruiting to advertise jobs, collect résumés, communicate with students and schedule interviews (refer to Chapter 6, Recommendation 6.3.3(h)&(j), p.280).
iii. Exhibits at career fairs	This is an opportunity for organisations or companies to promote and recruit top candidates at one or more of these career fairs. The employers get to meet with the students, promote full-time openings to graduates and co-operative education openings (refer to Chapter 6, Recommendation 6.3.1(e), p.273).
iv. Networking events	If a company is interested in sharing perspectives on their field with students who are exploring careers or planning job searches, Career Services holds industry-specific informational networking events each year (refer to Chapter 6, Recommendation 6.3.1(e), p.273).
v. Information sessions	Companies can schedule their company's information sessions for students prior to the yearly career fairs. Following these career fairs, decisions are made with regards to the interviewing process and short lists.

vi. Résumé critiques

If companies prefer to meet students and/or participate in the résumé critique sessions, arrangements can be made for their participation.

(c) Student Involvement

Throughout the activities of the NEU's Department of Career Services, students take active part in the planning and implementing of successful careers. Through proper preparation and planned selection of a placement position, the students actively prepare for their co-operative education career. The following refers to these aspects:

- i. Students can choose from among career development courses, seminars and special events, career counselling/coaching and Web-based services (refer to Chapter 6, Recommendation 6.3.1(e), p.273).
- ii. A variety of programmes exist for freshmen, sophomores and middlers, juniors, seniors and other graduating students, graduate and university college students.
- iii. Internships can also give students valuable employment experience working for an employer in a chosen field or one the student wishes to explore. Many companies have formal internship programmes and students find that the internship pays off in real-world work experience that enhances their résumé.
- iv. Only eligible students may submit their résumés on-line for positions posted on the HuskyCareerLink. Employers then select the candidates they wish to interview and invite them to sign up for an on-campus interview through HuskyCareerLink.

In Section 3.3.3 "Summary of International CE Systems" the systems at Huddersfield (UK), Drexel (USA), Waterloo (Canada), George Washington (USA) and Northeastern University (USA) are summarized for ease of comparison.

3.3.3 Summary of International Co-operative Education Systems

MAPPIT (Huddersfield, UK) (Refer to Section 3.3.2.1, pp.83-87)	DREXEL (USA) (Refer to Section 3.3.2.2, pp.87-90)	WATERLOO (CANADA) (Refer to Section 3.3.2.3, pp.90-92)	GEORGE WASHINGTON (USA) (Refer to Section 3.3.2.4, pp.93-98)	NORTHEASTERN (USA) (Refer to Section 3.3.2.5, pp.98-104)
AIM				
Aims to promote good practice in integrating the SWE into the curriculum by a capturing and modelling process	Strives to be state-of-the-art in delivery of EL, lifelong career skills and systems technology, by learners; aims to improve efficiency of CE; increased access for employers and students; high level of control and responsibility for participants	Focuses to reinforce the value of co-operative education, build partnerships, address accountability and quality control as well as provide state-of-the-art resources	The GWU Career Centre is centralised and its aim is to build relationships between employers and students	Primary aim is to assist all students, alumni and members of the NEU University community to plan and implement successful careers through self-assessment, career exploration, decision making/goal setting, job search and career management.
SYSTEM FEATURES				
<ul style="list-style-type: none"> • Linked with underlying database to extract various reports and special letters • Helps to manage work effectively rather than just act as a memory store • Efficient diary management of the process • Security at a high level, password access only 	<ul style="list-style-type: none"> • Stand-alone product – integrates with student system. CMC one-of-a-kind Web-based system to facilitate the hiring process. • Simplicity of operation (user-friendly) • Increased functionality • In addition to hiring, the system includes the assigning of a student to a CEL, student evaluation and employer evaluation of student performance 	The administration is operated from the CE and Career Services (CECS) department. One section of the CECS Website contains a career resource sub-section. Included in this part of the site is the Career Development Manual.	<ul style="list-style-type: none"> • Based on Employer Services and Student Services. • Provides access to qualified, skilled candidates for full-time, part-time co-operative education and internship positions. 	Education Management Information System (EMIS), a management information system, used by the Department of Career Services, the central office and regional offices.

MAPPIT (Huddersfield, UK) (Refer to Section 3.3.2.1, pp.83-87)	DREXEL (USA) (Refer to Section 3.3.2.2, pp.87-90)	WATERLOO (CANADA) (Refer to Section 3.3.2.3, pp.90-92)	GEORGE WASHINGTON (USA) (Refer to Section 3.3.2.4, pp.93-98)	NORTHEASTERN (USA) (Refer to Section 3.3.2.5, pp.98-104)
	In-house development and maintenance	Notices, job postings, interview schedules are posted on bulletin boards	A streamlined on-campus interview process, using GWork.	A well-integrated system offering access to HuskyCareerLink (HCL), several courses relating to placements and career planning.
	Provides service in the classroom, in the office and throughout Internet.	A complete system exists for students to arrange their own placements		
	Integrating CE experiences and academic programmes; teaching; prioritising effective career management; career counselling to graduates; vocational testing for graduates & alumni			
	CEL provides counselling services			
STUDENT SERVICES				
Students interact totally with system via Web such as submit CV's	<ul style="list-style-type: none"> • Students are required to participate in courses on résumé writing and interviewing skills • Employer-directed résumé search for graduating students & alumni 	<ul style="list-style-type: none"> • Continuously updated weekly earning survey of CE students. • They can arrange their own placements, if it is prior to the placement process with the CEL. If they stay within the process they must be available at all times - even during short mid-term breaks. 	<ul style="list-style-type: none"> • Formal programme to submit résumés to employers. 	<ul style="list-style-type: none"> • Access to workshops and résumé writing and critique, job search strategies.
<ul style="list-style-type: none"> • Students interact totally with system via Web to submit 	Students have to learn the policies and procedures of the		<ul style="list-style-type: none"> • Annual programme to introduce students to services 	<ul style="list-style-type: none"> • By registering with the Husky Career link (HCL)

MAPPIT (Huddersfield, UK) (Refer to Section 3.3.2.1, pp.83-87)	DREXEL (USA) (Refer to Section 3.3.2.2, pp.87-90)	WATERLOO (CANADA) (Refer to Section 3.3.2.3, pp.90-92)	GEORGE WASHINGTON (USA) (Refer to Section 3.3.2.4, pp.93-98)	NORTHEASTERN (USA) (Refer to Section 3.3.2.5, pp.98-104)
assignments and change contact details <ul style="list-style-type: none"> • Provide advice and track student problems 	entire co-operative education experience review.		of Career Centre such as: ~ subscription based e-mail list on Career Centre and community related events and workshops to develop effective career decisions. <ul style="list-style-type: none"> • Students submit résumés for critique. • Simulated video tape interview with a career consultant. 	the following services are available through the Career Services Department: <ul style="list-style-type: none"> • Self-assessment by students to evaluate their skills, values, personality and interests • Career exploration through researching a variety of careers and the changing workplace. Resources are available on the Internet. • Decision-making/goal setting by analysing the self-assessment and career information from above. • Long and short-term career goals are identified and steps to achieve these are determined.
				<ul style="list-style-type: none"> • Job search through developing résumé writing skills, refining interviewing skills, as well as identifying and implementing effective job-finding strategies.
Students totally interact with system via Web to check company details and apply for placements.	"Direct Apply", a position posting service for current undergraduate and graduate students	Students access the system to obtain information regarding the interview process, e.g. job descriptions, interview time and date, employers' special instructions	<ul style="list-style-type: none"> • All job listings for full-time, part-time, temporary, summer jobs, co-op education as well as internships. • Annual networking nights in other cities. • Sponsored career fairs. 	The Career Resource Centre houses a collection of career development and job search information such as: <ul style="list-style-type: none"> • Current job listings • Job search guides • Occupational information

MAPPIT (Huddersfield, UK) (Refer to Section 3.3.2.1, pp.83-87)	DREXEL (USA) (Refer to Section 3.3.2.2, pp.87-90)	WATERLOO (CANADA) (Refer to Section 3.3.2.3, pp.90-92)	GEORGE WASHINGTON (USA) (Refer to Section 3.3.2.4, pp.93-98)	NORTHEASTERN (USA) (Refer to Section 3.3.2.5, pp.98-104)
				<ul style="list-style-type: none"> • Employer information • Network contacts • Access to career-related sites on the Internet.
EMPLOYER SERVICES				
<p>Promotes items to the Web automatically so that users can make information available to learners</p> <ul style="list-style-type: none"> • Students and employers keep track of the placement process • Employers and CEL obtain students' placement preferences • CEL supplies support documentation via the Web • Holds copies of the latest documentation • Searches facilities on all data • Advertises jobs over theWeb • Collects student CV's over the Web 	<p>Students & employers complete the entire placement/hiring process on the Web</p> <ul style="list-style-type: none"> • Employers post their positions and all the details associated with the position • Learners search the positions and submit résumé as an interview request • Employers select and rank the interview candidates and arrange on-campus interview schedule • Learners view results, rank positions and sign up for interviews • Optimal pairing process runs. Learners not paired attend further workshops on résumé- writing and return to the process again 	<ul style="list-style-type: none"> • Tax legislation bulletin for employers • Continuously updated weekly earning survey of CE students. • Updating personal information via e-mail 	<ul style="list-style-type: none"> • On campus recruiting programme for employers interested in hiring full-time, professional candidates following graduation. • Five career fairs annually for employers to recruit full-time, part-time, co-operative education and internship opportunities. • Employers match student/alumni résumés on the state-of-the-art Referral Service, with their specific hiring requirements. • Employers list positions via On-line Access, Binder-only Access or Quick Buck (temporary positions) listings. • Employers employ students to work part-time while they study. • Employers select students from the co-operative education programme. 	<p>The Career Resource Centre has the following resources</p> <ul style="list-style-type: none"> • Several Career Expos each year - over 200 employers meet students/alumni informally • On-campus recruiting, i.e. meeting interested students/alumni in formal interviews • Over 200 000 employers register on "Jobtrak", on an on-line listing service.
			Employers can enhance their campus visibility through	

MAPPIT (Huddersfield, UK) (Refer to Section 3.3.2.1, pp.83-87)	DREXEL (USA) (Refer to Section 3.3.2.2, pp.87-90)	WATERLOO (CANADA) (Refer to Section 3.3.2.3, pp.90-92)	GEORGE WASHINGTON (USA) (Refer to Section 3.3.2.4, pp.93-98)	NORTHEASTERN (USA) (Refer to Section 3.3.2.5, pp.98-104)
			strategic advertising, outreach to students and staff, as well as participation in various events.	
			Temporary recruiters and third party recruiters may post their part-time and holiday positions on bulletin boards.	
SERVICES FOR THE CO-OPERATIVE EDUCATION LECTURER (CEL)				
<ul style="list-style-type: none"> • Prepares students for placements • Collects student CV's over the Web • Liaises with placement providers • Advertises placement opportunities on the Web • Obtains students' placement preferences • Plans the placement programme • Monitors students during placement • Assists placement providers to access the performance of students during placement • Assists students to assess their performance during placement • Manages deadlines 	<ul style="list-style-type: none"> • Assists CEL to improve effectiveness of co-operative education process • High level of control and responsibility of participants • Very user-friendly • Integrated system which facilitates hiring process, assigning a student to a CEL, links academic record of student with EL performance records • A series of short courses are available on the system 	<ul style="list-style-type: none"> • A fully integrated data and resource system assists the CEL to manage the entire co-operative education process via this Web-based Intranet system 	<ul style="list-style-type: none"> • Annual programme of detailed information on the total spectrum of co-operative education activities and requirements • Ease of pre-screening students for referral with GWork • Career fairs to facilitate placements • Tracking of final placements • Résumé critique • Simulated videotape interviews 	<ul style="list-style-type: none"> • Ease of matching students and companies through students' self-assessment of their skills, values, personality and interests; career explorations • Extensive list of participating employers promotes successful matching of students and placement positions • Integrated system allows effective management of the total co-operative education system

3.4 CO-OPERATIVE EDUCATION MANAGEMENT SYSTEMS IN SOUTH AFRICA

Managing co-operative education in South Africa is largely dependent on an *ad hoc*, stand-alone, course-specific data basis. A third party has established an integrated system for use in institutions of higher learning – “Integrated Tertiary Software”. This is now described.

3.4.1 Integrated Tertiary Software (ITS)

Integrated Tertiary Software (Pty) Ltd specialises in the provision of integrated software to support the administrative functions within the higher and further education sectors worldwide. The company also offers a wide range of related training, support and consultation services to facilitate the transfer of knowledge to staff members at client institutions. The ITS Enterprise Resource Planning (ERP) software solution can be implemented as a fully integrated solution to support the student, financial, human resources, payroll and library business processes of a university, university of technology or college.

(a) Client Base

The ITS client base currently consists of in excess of 40 universities, universities of technology and colleges worldwide. These range from fairly small institutions with approximately 2,500 students to some of the larger institutions with in excess of 85,000 students. ITS clients use a wide variety of educational models: this includes contact tuition, open (distance) learning and co-operative education. Informal offerings, such as short courses for adult education, workshops, and so on can also be handled by the system.

Institutions that have acquired the ITS systems include the University of Swaziland, Makerere University in Uganda, Ekurhuleni West College in Gauteng, South Africa and The Open Polytechnic of New Zealand. This

relatively wide range of clientele for a South African company is also reflected in the user-friendly technical considerations.

(b) Technical Considerations

The worldwide trend towards 'Open Systems' - which is also the accepted standard in the higher and further education sectors - is fully supported by ITS. ORACLE as a relational database management system is used. ORACLE runs under a number of operating systems. The ITS system uses the UNIX operating system.

The ITS system is fully Web-enabled and staff and students access the system on campus through a standard Web browser. Students and staff can also access the system remotely via the Internet using standard Web browsers and specially designed self-service applications (refer to Chapter 6, Recommendation 6.3.1(a), p.272).

(c) Co-operative Education System

Amongst other objectives, the co-operative education management system in South Africa seeks to (refer to Chapter 6, Conclusions 6.2.2, p.266; Recommendations 6.3.3, pp.278-280):

- i. allow an institution to manage not only the placement of students with participating employers (refer to Chapter 4, Section 4.2.5 (a)(ii),(iv)-(viii), pp.131-132; Chapter 6, Conclusion 6.2.1, pp.265-266; Recommendations 6.3.2(d),(e),(f),(h),(i), (j),(k),(m)&(o), pp.276-278),
- ii. but also the learning activities (also acquiring skills) in which students are involved during that experiential learning period (refer to Chapter 6, Conclusion 6.2.1, pp.265-266; Recommendations 6.3.2 (g),(l)&(n), pp.276&277&278),
- iii. whilst at the same time keeping record of the results obtained in all the projects and activities of the student (refer to Chapter 4, Section 4.2.5 (a)(x), p.132; Chapter 5, Section 5.3.1.1 (a), p.156; Chapter 6, Conclusion 6.2.1 pp.265-266; Recommendations 6.3.2(p), p.278).

Such a system allows for extensive records to be created of participants from industry who will support the experiential learning portion of a student. Typical information includes the facilities available, the number of students to facilitate, the number and quality of overseers, the visits by co-operative education lecturers, contact staff, and so on (refer to Chapter 6, Recommendation 6.3.3 (n), p.280).

The outcome of the experiential learning can be recorded. Marks allocated by the participating company in co-operation with the tertiary institution can be recorded and averaged. The final mark is recorded in the Study Records module of the Student Administrative System (refer to Chapter 6, Recommendation 6.3.3 (n), p.280).

The system facilitates correspondence with the student as well as the employer (refer to Chapter 6, Recommendation 6.3.1 (q), p.275) (<http://www.its.co.za>).

3.4.2 MIS in SA Technikons, Colleges and Universities

Although the ITS co-operative education system is readily available in South Africa, it is not used extensively. During a recent (March, 2006) telephone enquiry by the researcher, it was established that the institutions which bought into the system do not utilise the co-operative education system to its fullest. This can be ascribed mainly to the decentralised systems of managing co-operative education in institutions. The institutions which operate on an integrated system (a combination of centralised and decentralised systems) use the ITS co-operative education system to some extent. The ITS system is thus more an information system than a management information system for co-operative education.

The importance of developing a user-friendly system to manage co-operative education is thus accentuated. The development should, however, focus on the design and maintenance of the system. "Design" does not imply "reinventing the wheel". Various well-designed systems exist for specific

environments. Adaptations focusing on the needs in South Africa need to be considered.

The major elements of system maintenance are documentation, security and back-up. A further very important aspect in system maintenance is to train those who will use the system (and various sub-systems).

3.5 SUB-SYSTEMS OF CO-OPERATIVE EDUCATION

Taking cognisance of the systems investigated, several sub-systems appear to be common to all systems. In order to develop an effective management system, a survey of the various elements of co-operative education, is required. From their investigation, Ricks *et al.* (1990) summarised a set of common variables (elements) inherent in the manner in which co-operative education is practised (refer to Section 1.2, p.7, for full details).

Due to factors such as student numbers, finances and other available facilities, as well as the aims and objectives of the specific programmes, it stands to reason that programmes vary from one another in terms of the emphasis placed on, and the adherence to, these elements. This combination of specifically required elements dictates which specific sub-systems are required.

To be able to compile accurate sub-systems, a holistic approach is followed. The initial indication of possible sub-systems, as identified in Chapter 1, Section 1.11, pp. 27-28 and Annexure a(i), need further clarification.

3.5.1 Critical Activities and Sub-systems

From the literature survey (refer to Section 3.1 to Section 3.5, pp.72-114) clear indications on groupings of critical activities, are evident. These critical activities and their relation to specific sub-systems allow the defining of questions to be used in the qualitative research questionnaire.

Critical activities relating to the student sub-systems are, amongst other, recording the number of students to be facilitated (refer to p.106), references about students (refer to p.78) and recording student information (refer to p.78). Other critical activities are academic information (refer to p.84) and tracking the whole placement process (refer to pp.83, 84, 86, 91-92 & 102). Once placed, the critical activities mapped to managing aspects relating to the students are monitoring, supervision and tracking problems (refer to pp.85-86), evaluation and assessment of student performance (refer to pp.79, 80, 90, 108 & 109). Other critical activities linked to the student sub-system relate to recording of student details. Critical activities such as range of summary reports and copies of documents (refer to pp.80 & 85), experiential learning information (refer to p.91), track progress and provide a full audit trail (refer to pp.85 & 86), are established.

The employer sub-system is mapped from a wide range of critical activities. Critical activities relating to employer information, as well as their contributions to the planning and implementation of the placement process are evident (refer to pp.83, 84-85, 88, 89-90, 92, 93-97, 102-103, 108-109). Some critical activities stress the interdependence of the student – and employer sub-systems (refer to pp.78, 80, 83, 84-85, 89-90, 105-109). Others link all three sub-systems such as on pp.86-87, 91-92, 93-97, 105-106.

Several of the critical activities define the short course sub-system. These include not only references to the various courses (refer to pp.78, 83, 87, 89-90, 92, 97, 99-100), but also reports on these such as on pp.79, 80, 87, 90, 92, 98, 104, 105-109.

3.6 SUMMARY

The preceding are some of the trends regarding the management and administration of co-operative education present in five universities (three from USA, one from the UK and one from Canada) that are taking advantage of a Web-based information system in the design of new systems to communicate information. Emphasis is on the development of new systems, since continuous updating and improvement of existing systems are the established practice". All universities surveyed currently have co-operative education Webpages, although there is considerable variation in the depth and scope of the content, and in the functionality of the different systems that are in use (refer to Section 3.3.3, pp.105-109) for an abbreviated comparison of the various systems).

Originally, co-operative education Websites tended to provide general information for students and employers. As Web designers and Web users have become more sophisticated, the documents available on the Web are becoming more specific and detailed at many institutions (refer to Section 3.5.1, pp.113-114). For example, some Websites provide lengthy on-line manuals to help students prepare for co-operative education and to understand how the co-operative education process works.

With the exception of universities with completely decentralised co-operative education departments, most new management information systems that are planned provide a connection between the co-operative education databases and university-wide student records and demographic information. These connections are being established to avoid duplication of data entry, confusion, and problems with updating multiple databases. This trend toward building interfaces with the registrar's systems provides for real-time sharing of information.

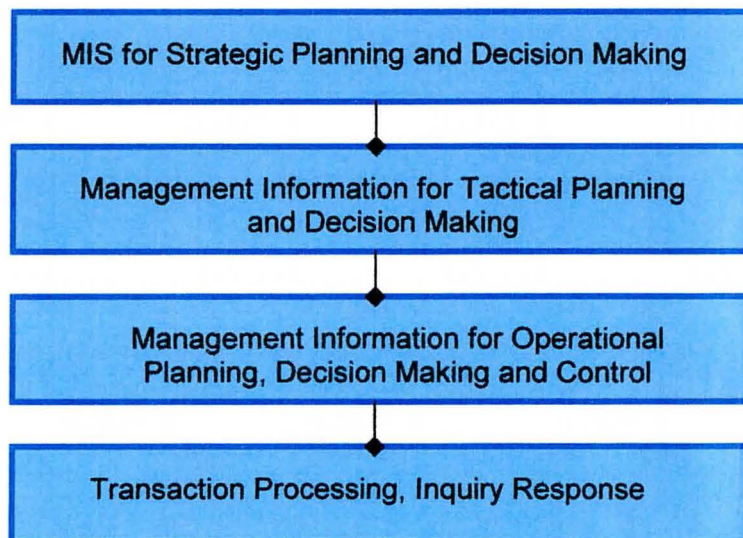
The management information system for co-operative education in South Africa (refer to Section 3.4.2, pp.112-113) currently seems to be a system which was designed some time ago with a specific set of requirements in mind. The present clients

of this system use a variety of educational models (refer to Section 3.4.1(a), pp.110-111) and this system with its original specific application does not seem to suite the variety of requirements. It was also evident from the literature survey of the five international universities that, although some similarities do exist, each system has to comply to unique requirements.

Therefore, on the basis of this analysis of the literature studied, the Management Information System for co-operative education should be designed on the following basis (refer to Figure 3.3, "Proposed Summary of a Management Information System").

FIGURE 3.3

Proposed Summary of a Management Information System



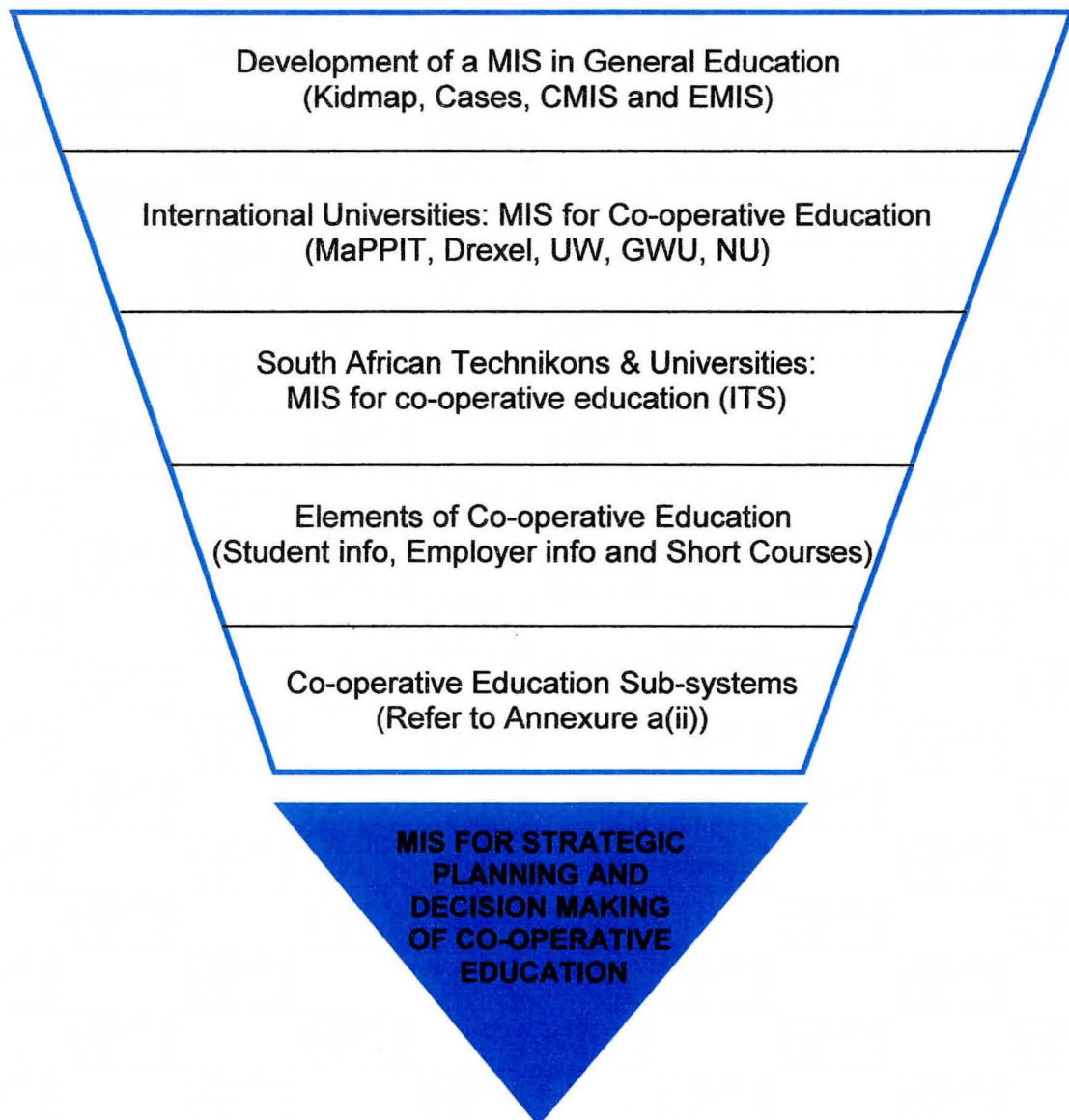
In Chapter Three various models of existing co-operative education management information systems in Canada, South Africa, UK and USA were investigated (refer to Figure 3.4, "Summary of Chapter Three"). The possible co-operative education sub-systems were identified.

In Chapter Four the systematic and orderly procedure of the study, research methodology and the techniques applied to address the research objective are reported. The manner in which the data was collected from the identified target population is also discussed.

In Chapter Five the results from the survey are interpreted on and interpreted, and in Chapter Six the conclusions and recommendations are recorded.

FIGURE 3.4

Summary of Chapter Three



CHAPTER 4

RESEARCH METHODOLOGY

This chapter outlines the systematic and orderly procedure of the study, research methodology and the techniques applied to address the research objective. The factors influencing the planned development of the questionnaires and a two dimensional matrix of the measuring instrument are explained. In conclusion, the manner in which the data was collected from the identified target population is discussed.

4.1 INTRODUCTION

Walsh (2001:2) declares that real research investigation involves more than general information seeking. It involves putting forward ideas that can be tested; collecting data to test these ideas in a systematic way; analysing the collected data; and drawing conclusions based on the research evidence.

Research methods are determined by many factors, but the specific field of research is perhaps the most important. This field is usually defined by theoretical considerations. Educational theory has a narrower range of considerations than learning theories – with which it is often wrongly confused (Van Gyn & Grove-White, 2004:27,28).

It is beyond the scope of this research project to deal with the various theories of education extensively. A brief mention of some of these theories should be adequate to indicate the rationale behind the choice of the specific research methodology of this thesis.

The Transmission Perspective : Behaviourism and empiricism has, as a primary purpose, the transmission of knowledge, skills and values with the student (learner) in a more passive role. This content centred educational system is largely based on the “Stimulus – Response” assumption (Van Gyn, et al. 2004:29). This perspective does not reflect the co-operative education perspective.

The Transformation Position : Humanism, critical theory and post modernity as an perspective, displays an objective in which the learner’s growth in critical consciousness, autonomy and independent thinking, is central. In the transformation orientation in education, scientific research and psychological theories play a minor role (Van Gyn, et al. 2004:33,34).

The Transaction Perspective : Cognitive and pragmatism is pre-occupied with the specific knowledge that must be required, with great emphasis on intellectual and rational activities associated with the problem solving, which in itself, will lead to further knowledge acquisition which ensures personal and public value. Teamwork (student/tutor and student/student) is encouraged. Dewey’s educational theory supported collaborative rational problem solving as a critical educational methodology (Van Gyn, et al. 2004:30-33). This reflects several perspectives of co-operative education.

Moving on to learning theories which are related to the above, the constructivist learning theory in particular, it is evident that early pioneers such as (amongst others), Piaget and Dewey did not refer to themselves as constructivists, but their work has contributed to what is now considered to be constructivist thought. “Constructivism is based on the assumption that learners construct their own understanding of the world” (Kizito, 2001:3). Eames and Cates (2004) explain the relevance of a further six learning theories and their contributions to co-operative education. They briefly discuss :

- Piaget’s Cognitive-Development Theory (three fundamental processes in developing logical thinking such as assimilation, accommodation,

equilibrium)

- Cagne's Conditions of Learning (attention, selective perception, coding, retrieval, response generation, cognitive strategies and expectancy)
- Atkinson's Model of Achievement Motivation (expectancy-value model)
- Bandura's Social Learning Theory (consequences of behaviour – reinforcement or punishment – are essential to learning)
- Kolb's Experiential Learning Model (the sequence of concrete experience followed by observation and reflection which lead to the formation of abstract concepts and generalisations which leads to hypotheses to be tested in future action which in turn lead to concrete experience)
- Socio-cultural Views of Learning (Eames & Cates, 2004:39-43).

Several of these learning theories may be practiced on various occasions in a variety of situations during both the academic and experiential learning components of co-operative education. It is important to take note of their existence and their (possible) impact on the learning situations. Their impact on the administration of co-operative education or the development of a management information system for co-operative education does not fall within the scope of this research project.

Methodology in educational research can be defined as the overall strategy for resolving the complete set of choices or options available to the researcher. It represents the position from which the researcher investigates the situation. It is the aim of research to obtain valid generalisations. These generalisations can be established most effectively through the development of explanatory theory as it is the application of theory that turns fact-finding into research. The methodology then indicates the tools for data collection and it influences the data analysis. The choice of methodology dictates the selection of tools or methods of inquiry, in that the method(s) chosen must be capable of providing data that can be analysed in a manner commensurate with the methodological approach.

Mouton (2001:55) states that research design is a plan or blueprint of how the

researcher intends conducting the research. Research designs are tailored to address different kinds of questions or problems. It is therefore logical to assume that the research design will have the research problem as a point of departure. This study employed a mix of quantitative and qualitative methods, but the emphasis was on a quantitative assessment of the needs and expectations of those involved in the management of co-operative education.

In summary:

- A survey was undertaken of good international practice, from which a set of desirable “elements”, “components” or “sub-systems” was established. Hereafter they are referred to as “**sub-systems**”.
- These subsystems were taken as the foundation for a questionnaire, wherein respondents were asked to consider the importance and detail of the sub-systems.
- The questionnaire was reviewed for its effectiveness and completeness, refined, and then deployed to 325 people nationally. Internationally 77 delegates responded.
- An analysis of their responses was used to develop a set of desirable characteristics of a co-operative education management information system in South Africa.

Some comparison of local (South African) and international preferences is included.

The main objective of this study was to develop a scientifically-established model of an adequate management information system for co-operative education, which will comply with the needs of the South African Co-operative Education System (refer to Chapter 1, Section 1.3, p.10). “If managerial functions are to be carried out both efficiently and effectively, then it is a prerequisite that high quality information is available to inform decision making at the various managerial levels. An information system should be reliable and provide the right information:

- To the right people
- At the right time
- In the right way, and
- To achieve clear objectives" (Davies & Ellison, 1990:27).

The information systems developed should be seen as rational, and able to supply different types of information to different parts of an organisation. The emphasis is on the construction of appropriate information from the data collected.

4.2 RESEARCH METHOD AND MEASUREMENT ISSUES

To bring the problem (as analysed in Chapter 1, and further defined in Chapter 2 and Chapter 3) into sharper focus, it was discussed at an informal level with learners, co-ordinators of experiential learning (EL) as well as co-operative education lecturers (CEL's). From these discussions the expectations and issues with regard to the present system to manage EL, were identified. From additional discussions, along with correspondence with participating employers, specific, as well as generic aims relating to co-operative education, were identified.

From the information gathered in this way, certain related factors were identified. These factors were further analysed into formulated items, and ultimately questions relating to each of the factors were formulated. According to Alreck and Settle (2004:146), a questionnaire has several functions or objectives. The first section of the questionnaire, for example, introduces the survey to the respondents; the middle section contains the items and scales to measure the survey topics; and the final section has the questions to measure the respondents characteristics to group and compare the individual cases. White (2003:66) suggests the following guidelines for writing effective questions or statements in the questionnaire: make items clear; avoid double-barrelled questions; respondents must be competent to answer; questions should be

relevant; simple items are the best; avoid negative items; and avoid biased items or terms.

In this study the questionnaire method was chosen to allow collection of relevant data from a variety of Technikons and Colleges throughout South Africa. The specific questionnaire has been developed based on a review of previous research, and investigations focussing on all the elements of co-operative education and the possible best practices of each (refer to Chapter 3). The questionnaire was tested for reliability and validity by a panel of "competent practitioners" of co-operative education and subsequently revised to enhance its validity and relevance.

4.2.1 Reliability

Reliability is primarily concerned not with what is being measured but how well it is being measured and can also be seen as an integral part of validity (White, 2005:197). According to White (2005:197), several procedures exist to measure reliability and include the test-retest and alternate forms methods and split half technique.

Reliability in quantitative research equates to dependability. Neuman (2003:179) states that reliability implies that the numerical results produced by an indicator remain constant because of the nature of the measurement process, or measurement instrument itself. Struwig and Stead (2001:130) agree with the above, asserting that reliability is the extent to which test scores are accurate, consistent or stable. Neuman (2003:179) identifies three types of reliability: stability reliability, representative reliability, and equivalence reliability. Due to the dynamics of the entire educational scene since 1994 in South Africa, and the subsequent impact of learnerships on the experiential learning component of co-operative education, stability reliability is seen as an important criterion of the research model. For the purpose of this study, only stability reliability will be discussed.

4.2.1.1 Stability Reliability

White (2005:198) differentiates between three types of reliability, namely determining stability (determined by the test-retest method); alternate forms (in which two tests were given to sample the same material); and split half techniques (which is used to determine internal consistency).

Stability reliability also is known as test-retest reliability. According to Struwig and Stead (2001:131) and Neuman (2003:179), stability reliability is the extent to which a test score is reliable over a period of time. Since this research project was initiated on a part-time basis, and taking the developments in education since 1994 into consideration, the work that has been done during the initial phases had to be consistent and reliable for the work that followed.

Administering the questionnaire to the same group of people at two different times tested the final questionnaire's reliability. The group used for the above reliability test was a cohort of 45 respondents from the academic institutions (technikons) within South Africa. The test scores from the two different test sessions were compared and found to be similar within an overall margin of 2%, which is acceptable for this study. The questionnaire can thus be deemed reliable.

4.2.2 Validity

White (2005:193) refers to validity as that which may either be true or correct, corresponds to the actual state of reality. White (2005:193) differentiates between two types of validity in quantitative research, namely internal validity, which refers to the degree to which the design of an experiment controls extraneous (external) variables, and external validity, which concerns itself with whether the results of the research can be generalised to another situation, populations, different subjects, settings, times and occasions. Validity in quantitative research concerns conclusions about causal connections, for

example when a connection between variables yields a statistically significant correlation (White, 2005:201).

In this thesis validity is based on the definition of Trochin (2001:20) who defines validity as the best available approximation to the truth of a given proposition, inference, or conclusion. Struwig and Stead (2001:138) elaborate further that the validity of a test's score is related to its reliability - if the test scores are not reliable, they cannot be valid.

Neuman (2003:183) identifies eight types of validity namely; face validity, content validity, criterion validity, concurrent validity, predictive validity, construct validity, convergent validity and discriminant validity. For the purposes of this study, only face validity (the items of the test should measure what it intends to measure) and content validity (the items should reflect the theoretical content of co-operative education) will be discussed.

4.2.2.1 Face Validity

Neuman (2003:183) is of the opinion that face validity is the easiest to achieve. According to him and Struwig and Stead (2001:139), face validity refers to whether the items of the test appear to measure what the test claims to measure. In this research, the pilot questionnaire was discussed with the respondents once they had completed it. Each question was discussed on a one-to-one basis and it was thus clarified that the questionnaire did comply with the test, that is, face validity.

The different items contained in the final instrument, for example, co-operative education information on students and employers, as well as short courses required on the Intranet, clearly comprise all the information of a management information system for co-operative education. The questionnaire thus measures what it claims to measure.

4.2.2.2 Content Validity

According to Struwig and Stead (2001:139), content validity refers to the extent to which the items reflect the theoretical content domain of the construct being measured. The final measuring instrument was developed after several sessions of scrutinising by diverse sub-groups of respondents. The initial content was developed from various inputs such as: the literature surveys (Chapter 2 and Chapter 3), several discussion groups, both nationally and internationally (refer to Section 4.2.5, pp.130-136, "The Pilot Study" as well as Section 4.2.6, pp.136-137, "Preliminary Measuring Instrument"). Both "content validity" and "face validity" adequately define "validity" for the present purpose, and administering the sample can now be addressed.

The instrument was administered to a random sample of the identified population. Descriptive statistical analysis has been performed on the data gathered.

4.2.3 Qualitative vs. Quantitative Research

Since this thesis is based on both qualitative and quantitative methods of data collection, the criteria for judging both qualitative and quantitative research quality were addressed. Quantitative data is that information on a characteristic or property which can be measured on a numerical scale. This data (e.g. age, fuel consumption) can be discrete data (only fixed isolated values) or continuous data (can assume all possible values within a particular logical interval) (Steyn, Smit, Du Toit & Strasheim, 1999:7). According to Struwig and Stead (2001:4), quantitative research is a form of conclusive research involving large representative samples and fairly structured data collection procedures. Qualitative or categorical data refers to data that is not numerical, such as the colour of someone's hair or a person's attitude towards something. However qualitative data can be represented in a quantitative manner by quantifying an attitude as "1" – poor, "2" – fair, "3" – good and "4" – excellent. This definite order in the categories creates "ordinal data", where as, in the example of hair

colour (1 – blond, 2 – brunette, etc.) is referred to as nominal data (Steyn, et al. 1999:7). In this research, **qualitative data** is represented in a **quantitative manner as ordinal data** where the inclusion of an element is judged to be 1 = “very important”, 2 = “important”, 3 = “not important” and 4 = “nice to have”. Trochim (2001:152) describes qualitative measures as short written responses on surveys, interviews, anthropological field research, video and audio data recording, and other forms of enquiry, all of which are characterised by a non-numerical format.

For the qualitative research component of this thesis, criteria such as credibility, transferability, dependability and conformability were used. To judge the quantitative research, criteria such as internal and external validity, reliability and objectivity were used. Trochim (2001:162) defines these terms in the following manner:

Credibility involves establishing whether the results of qualitative research are credible or believable from the perspective of the participants in the research.

Transferability refers to the degree to which the results of qualitative research can be generalised or transferred to other contexts or settings. From a qualitative perspective, transferability is primarily the responsibility of the one doing the generalising (i.e., the reader).

Dependability: The traditional quantitative view of reliability is based on the assumption of replicability or repeatability.

Confirmability (in qualitative research), refers to the degree to which the results can be confirmed or corroborated by others. Amongst some researchers the discussions around “external validity” have been dominated by the idea of statistical sampling as the basis for generalising.

4.2.4 Situation Analysis Questionnaire

Cohen et al. (2003:247) distinguishes one important rule for questionnaires, namely the larger the size of a sample the more structured, closed and numerical the questionnaire has to be, and the smaller the sample size the less structured, more open and word-based the questionnaire should be. According to White (2003:67), the closed ended questionnaire only permits certain responses and the quantification and analysis of results may be carried out easily and very effectively. It should be used where the answer categories are discrete, distinct, and relatively few in number. According to White (2003:68), most questionnaires contain both open and closed questions and recommends that the researcher uses closed questions as much as possible during their research. It is further recommended that a section of the questionnaire consist of closed questions for statistical analysis and a section with open questions to be processed manually.

Using Peterson's (2000:141) work on the construction of effective questionnaires, a self-administered questionnaire was developed. The questionnaire conformed to the following minimum criteria:

- The demographic component was uncomplicated in style and provided data which would assist in establishing and analysing variables
- The demographic data ensured that the sample and the population could be described
- The collected demographic data was analysed
- The questionnaire could be self-administered, but was in fact administered on a face-to-face basis
- Administration time (i.e., time to complete) was less than one hour
- Response scores were not weighted but clear indications of their relative importance were supplied
- Scoring was relatively easy, and
- A pilot study was undertaken to insure that the proposed instrument was capable of achieving its prescribed objectives.

Once the basic criteria of the questionnaire were complied with, the scope of inputs to co-operative education was verified. In managing a co-operative education system effectively, various inputs influence the degree of success achieved. To develop a management information system for co-operative education, these diverse, but related inputs, should be taken into account. That is, inputs from the academic institution and those from commerce and industry should be accommodated.

It is essential for co-operative education administrators to understand the normal differences that exist between what is the aim of academic institutions and what is the aim of commerce and industry. This understanding then needs to be translated into the ability to work with the differences, and find common ground in the shared purpose of developing students into professionals. Students themselves play a different role in each environment, but the eventual outcome for them should be the integration of learning at work (Lazarus & Oloroso, 2004:179).

The co-operative education administrator must therefore develop and guide the co-operative education programme in such a way as to bridge the talent development aspects of the academic institution, and the priority of the employer regarding talent acquisition. The success of the programme rests upon the administrator's ability to assess the changing environment of the academic institution, the academic leadership's expectations for the programme, and clear understanding of the skills needed to succeed in the position (Lazarus & Oloroso, 2004:180).

According to Cohen et al. (2003:260), the wording of a questionnaire is of paramount importance and pre-testing is crucial to ensure its success. Furthermore, a pilot study has many functions but mainly to increase reliability, validity and practicability of the questionnaire. A panel of at least 15 members, representatives of academia, mentors from industry and/or commerce as well as students (or alumni) who have completed their experiential learning component, each actively associated with co-operative education, were

requested to evaluate the proposed instrument for its ability to measure the identified variables ("Students' reports", "Reports on Companies" and "Short Courses on the Intranet"). This feedback was considered in the design of the final instrument (refer to Annexure B). The final instrument was sent to key role players in co-operative education.

4.2.5 The Pilot Study : First Phase

Newman (2003:29) defines exploratory research as research into an area that has not been studied and in which a researcher wants to develop initial ideas and a more focussed research question.

Chapter Three focuses on the background information required for an information technology based management information system for co-operative education. Once the variables had been defined, the final phase was to produce a conceptual model of a system.

During 1996 the Cape Technikon endeavoured to develop a management information system for co-operative education. Up to that point several management information systems for co-operative education had been used, with some degree of success, both in the United Kingdom and the United States of America. An example of an off-the-shelf or customised commercial product used in the USA, is "First Place". The system developed by the Co-operative Education Unit of the Cape Technikon was based on the "First Place" system. This system was later adopted and adapted by Integrated Tertiary Software (ITS) with the aim to provide a product for the South African market.

During a workshop held at Technikon South Africa during November 2001, a collective effort was made to improve the Integrated Tertiary Software (ITS) system by all the delegates present. Although some minor changes to the ITS-system have been implemented, the fact that the system is not fully utilised by any technikon, college or university, points to a continuing need for a functional

system in South Africa. A questionnaire was compiled from the information collected from the "First Place" system, the adapted ITS system, as well as personal enquiries from peer co-operative education lecturers. In addition, at this workshop, a questionnaire (see Annexure A) was submitted to each of the delegates with a request to comment on the content as well as the clarity of the questions. As a point of departure, certain terms and concepts were defined (refer to Glossary, pp.xxix-xxxv).

From the literature reviewed in Chapters 1 and 3, critical activities were mapped to the three sub-systems (refer also to Annexure a(i) and Annexure a(ii)). Comparative sub-systems are used in South African technikons, most often, on an *ad hoc* basis. These subsystems are also included in the one co-operative education information system (ITS) being marketed in South Africa. These subsystems are:

- i. Student information (refer to Chapter 6, Recommendations 6.3.2, pp.275-278)
- ii. Employer information (refer to Chapter 6, Recommendations 6.3.3, pp.278-280)
- iii. Various standard letters (refer to Chapter 6, Recommendation 6.3.1(q), p.275).

These three sub-systems are now elaborated on individually.

(a) Student Sub-system

The reports identified in the pilot study for this sub-system "**List of students**" are as follows (refer to Conclusions 6.2.1, pp.265-266) :

(GLOSSARY: Annexure A = Pilot Questionnaire; Sub-section (a) = First section in questionnaire; Question 1 = First question in sub-section; Also refer to Section in 3.3.2.5, pp.98-104 for clarification on reference to questions and questionnaires).

LIST OF STUDENTS:

- (i.) Initially applying to be placed (refer to Annexure A, Sub-section (a), Question 1; Refer also Chapter 6, Conclusions 6.2.1, pp.265-266; Recommendation 6.3.2(d), p.276)
- (ii.) Applied to be placed but do not qualify (refer to Annexure A, Sub-section (a),

Question 2; Refer also Chapter 3, Section 3.4.1(c)(i), p.111; Chapter 6, Conclusions 6.2.1, pp.265-266; Recommendation 6.3.2(e), p.276)

- (iii.) **Qualified to be placed** (refer to Annexure A, Sub-section (a), Question 3; Refer also Chapter 3, Section 3.3.2.1(b)(iii)&(c)(ii), pp.84&85; Chapter 6, Conclusions 6.2.1, pp.265-266; Recommendation 6.3.2(f), p.276)
- (iv.) **Referred for placement** (refer to Annexure A, Sub-section (a), Question 4; Refer also Chapter 3, Section 3.4.1(c)(i), p.111; Chapter 6, Recommendation 6.3.2(h), p.277)
- (v.) **Placed/company** (refer to Annexure A, Sub-section (a), Question 5; Refer also Chapter 3, Section 3.4.1(c)(i), p.111; Chapter 6, Recommendation 6.3.2(i), p.277)
- (vi.) **Registered after placement** (refer to Annexure A, Sub-section (a), Question 6; Refer also Chapter 3, Section 3.4.1(c)(i), p.111; Chapter 6, Conclusions 6.2.1, pp.265-266; Recommendation 6.3.2(j), p.277)
- (vii.) **Placed but not registered** (refer to Annexure A, Sub-section (a), Question 7; Refer also Chapter 3, Section 3.4.1(c)(i), p.111; Chapter 6, Conclusions 6.2.1, pp.265-266; Recommendation 6.3.2(k), p.277)
- (viii.) **Dates visited/company** (refer to Annexure A, Sub-section (a), Question 8; Refer also Chapter 3, Section 3.4.1(c)(i), p.111; Chapter 6, Conclusions 6.2.1, pp.265-266; Conclusions 6.2.2, p.266; Recommendation 6.3.2(m), p.278; Recommendation 6.3.3(k), p.280)
- (ix.) **Progress marks and final mark** (refer to Annexure A, Sub-section (a), Question 9; Refer also Chapter 3, Section 3.2(a)&(c), pp.78-80; Section 3.3.2.1(b)(iv), p.84; Chapter 6, Conclusions 6.2.1, pp.265-266; Recommendation 6.3.2(c),(l)& (n), pp.276&277&278)
- (x.) **Summative report per student on all aspects of experiential learning** (refer to Annexure A, Sub-section (a), Question 10; Refer also Chapter 3, Section 3.3.2.1(b)(iv)&(c)(vii)(viii), pp.84&85; Section 3.4.1(c)(iii), p.111; Chapter 6, Conclusions 6.2.1, pp.265-266; Recommendation 6.3.2(p), p.278).

(b) Employer Sub-system

The reports identified in the pilot study for this sub-system **“Lists on Employer Information”** are as follows (Refer to Conclusions 6.2.2, p.266) :

(GLOSSARY: Annexure A = Pilot Questionnaire; Sub-section (b) = Second section in questionnaire; Question 1 = First question in sub-section; Also refer to Section in 3.3.2.5, pp.98-104 for clarification on reference to questions and questionnaires)

“LISTS ON” –

- (i.) **History of participating companies** (refers to Annexure A, Sub-section (b), Question 1; Refer also Chapter 3, Section 3.3.2.1(b)(i), p.84; Chapter 6, Conclusions 6.2.2, p.266; Recommendation 6.3.3(a), p.279)

- (ii.) **Active companies** (refers to Annexure A, Sub-section (b), Question 2; Refer also Chapter 3, Section 3.3.2.1(v), p.84; Chapter 6, Conclusions 6.2.2, p.266; Recommendation 6.3.3(f), p.279)
- (iii.) **Contact person/company** (refers to Annexure A, Sub-section (b), Question 3; Refer also Chapter 3, Section 3.3.2.1(b)(i), p.84; Chapter 6, Conclusions 6.2.2, p.266; Recommendation 6.3.3(e), p.279)
- (iv.) **Companies and dates visited** (refers to Annexure A, Sub-section (b), Question 4; Refer also Chapter 3, Section 3.3.2.1(b)(vii), p.85; Chapter 6, Conclusions 6.2.2, p.266; Recommendation 6.3.3(k), p.280)
- (v.) **Students referred to a company** (refers to Annexure A, Sub-section (b), Question 5; Refer also Chapter 3, Section 3.3.2.1(b)(iv), p.84; Chapter 6, Conclusions 6.2.2, p.266; Recommendation 6.3.3(i), p.280)
- (vi.) **Main activities of a company** (refers to Annexure A, Sub-section (b), Question 6; Refer also Chapter 3, Section 3.3.2.1(b)(iv)&(v), p.84; Chapter 6, Conclusion 6.2.2, p.266; Recommendation 6.3.3(b), p.279)
- (vii.) **Variety of placement positions within a company, in different courses** (refers to Annexure A, Sub-section (b), Question 7; Refer also Chapter 3, Section 3.3.2.1(b)(v)&(vi), p.84; Section 3.3.2.2(a)(i), p.89; Chapter 6, Conclusions 6.2.2, p.266; Recommendation 6.3.3(g), p.279)
- (viii.) **Accessibility of a company** (refers to Annexure A, Sub-section (b), Question 10; Refer also Chapter 6, Conclusions 6.2.2.5, p.266; Recommendation 6.3.3(l), p.280).

An aspect which was emphasised (especially by the international institutions investigated in the pilot study) was the presentation of short courses relating to several elements in the placement process. Elements relating to self-analysis, CV preparation, career planning, and so on are some of these courses.

Work by McRae (1999) towards a possible program specification, identified specific requirements for a curriculum to meet its objectives. A curriculum should be:

- Generic yet customisable to meet specific programme needs
- Not paper dependent
- Easily updated
- Consistently structured
- Based on students' self-directed learning and not programme resource dependent, and
- Able to result in logical measurable outcomes so that student learning could be evaluated and monitored.

McRae (1999) reports that a curriculum delivered through the Internet could meet these objectives. However, an investigation of the international institutions (refer to Sections 3.3.2.1 to 3.3.2.5, pp.83-104) revealed that a benefit of a curriculum is its ability to be broken down into a series of modules, based on the student preparation services. These modules are:

- Market trends
- Self-assessment
- Résumés
- Cover letters
- Interview preparation
- Job development
- Job search
- Learning objectives
- Time management systems, and
- Other information (McRae, 1999:49-53).

Each module could then be broken down into the following consistent structure, which formed the basis for the Intranet design:

- Resource available on the topic (from libraries, on the Intranet, and any other sources)
- Sample material (including exercises, examples, checklists for reference), and
- Outcomes (the actual outcome expected once the student has completed each module).

(c) Short Courses Sub-system

The resources section was established as crucial for ensuring that the objectives of self-directed learning were maintained. By listing where students could go and learn more about each topic, they are able to conduct their own research.

The courses identified through the pilot survey, for this sub-system **"Lists of Short Courses"** are as follows (refer to Conclusions 6.2.3, p.266) :

(GLOSSARY: Annexure A = Pilot Questionnaire; Sub-section (c) = Third section in questionnaire; Question 1 = First question in sub-section; Also refer to Section in 3.3.2.5, pp.98-104 for clarification on reference to questions and questionnaires).

"SHORT COURSES ON"

- (i.) **Introduction to co-operative education** (refers to Annexure A, Sub-section (c), Short Course 1; Refer also Chapter 3, Section 3.3.2.1(a), p.84; Chapter 6, Conclusions 6.2.3, p.266; Recommendation 6.3.4(c), p.281)
- (ii.) **Policies and procedures of the "On-line Placement System"** (refers to Annexure A, Sub-section (c), Short Course 2; Refer also Chapter 3, Section 3.3.2.2, p.88; Section 3.3.2.3(i)(a), p.91; Chapter 6, Conclusions 6.2.3, p.266; Recommendation 6.3.4(d), p.281)
- (iii.) **Available communication channels** (refers to Annexure A, Sub-section (c), Short Course 3; Refer also Chapter 3, Section 3.3.2.5(a), p.102; Chapter 6, Conclusions 6.2.3, p.266; Recommendation 6.3.4(e), p.281)
- (iv.) **Recognition of prior learning of co-operative education**
- (v.) **Self-assessment and placement preferences** (refers to Annexure A, Sub-section (c), Short Course 4; Refer also Chapter 3, Section 3.3.2.1(c)(ix), p.85; Section 3.3.2.5, p.100; Chapter 6, Conclusions 6.2.3, p.266; Recommendation 6.3.4(f), pp.281-282)
- (vi.) **Compiling a CV/résumé** (refers to Annexure A, Sub-section (c), Short Course 5; Refer also Chapter 3, Section 3.3.2.2, p.88; Chapter 6, Conclusions 6.2.3, p.266; Recommendation 6.3.4(g), p.282)
- (vii.) **Professional conduct** (refers to Annexure A, Sub-section (c), Short Course 6; Chapter 6, Conclusions 6.2.3, p.266; Recommendation 6.3.4(h), p.282)
- (viii.) **Interviewing skills** (refers to Annexure A, Sub-section (c), Short Course 7; Refer also Chapter 3, Section 3.3.2.2, p.88; Table 3.3, pp.100-102; Chapter 6, Conclusions 6.2.3, p.266; Recommendation 6.3.4(i), p.282)
- (ix.) **Work ethic** (refers to Annexure A, Sub-section (c), Short Course 8; Refer also Chapter 3, Section 3.3.2.1(c)(i), p.85; Chapter 6, Conclusions 6.2.3, p.266; Recommendation 6.3.4(j), p.282)
- (x.) **Career exploration/mobility** (refers to Annexure A, Sub-section (c), Short Course 9, Refer also Chapter 3, Section 3.3.2.4(2), p.97; Section 3.3.2.5, pp.98-104; Chapter 6, Conclusions 6.2.3, p.266; Recommendation 6.3.4(k), p.282)
- (xi.) **Workplace experience** (refers to Annexure A, Sub-section (c), Short Course 10, Refer also Chapter 3, Section 3.3.2.1(b)(viii)&(ix), p.85; Chapter 6, Conclusions 6.2.3, p.266; Recommendation 6.3.4(l), p.282).

Once the data has been obtained and sorted into specific blocks of information, it should be utilised to develop a conceptual model of an MIS for co-operative education. An obvious method to implement the management of the information, is to set tasks which should be performed effectively and in a timely fashion (refer to Chapter 6, Section 6.4, pp.283-287).

The second phase, which followed the "pilot study", was conducted at an International Conference.

4.2.6 Preliminary Measuring Instrument : Second Phase

During the 12th World Conference on Co-operative Education held at Suranaree University of Technology, Thailand, during August 2001, a revised questionnaire was submitted to international delegates (i.e., non-South African delegates). The aim of this revision was two-fold: firstly, to make final adjustments to the clarity and validity of the questions and secondly, because the instrument was also sent to international co-operative education practitioners to form a control group. "Control group" in this study refers to the views of a group of respondents who are using an established MIS for co-operative education. The latter's views were used primarily as a basis for comparison to assess whether the newly developed South African model of an MIS for co-operative education resembles in any way established models of MIS for co-operative education internationally. These delegates were from a variety of countries but they were all practising some form of co-operative education. They represented institutions of higher learning throughout Australia, Canada, China, Germany, Great Britain, Japan, The Netherlands, New Zealand, Spain, Thailand and USA.

This questionnaire (refer to Annexure A) consisted of three sub-sections, namely "Reports Required", "Information of Students", "Companies and Short Courses on the Intranet System". Each of these sub-sections was divided into several items. The respondents were asked to evaluate the importance of the

items for inclusion into a management information system. The third and final phase consisted of a measuring instrument with several sections (refer to Table 4.1, p.138).

4.2.7 Measuring Instrument : Final Phase

From the feedback received during the 2001 World Conference on Co-operative Education in Thailand, it was clear that no generic questionnaire could be used internationally. Aspects that need to be clarified are the different systems of co-operative education in use, and the different terminology of the various elements of co-operative education in use internationally.

It was subsequently decided to produce a basic questionnaire for South Africa to investigate to what extent the management information system in use at leading co-operative education institutions internationally could be utilised in South Africa. The final instrument was compiled from feedback received from the representative samples.

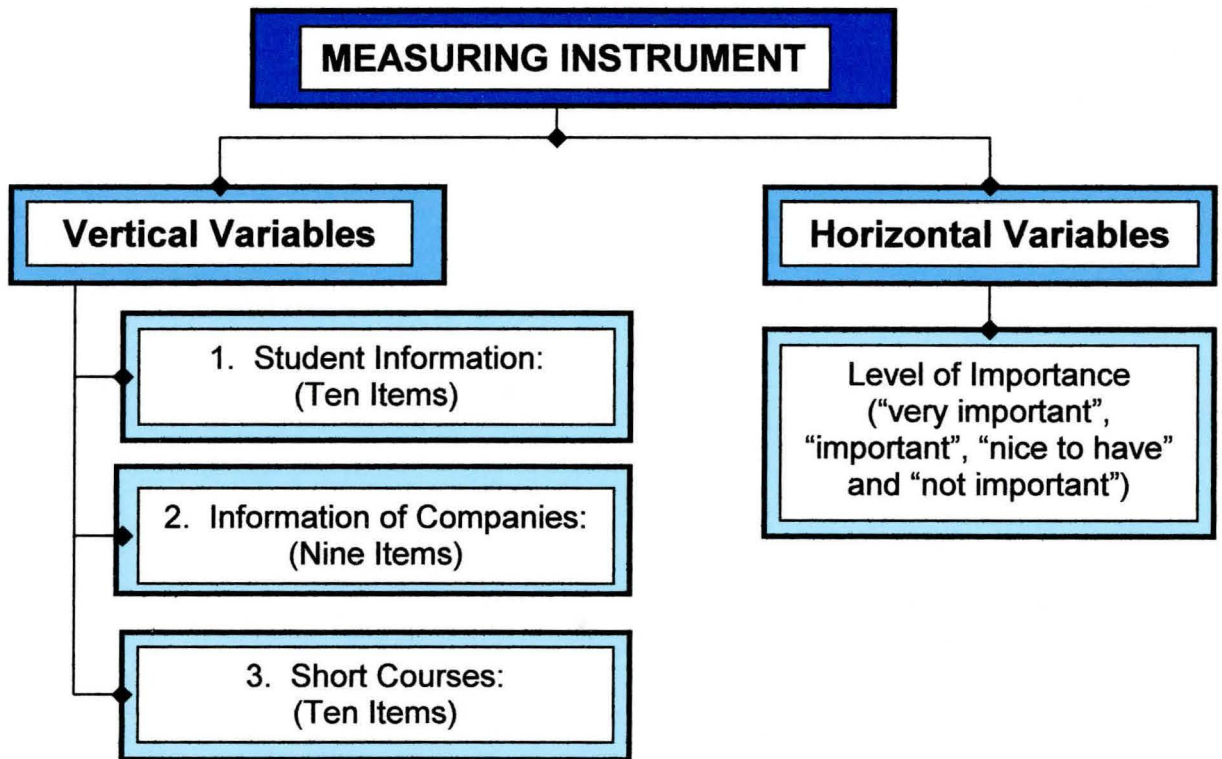
Although one core instrument was used, this instrument was divided into "questionnaires". Firstly, all questionnaires sent to respondents were identified as: (a) Technikons, (b) Colleges and (c) International Universities. The questionnaires were further divided into: 1. "The Reports Required on Student Information" (Students' Reports); 2. "Employer Information" (Reports on Companies); as well as 3. "Courses Available on the Intranet". Hence the final instrument consisted out of three sub-sections, as set out as in Table 4.1 :

TABLE 4.1
Data Capturing Sections of Measuring Instrument

SECTIONS IN QUESTIONNAIRE	QUESTIONNAIRE CODE
<ul style="list-style-type: none"> • Students' Reports : Technikons • Reports on Companies : Technikons • Short Courses on the Intranet : Technikons 	<p>1(a)</p> <p>2(a)</p> <p>3(a)</p>
<ul style="list-style-type: none"> • Students' Reports : Colleges • Reports on Companies : Colleges • Short Courses on the Intranet : Colleges 	<p>1(b)</p> <p>2(b)</p> <p>3(b)</p>
<ul style="list-style-type: none"> • Students' Reports : International Universities • Reports on Companies : International Universities • Short Courses on the Intranet : International Universities 	<p>1(c)</p> <p>2(c)</p> <p>3(c)</p>

The data gathered during this phase, formed the basis on which the various factors were included (ranked according to importance) into the conceptual model of the management information system. The accuracy and inclusiveness of these factors are thus significant. This final questionnaire consisted of a two dimensional matrix (refer to Figure 4.1 "Two Dimensional Matrix of Measuring Instrument" as well as Annexure B). The vertical variables were grouped into three main factors: "Student Information", "Information of Participating Companies" and "Short Courses". The horizontal variables were initially grouped under three variables: "important", "nice to have", and "not important". At the suggestion of the majority of the respondents reacting on the final phase of the instrument during the 2001 World conference on co-operative education in Thailand, the "important" variable was further split into "very important" and "important".

FIGURE 4.1
Two Dimensional Matrix of Measuring Instrument



4.2.7.1 Student Information

The 10 Items of student information follow a chronological course from students' application for placement (Item 1) to the summative report (By Student) of his/her experiential learning experience (Item 10).

4.2.7.2 Information of Companies

The nine Items of company information identify all the relevant information relating to the experiential learning offered by a company, as well as its physical location(s).

4.2.7.3 Short Courses (also on the Intranet)

The 10 Items of short course information should adequately prepare students to

make the correct career choices within a given field, as well as boost the development of the student during the experiential learning phase.

4.3 THE EMPIRICAL SURVEY

From the information obtained from the pilot study, (refer to Section 4.2.5, pp.130-136) the preliminary measuring instrument (refer to Section 4.2.6, pp.136-137) was administered. The measuring instrument (refer to Section 4.2.7, pp.137-140) was administered to the target population. According to Schumann, Bouwer and Schoeman (1980) a universum or population can be defined by any collection of individuals or items that possess a common attribute and that include the whole or totality of the aspects relevant to the study (Schumann, et al. 1980:8).

4.3.1 Identification of the Target Population and a Representative Sample

Alreck and Settle (2004:60) advise that smaller samples are more likely to be different from the population than larger ones. Furthermore, the smaller the samples, the larger the error and the lower the reliability. On the other hand, the larger the sample the lower the error and the less the sampling error is, and the greater the reliability would be. Therefore, larger samples enable researchers to draw more accurate conclusions and make more accurate predictions (Alreck and Settle, 2004:60). An attempt was made in this study to obtain the largest possible sample.

Several of the educational institutions which focus on career-orientated education in South Africa, are aware of the co-operative education principle. However, not all of those who are aware of this educational principle, practice it. Amongst those who practice co-operative education, the scope and quality of commitment vary.

Co-operative education is a system in use by all the technikons within the

higher education environment in South Africa. Although co-operative education is not a compulsory component in all the courses at any one of the technikons at this point in time, all the technikons offer at least some courses based on the co-operative education principle. When considering the representative sample for technikons, the total population was small enough and accessible enough to include all 15 technikons. The final instrument (refer to Annexure B) was initially sent to all 15 technikons. It should be noted that not all technikons offer the same number of courses based on the co-operative education system. The number of co-operative education lecturers (participants) involved in co-operative education thus depended on the number of courses offered based on the co-operative education system within an institution. All technikons were included due to the relatively small number of technikons.

As far as the colleges in South Africa and the international "co-operative education community" were concerned, samples had to be drawn. The Australian Bureau of Statistics (ABS) states on their web-site (www.abs.gov.au, as updated 27 August 2004) that "samples are taken from populations, and estimates made about the population based on information derived from the sample". They explain five random sample techniques namely :

- **Simple random sampling** – each item in a small population has an equal chance of inclusion in the sample (ABS, 2004:2; Steyn, et al. 1999:21; Schumann, et al. 1980:10)
- **Systematic sampling** (interval sampling) – means that there is a gap, or interval between each selection e.g. every 10th item is selected (ABS, 2004:2; Schumann, et al. 1980:13)
- **Stratified sampling** – population is first divided into groups then samples representing each group are drawn. The number drawn from each group may vary (ABS, 2004:3; Steyn, et al. 1999:25; Schumann, et al. 1980:13)
- **Cluster sampling** – or randomly divides the population into groups or clusters. Less accurate results are often obtained due to higher sampling error (ABS, 2004:4; Steyn, et al. 1999:32; Schumann, et al. 1980:13)
- **Multi-stage sampling** – is selecting a sample within each chosen cluster.

In the first stage, large groups or clusters are selected. These clusters are designed to contain more population units than are required for the final sample. In the second stage, population units are chosen from selected clusters to derive a final sample (ABS, 2004:5).

Due to the diversity of the population of South African colleges and international institutes of higher learning practicing co-operative education, this method of sampling – multi-stage sampling – was used. Colleges administering a “co-operative education” system in their courses were selected on a proportional basis. Fifteen colleges were invited to take part in the investigation nationally.

The measuring instrument was submitted to delegates while visiting the United States of America, as well as attending World Conferences on Co-operative Education internationally.

Universities from the following international countries took part in the survey (refer to Table 4.2, “Participating International Countries”) :

TABLE 4.2
Participating International Countries

COUNTRIES	Questionnaires Returned
Australia	12
Canada	7
Germany	3
Japan	1
Netherlands	5
New Zealand	6
Spain	3
Thailand	4
United Kingdom	9
United States of America	27
TOTAL	77

Analysis commenced only once all the questionnaires had been received. Some 73 questionnaires were received from the technikons, 55 from the colleges and 77 questionnaires from institutes of higher learning internationally - a total of 205 responses from the total of 325 questionnaires distributed. Initially these three groups were investigated separately. As noted above, persistent personal follow-up resulted in a high percentage of return (63%). The group of international institutes of higher learning was used as a control group to compare the input from well-established systems with the new system being developed for South African requirements.

4.3.2 Administering the Questionnaire

Although all 325 questionnaires were mailed within one week, a follow-up phone call revealed that not all the staff interested in participating had received a copy of the questionnaire. Additional copies were sent to these members. Due to the workload of staff, the completed questionnaires were returned over a three-month period.

4.3.3 Data Capturing

The researcher consulted various sources (Rose & Sullivan, 1993; Fink, 1995; Greenfield, 1996; Wright, 1997 and Byrne, 2002) on statistics and data capturing, editing, and analysis. In addition she consulted a specialist in the field of statistics. This is also recommended by Struwig and Stead (2001:150) they mention that data analysis is a specialised area of research procedures and that the researcher should use experts in the field.

It was established that a process was needed to convert the masses of raw data into meaningful information. The researcher may have had many completed questionnaires, but until they were tabulated and analysed, they remained useless (Struwig & Stead, 2001:150).

The first step the researcher and the statistician took was to edit and encode the data. Neuman (2003:332) advises that before a researcher examines quantitative data, he/she needs to put it into a different form. Struwig and Stead (2001:150) advise that the primary purpose of editing is to eliminate errors in the raw data and to place the data into categories to facilitate the tabulation and interpretation of the data. They also add that editing refers to the elimination of errors in the raw data, and encoding refers to the assignment of data to appropriate categories. The different categories were established.

To group the responses by technikon (or college) courses was problematic due to the relatively small number of students registered in each course, as well as

the differing scope of courses, means the sub-groups were too small. Even when technical courses (such as engineering-related courses and commerce-related courses) were grouped, the numbers were still too small to make any valid deductions. It was subsequently decided to group all technikon courses as one sub-group, and all college courses as another sub-group.

Responses were based on the perceptions of co-operative education lecturers responsible for co-operative education. Factor analyses to identify basic connections were mainly explorative in nature. Where applicable, this was supported by frequency tables. This research investigated various variables but correlation between these variables is not investigated. This research did not endeavour to determine why respondents have different views, but accepted that they do have different views, as a fact. Possible variables might be the different designs of educational systems, demographics of student populations, facilities and resources available, etc.

Factor analysis includes both component analysis and common factor analysis. According to Darlington (2004) the purpose of factor analysis is to discover simple patterns in the pattern of relationships among the variables. In particular, it seeks to discover if observed variables can be explained largely or entirely in terms of a much smaller number of variables called factors. In this research, it is accepted that the list of variables is not an absolute representation and that they are interdependent. Factor analysis can suggest either absolute or heuristic models; the distinction is in how the output is interpreted. A heuristic way of using factor analysis is a way of thinking about a topic, which is convenient even if not absolutely true, as is the situation in this research (Darlington, 2004:1-5).

Many statistical methods are used to study the relationship between independent and dependent variables. Factor analysis is different; it is used to study the patterns of relationship among many dependent variables, with the goal of discovering something about the nature of the independent variables that affect them, even though those independent variables were not measured

directly. Thus answers obtained by factor analysis are necessary more hypothetical and tentative than is true when independent variables are observed directly.

Another challenge to factor analysis has come from the use of competing techniques such as cluster analysis and multidimensional scaling. While factor analysis is typically to a correlation matrix, those other methods can be applied to any sort of matrix of similarity measures. Factor analysis may be used to determine groupings of variables, which variables belong to which group, how many dimensions were needed to explain the relations among variables, a frame of reference to describe the relations among the variables and scores of individuals on such groupings. Factor analysis normally begins with a complete table of intercorrelations among a set of tests. Such a table is known as a correlation matrix, which shows the weight or loading of each of the factors in each test (Anastasi & Urbina, 1997:303).

According to Cronbach (1970:309), factor analysis is a systematic method for the examination of the meaning of a test by studying its correlation with other variables and the basic idea is to that of simple correlation itself. A factor analyst introduces composite variables also known as factors that can be interpreted and describes the test by its relation to key variables (Cronbach, 1970:312).

No in-depth analysis was made due to the variations in the frames of reference of the participants from South African colleges as well as the international participants. To try to establish any significant correlation between variables proved to be mainly speculative in nature. The validity of the instrument reflected the best available approximation of the true view of the respondents.

4.3.4 Content Validity of the Items

The number of respondents was small (73 from technicians and 55 from colleges = 128 in total out of 325 questionnaires sent out) in relation to the number of items (32) on the questionnaire. Content validity (refer to Section 4.2.2.2, p.126) for each item included in the relevant variables could thus only be achieved on a qualitative basis.

The completed questionnaires received from all the respondents were recorded and processed to compile a comprehensive report.

4.4 SUMMARY

Chapter Four has explained the methodology used, some terminology used, and the compilation of the measuring instrument. In this chapter the research design and methodology with regard to data collection and the target population involved in this research was discussed. The measuring instrument used in the empirical research, the pilot study, population sampling, data collection/processing, validity, reliability and factor analysis were discussed. Further investigation and interpretation of these results are required, and this is covered in Chapter Five. Conclusions and recommendations are reported in Chapter Six.

CHAPTER 5

REPORTING AND INTERPRETATION OF DATA AS WELL AS SYNTHESIS OF RESEARCH FINDINGS

The responses to the various elements on each of the questionnaires are reported in Chapter 5. The data interpretation is also presented. From the data interpretation in this chapter, conclusions are formulated. Recommendations are presented in Chapter 6.

5.1 INTRODUCTION

This research project sought to obtain insights into the use of a management information system for use in the South African co-operative education environment. The situation analysis (Chapters 2 and 3) delivered information from which the research was subsequently conducted. In revisiting the literature, which was surveyed some four years before completion of this work, it becomes apparent that the problem that was then clearly identified, still exist and is now scientifically investigated.

First, a general observation: the total commitment to co-operative education of the international respondents differs when compared to that of their South African colleagues. International respondents market their institutions and courses – primarily - based on the co-operative education principle. In the South African context, co-operative education as part of a course is mentioned often but the benefits of experiential learning gained prior to completion of the formal qualification is not emphasised in all courses. Another general observation is that not all respondents use the same terms of reference and definitions of concepts. This initiated additional correspondence to clarify matters. (Refer to the Glossary on pp. xxiv-xxxv).

In this study "synthesis" refers to a summative merger of separate elements of the study into a new whole. Consequently, a synthesis is presented of the MIS of co-operative education as constituted from the functional coherence of the situation analysis, aims and objectives, student reports, reports on companies, and short courses available on the intranet system.

The results obtained in this chapter are interpreted in three distinct groupings namely, results obtained from South African technikons (refer to Section 5.3, pp.152-176), South African colleges (refer to Section 5.4, pp.177-221), and international universities (refer to Section 5.5, pp.222-233).

5.2 REPORTING ON GENERAL ASPECTS OF THE SURVEY

For the final analysis the responses of the following three groups were used. Responses from the technikons were 73, those from the colleges were 55 and those from international universities were 77.

Due to the nature of the data gathered frequency tables and bar charts were used. Since the area under the "curve" does not indicate any significant information no histograms or pie-charts were used – only bar charts. Bar charts are graphic representations of the frequency distribution of discrete or categorical data in which the categories are given on the horizontal axis and the frequencies on the vertical axis (Steyn, et al. 1999:71; Schumann, et al. 1980:31). The median – central value, the mode – the value most often occurring in the data set as well as the standard deviation – the measure of the distribution around the arithmetic mean were not used in Chapter 5 due to the fact that the arithmetic mean of the raw data, and expressed as percentages, rendered the required level of clarity and accuracy. When the measuring instrument was developed, it was envisaged that sufficient responses would be received to eliminate possible biases of particular biographical groups out of the final conclusions. With the relative small groups of responses received, it was impossible and hence not reported on.

According to Alreck and Settle (2004:24), demographic groups differ significantly on the issues of importance and can be used to identify segments, groups, audiences, or constituencies of people who were both identifiable and behave in similar ways.

5.2.1 Is the Course/Programme Credit Bearing?

(a) Technikons

The fact that not all the courses are based on the co-operative education principle, or have the experiential learning component as a compulsory component, was reflected in the results. 63% reported, "Yes it is credit bearing" and 37% "No, it is not credit bearing". The relatively high percentage of courses which are not credit bearing, may influence the importance assigned to the various sub-sections, and items within a sub-section (refer to Chapter 6, Section 6.3.2(a), p.275).

(b) Colleges

Some of the respondents were of the opinion that since learners are expected to "work" for a predetermined period after the completion of their academic studies and prior to "graduation", their courses/programmes are credit bearing. In these courses at colleges, the "work" component does not reflect a structured experiential learning system, but merely an exposure to commence industry. This exposure need not necessary be to situations related to their field of study. The minority (23%) was of the opinion that it is not credit bearing.

(c) International Universities

All participants indicated that it is compulsory for their students to do experiential learning. In these institutions both experiential learning and co-operative education are established principles.

(d) Summative : Technikons, Colleges and International Universities

It would appear from the results that “additive academic credits” and “non-additive academic credits” were defined differently by different respondents. For example, some institutions (some colleges) would regard the fact that time to gain “work experience” was allowed prior to the graduation, as additive academic credits while others (technikons) would regard this as non-additive academic credits. As such then, these results cannot be reported with a reasonable level of accuracy. Again, the actual number of respondents indicating that their course(s) has/have the experiential learning component as credit bearing (or non-credit bearing) was small (refer to Chapter 6, Section 6.3.2(a), p.275).

5.2.2 Reports as well as Short Courses Required on the Intranet

The views of the respondents on both the importance and the various sort options required for each report, are listed in Tables 5.1 and 5.3, for technikons, and for colleges in Tables 5.7 and 5.9. The replies of the respondents on the “short courses required on the Intranet” are listed in Tables 5.5 (technikons) and 5.11 (colleges). Replies of respondents from international universities regarding the “Importance of the Reports on Student Information” and “Information on Companies”, are listed in Tables 5.13 and 5.14 respectively. The “List of Short Courses required to be available on the Intranet” are listed in Table 5.15.

Since the questionnaires were already divided into sub-groups 1(a) (Information on Students as indicated by respondents from technikons) up to 3(c) (Short Courses required on the Intranet as indicated by respondents from international universities), gathering and sorting the data followed a logical sequence.

5.3 REPORTING ON THE RESULTS FROM SOUTH AFRICAN TECHNIKONS

The first sub-group investigated was the replies received from respondents attached to technikons. These respondents were all co-operative education lecturers responsible for the management of co-operative education. They were requested to indicate the level of importance they assign to each of these reports as well as the way in which the information should be sorted.

The approach of co-operative education lecturers at technikons in the Republic of South Africa where experiential learning is planned, is to complement the academic component (as shown in the situation analysis Chapter 3, and the results reported in this chapter), and to offer a relevant and career-orientated educational system.

5.3.1 Students' Reports (Student Information)

Questionnaire 1(a), Table 5.1, investigated the importance assigned by co-operative education lecturers responsible for co-operative education at technikons to the various items of student information, as well as the way in which (if any) it should be sorted.

The numbers in bold and placed in boxes indicate the percentages, of respondents who rated the specific list as "very important", "important", "nice to have" or "not important".

TABLE 5.1

Students' Reports : Teknikons

Sample Size : 73 Respondents

QUESTIONNAIRE 1(a)

(Values indicated in this chapter are the arithmetic mean of the raw data, expressed as percentages)

1(a) Students' Reports : Teknikons	Very Important	Important	Nice to have	Not important
	%	%	%	%
1. List of Students Applying to be Placed :	58	42	0	0
Sort : By Course	83	17	0	0
By Semester	79	21	0	0
By Area	3	25	72	0
By City	4	27	69	0
By Province	3	27	70	0
2. List of Students Applying to be Placed, but do not Qualify :	28	36	36	0
Sort : By Course	81	19	0	0
By Semester	80	20	0	0
By Area	2	79	19	0
By City	4	76	20	0
By Province	3	78	19	0
3. List of Students Qualifying to be Placed :	59	25	8	8
Sort : By Course	79	21	0	0
By Semester	83	17	0	0
By Area	5	69	21	5
By City	4	71	19	6
By Province	6	68	22	4

1(a) Students' Reports : Technikons	Very Important	Important	Nice to have	Not important
	%	%	%	%

4. List of Students Referred for Placement :	50	36	7	7
Sort : By Course	83	17	0	0
By Semester	81	19	0	0
By Area	6	73	15	6
By City	4	71	22	3
By Province	6	74	15	5

5. List of Students Placed by Company :	100	0	0	0
Sort : By Course	81	19	0	0
By Semester	83	17	0	0
By Area	68	14	12	6
By City	64	17	17	2
By Province	67	13	14	6

6. List of Students Registered After Placement:	55	27	18	0
Sort : By Course	84	16	0	0
By Semester	81	19	0	0
By Area	9	76	12	3
By City	10	84	6	0
By Province	7	69	21	3

7. List of Students Placed, but not Registered by Company :	64	18	18	0
Sort : By Course	86	14	0	0
By Semester	81	19	0	0

1(a) Students' Reports : Technikons	Very Important	Important	Nice to have	Not important
	%	%	%	%
By Area	5	79	12	4
By City	4	82	14	0
By Province	6	69	20	5

8. List of Students and Dates Visited by Co-ordinator :	73	27	0	0
Sort : By Course	83	17	0	0
By Semester	82	18	0	0
By Area	76	14	7	3
By City	81	16	3	0
By Province	74	15	7	4

9. List of Students' Progress and Final Marks:	82	18	0	0
Sort : By Course	88	12	0	0
By Semester	86	14	0	0
By Area	4	72	20	4
By City	6	81	13	0
By Province	3	71	19	7

10. Summative Report by Student on All Aspects of Experiential Learning e.g. :	91	9	0	0
Sort : Referred	86	14	0	0
Placed	89	11	0	0
Visited	82	18	0	0
Work Reports	88	12	0	0

5.3.1.1 Interpretation and Synthesis of Data Relating to Students' Reports : Technikons – Sample Size : 73 Respondents
(Questionnaire 1(a) - ANNEXURE B)

These reports referred to all relevant data of students registered in co-operative education courses. This included data such as demographic information, field of study, study progress, placement progress, interests in specific sub-disciplines within their field of study, and short courses completed on the intranet.

The 73 respondents responded according to a relatively uniform approach (in contrast to the respondents from the South African Colleges).

a) Relative Importance of Items Relating to Students' Reports : Technikons (DIAGRAM 5.1)

All items, except Item 2 - "List of students applying to be placed, but do not qualify", were rated by the majority of respondents as "very important". Item 2 was rated as "important" by 36% of respondents, and as "nice to have" by 36% of respondents. Only 28% of respondents rated it as "very important". If the two ratings "very important" and "important" are grouped together, as a category, all items are rated highly in this category ("very important" and "important" combined). Since Item 2 is rated as "nice to have" by 36% of the respondents, it seems to be of somewhat lesser importance, but when considered with the combined rating ("very important" and "important") it is still rated by 64% of the respondents as important enough to be included.

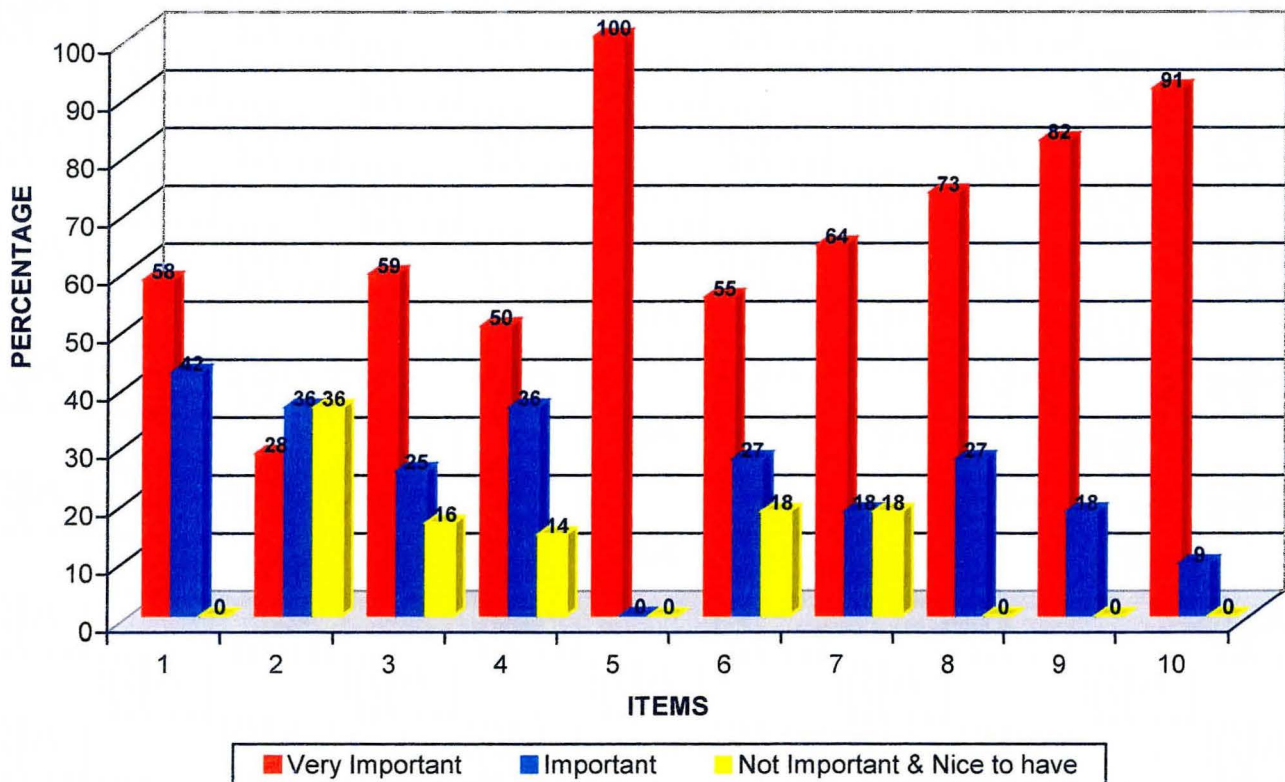
Item 5 - "List of students placed per company", was regarded by all (100%) of the respondents as "very important" and can thus be interpreted as the most important item in the list of students' reports.

From Chapter 3, Section 3.4.1 (c)(iii), p.111, it can be concluded that **"students' reports" should form an integral part of a management**

information system for co-operative education. The relevance of items one to ten was also established, but the outcome of the survey conducted and reported in this chapter and now interpreted, needs to be established.

The students' reports consisted of 10 sub-reports (items). The importance of each of these items was considered individually as well as the sort options available to enhance the management possibilities.

DIAGRAM 5.1
Relative Importance of Items Relating to Students' Reports : Teknikons
 – Sample Size : 73 Respondents



ITEMS RELATING TO STUDENTS' REPORTS : Teknikons

- | | |
|---|---|
| 1. List of students applying to be placed | 6. List of students registered after placement |
| 2. List of students applying to be placed, but not qualifying | 7. List of students placed, but not registered by company |
| 3. List of students qualifying to be placed | 8. List of students and dates visited by co-ordinator |
| 4. List of students referred for placement | 9. List of students' progress and final marks |
| 5. List of students placed by company | 10. Report on student history of all aspects of EL |

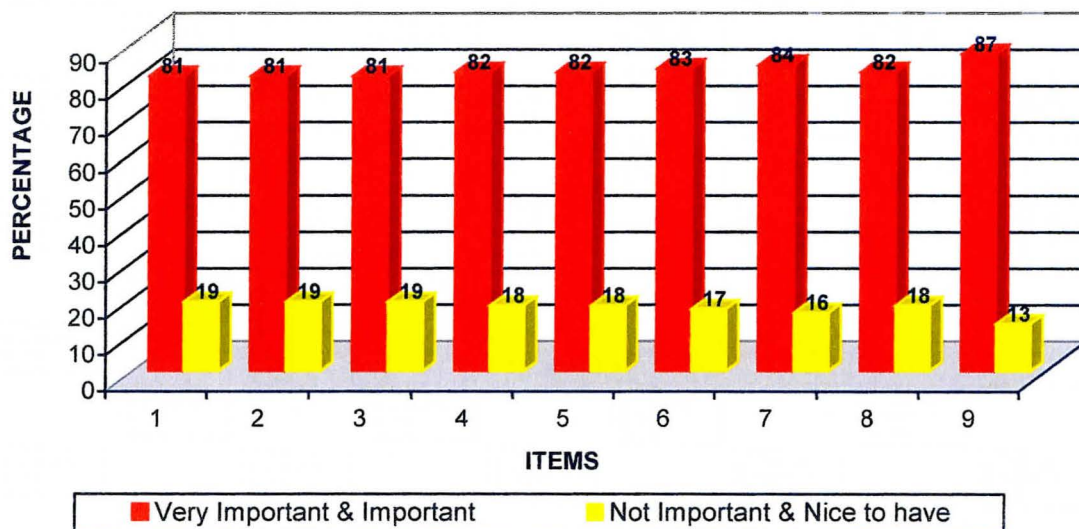
All the items relating to information on students could be sorted under various sort options. These are to sort "By Course", "By Semester", "By Area", "By City" and "By Province" (Items 1 to 9), as well as lists of students "Referred", "Placed", "Visited" and "Results of Work Reports" (Item 10). Diagram 5.1 illustrates this interpretation.

b) Sorting Students' Information "By Course" and/or "By Semester" of Items One to Nine : Teknikons (DIAGRAM 5.2)

When considering how these items should be sorted, all nine items that could be sorted "By Course" and "By Semester" were rated by a clear majority of the respondents as "very important". When the two sort options "very important" and "important" were grouped together, scores of 79% (plus) were recorded for each item, as such underlining the importance of each. From the results it can be concluded that the importance of the sort options "By Course" and/or "By Semester" for all nine items on the "Lists of data relating to students", is confirmed. Diagram 5.2 illustrates this interpretation.

DIAGRAM 5.2
Sorting Students' Information "By Course" and/or "By Semester" of
Items One to Nine : Teknikons

– Sample Size : 73 Respondents



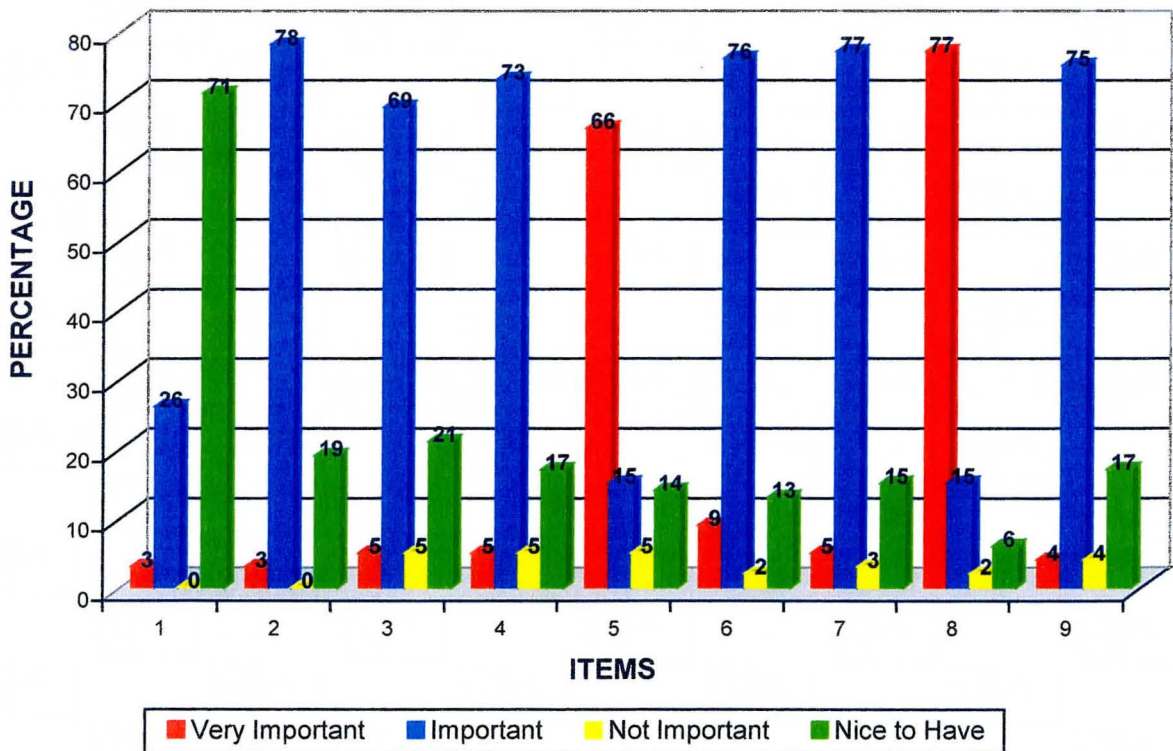
ITEMS RELATING TO STUDENTS' REPORTS : Teknikons

- | | |
|---|---|
| 1. List of students applying to be placed | 6. List of students registered after placement |
| 2. List of students applying to be placed, but not qualifying | 7. List of students placed, but not registered by company |
| 3. List of students qualifying to be placed | 8. List of students and dates visited by co-ordinator |
| 4. List of students referred for placement | 9. List of students progress and final marks |
| 5. List of students placed by company | |

c) Sorting Students' Information "By Area" and/or "By City" and/or "By Province" of Items One to Nine : Teknikons (DIAGRAM 5.3)

From the items which could be sorted "By Area, City and Province", only one was rated as "very important" (Item 8 - "List of students and dates visited per co-ordinated"); rated as "important" are all items – except Item 1. Item 1 - "List of students applying to be placed", was rated by the majority (71%) as "nice-to-have". The results conclude and confirm the importance to sort all items (except Item 1 – "List of students applying to be placed") "By Area" and/or "By City" and/or "By Province". Diagram 5.3 illustrates this interpretation.

DIAGRAM 5.3
Sorting Students' Information "By Area" and/or "By City" and/or "By Province" of Items One to Nine : Teknikons
 – Sample Size : 73 Respondents



ITEMS RELATING TO STUDENTS' REPORTS : Teknikons

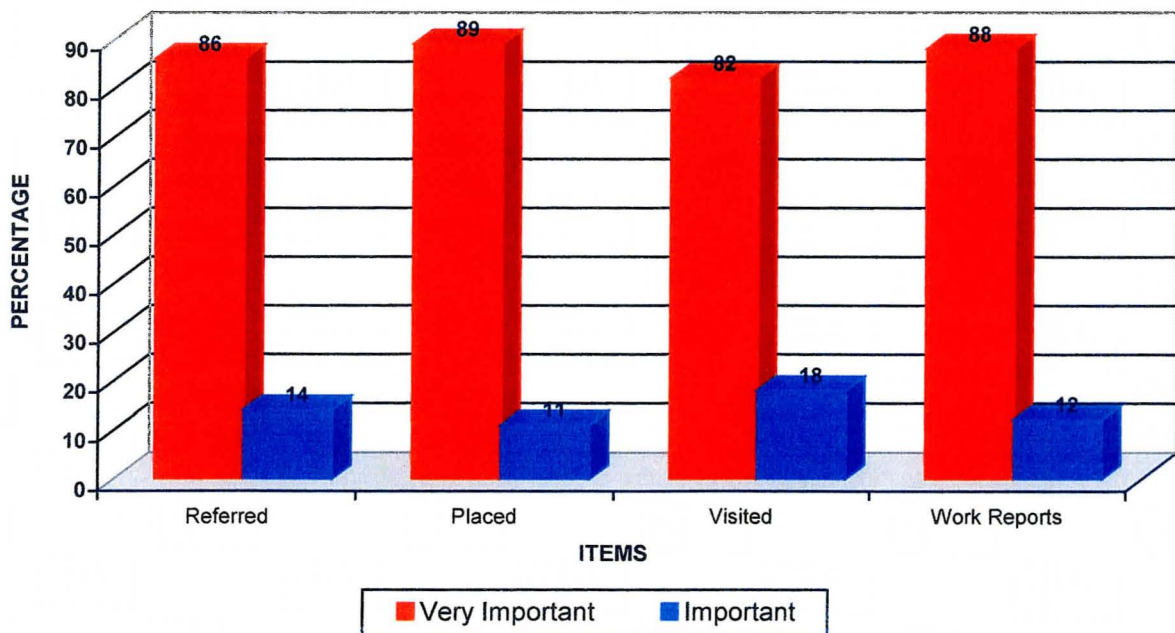
- | | |
|---|---|
| 1. List of students applying to be placed | 5. List of students placed by company |
| 2. List of students applying to be placed, but not qualifying | 6. List of students registered after placement |
| 3. List of students qualifying to be placed | 7. List of students placed, but not registered by company |
| 4. List of students referred for placement | 8. List of students and dates visited by co-ordinator |
| | 9. List of students progress and final marks |

d) Sorting Students' History on All Aspects of Experiential Learning as "Referred, Placed, Visited and Work Reports" (DIAGRAM 5.4)

Item 10 - "Report of student history on all aspects of experiential learning" of the students' reports (Questionnaire 1(a)), was indicated by 91% of respondents as "very important" and by the remaining 9% as "important".

The sort options of Item 10 - "Report of student history on all aspects of experiential learning", namely, sort into "Referred" and/or "Placed" and/or "Visited" and/or "Work Reports", were all rated by a clear majority of respondents (86%, 89%, 82% and 88% respectively) as "very important". The results conclude and confirm the importance of this item relating to data of students, as well as the importance for all four sort options. Diagram 5.4 illustrates this interpretation.

DIAGRAM 5.4
Sorting Students' History on All Aspects of Experiential Learning as "Referred", "Placed", "Visited" and "Work Reports" : Teknikons
- Sample Size : 73 Respondents



e) **Conclusions Relating To All Items Relating to Students' Reports : Teknikons (Questionnaire 1(a))**

Table 5.2 presents a summative merger of the separate items of the students' reports. From Table 5.2 it can be concluded that:

- All items should be included in the management information system of co-operative education
- All Items 1 to 9 should be sorted "By Course"
- Item 1 should not be sorted "By Area, City and Province"
- Items 2 to 9 should be sorted "By Area, City and Province"
- Item 10 should be sorted as "Referred, Placed, Visited and Work Reports" completed.

TABLE 5.2

**Inclusion of Items and Scope of Sorting : Students' Reports : Teknikons
– Sample Size : 73 Respondents**

ITEMS	INCLUDE	SORT ORDER								
		By Course	By Semester	By Area	By City	By Province	Referred	Placed	Visited	Work Reports
1. List of students applying to be placed	YES	Yes	Yes	No	No	No	N/A	N/A	N/A	N/A
2. List of students applying to be placed, but not qualifying	YES	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A
3. List of students qualifying to be placed	YES	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A
4. List of students referred for placement	YES	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A
5. List of students placed by company	YES	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A
6. List of students registered after placement	YES	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A
7. List of students placed, but not registered by company	YES	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A
8. List of students and dates visited by co-ordinator	YES	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A

ITEMS	INCLUDE	SORT ORDER								
		By Course	By Semester	By Area	By City	By Province	Referred	Placed	Visited	Work Reports
9. List of students progress and final marks	YES	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A
10. Report of student history on all aspects of experiential learning	YES	N/A	N/A	N/A	N/A	N/A	Yes	Yes	Yes	Yes

When comparing the above conclusions (refer to Section 6.2.1, pp.265-266) with the control group (international respondents), a similar result is recorded. This group of respondents also allocated a low level of importance to Item 2 - "List of students applying to be placed, but do not qualify", thus supporting the outcome of the research relating to this element.

The second section of the questionnaire completed by the co-operative education lecturers of technikons referred to information based on companies who participate in experiential learning. They are key role players in the co-operative education system. Information on these participating companies presents various sort options.

5.3.2 Employer Reports

Questionnaire 2(a), Table 5.3, investigated the importance assigned by the respondents (co-operative education lecturers responsible for co-operative education from technikons) to each of these items relating to companies, as well as the way (if any) in which it should be sorted.

The numbers in bold and placed in boxes indicate the average, in percentages, of respondents who rated the specific list as "very important", "important", "nice to have" or "not important".

TABLE 5.3

Reports on Companies : Technikons

Sample Size : 73 Respondents

QUESTIONNAIRE 2(a)

(Values indicated in this chapter are the arithmetic mean of the raw data,
expressed as percentages)

2(a) Reports on Companies : Technikons	Very Important	Important	Nice to have	Not important
	%	%	%	%
1. List and History of Participating Company(ies):	45	55	0	0
Sort : By Course	87	13	0	0
By Semester	85	15	0	0
By Area	78	15	7	0
By City	82	16	2	0
By Province	72	15	10	3
2. List of Active Companies :	73	27	0	0
Sort : By Course	95	5	0	0
By Semester	94	6	0	0
By Area	83	15	2	0
By City	87	13	0	0
By Province	84	13	3	0
3. Contact Persons :	91	9	0	0
Sort : By Company	98	2	0	0
By Course	93	7	0	0
4. List of Companies and Dates Visited :	64	36	0	0
Sort : By Co-ordinator	91	9	0	0

2(a) Reports on Companies : Technikons	Very Important	Important	Nice to have	Not important
	%	%	%	%
By Course	93	7	0	0
By Semester	92	8	0	0
By City	27	73	0	0
By Province	27	68	5	0

5. List of Students Referred to a Company :	62	38	0	0
Sort : By Course	82	18	0	0
By Semester	85	15	0	0
By Area	19	81	0	0
By City	79	21	0	0
By Province	15	76	9	0

6. Main Activities of a Company (sub-disciplines within a course)	70	30	0	0
---	-----------	-----------	----------	----------

7. Variety of Placement Positions within a Company, in Different Courses	80	20	0	0
--	-----------	-----------	----------	----------

8. Accessibility of a Company (By Road/By Taxi/By Rail)	90	10	0	0
---	-----------	-----------	----------	----------

9. Accommodation Near the Company	80	20	0	0
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5.3.2.1 Interpretation and Synthesis of Data Relating to Reports on Information of Participating Co-operative Education Employers : Technikons - Sample Size : 73 Respondents (Questionnaire 2(a) – ANNEXURE B)

These reports referred to all relevant data of employers participating in co-operative education, data such as demographics of companies and students placed and visited in all disciplines. The responses from Questionnaire 2(a) of respondents as reported, indicated a relatively uniform outcome.

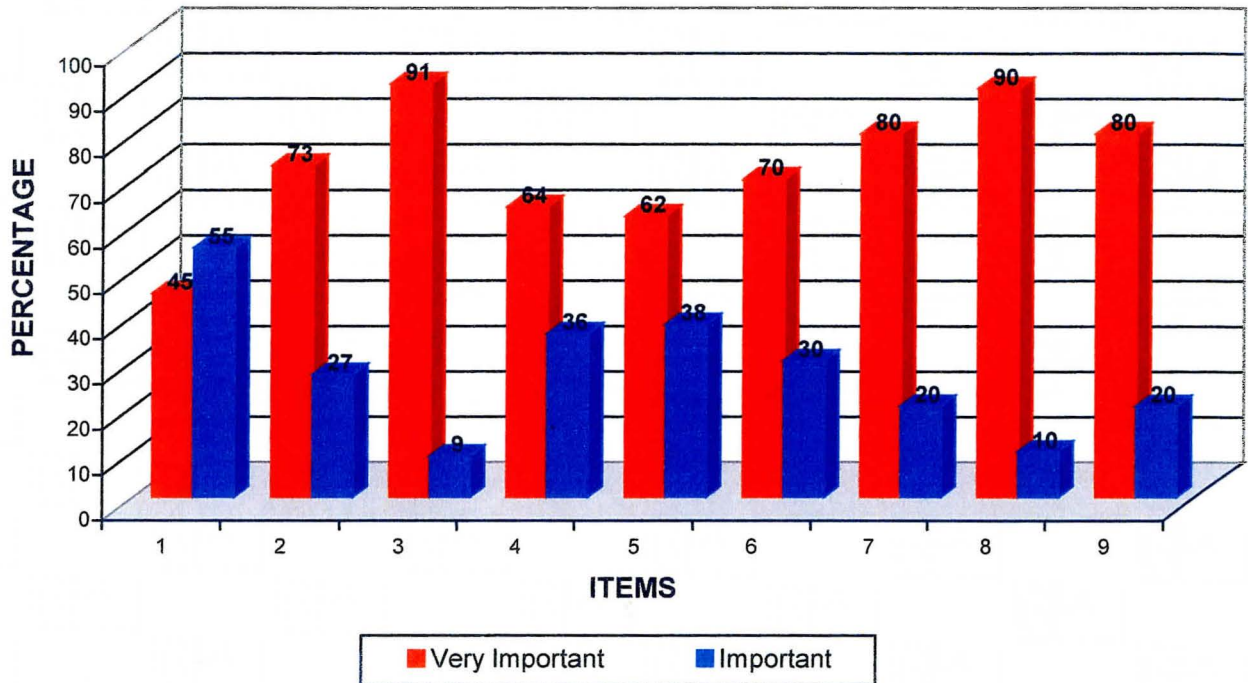
a) Relative Importance of Items One to Nine Relating to Reports of Participating Employers : Technikons (DIAGRAM 5.5)

The reports on companies consist of nine sub-reports (Items). The importance of each of these items was considered individually, as well as the sort options available to enhance the management possibilities.

All items (1 to 9), except Item 1 - "List and history of participating company(ies)", were rated by the majority of respondents as "very important". Item one was rated by the majority (55%) of respondents as "important", with 45% of respondents rating it "very important". Consequently Item 1 was rated by 100% of respondents with a relatively high level of importance once the scores for "very important" and "important" had been grouped together. None of the items was rated as "nice-to-have".

DIAGRAM 5.5
Relative Importance of Items One to Nine Relating to Reports of
Participating Employers : Teknikons

– Sample Size : 73 Respondents



ITEMS RELATING TO REPORTS ON COMPANIES : Teknikons

- | | |
|---|--|
| 1. List and history of participating company(ies) | 6. Main activities of a company (sub-disciplines within a course) |
| 2. List of active companies | 7. Variety of placement positions within a company, in different courses |
| 3. Contact persons | 8. Accessibility of a company (road/taxi/rail) |
| 4. List of companies and dates visited | 9. Accommodation near the company |
| 5. List of students referred to a company | |

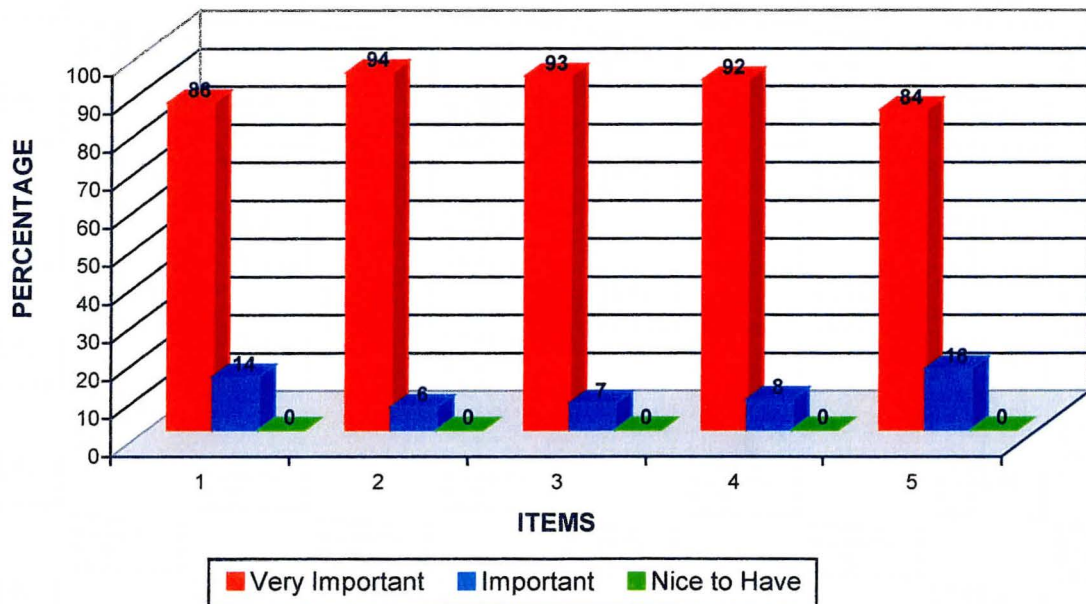
Items 1, 2, 4 and 5 have the same sort options, namely to sort “By Course”, “By Semester”, “By Area” (except Item 4), “By City”, and “By Province”. Item 3 has the sort options “By Company” and “By Course”. Item 4 has the sort options “By Area” and “By Co-ordinator”.

The results then conclude and confirm the importance of all nine items on the “List of data relating to participating co-operative education employers”. Diagram 5.5 illustrates this interpretation.

b) Sorting Participating Employers Information “By Course” and/or “By Semester” of Items One to Five: Teknikons (DIAGRAM 5.6)

The first five items have a variety of sort options. From the data analysed the following was evident: considering how these items should be sorted, all items which could be sorted “By Course” (Items 1, 2, 3, 4 and 5) were indicated as “very important” by a clear majority of respondents. All the items which could be sorted “By Semester” (Items 1, 2, 4 and 5) were rated as “very important” by a clear majority of respondents. Diagram 5.6 shows the average scores for the sort options “By Course” and “By Semester” combined. For Item 3 - “Contact persons”, Diagram 5.6 reflects only the sort option “By Course”.

DIAGRAM 5.6
Sorting Participating Employers Information "By Course" and/or "By Semester" of Items One to Five : Teknikons
 – Sample Size : 73 Respondents



ITEMS RELATING TO REPORTS ON COMPANIES : Teknikons

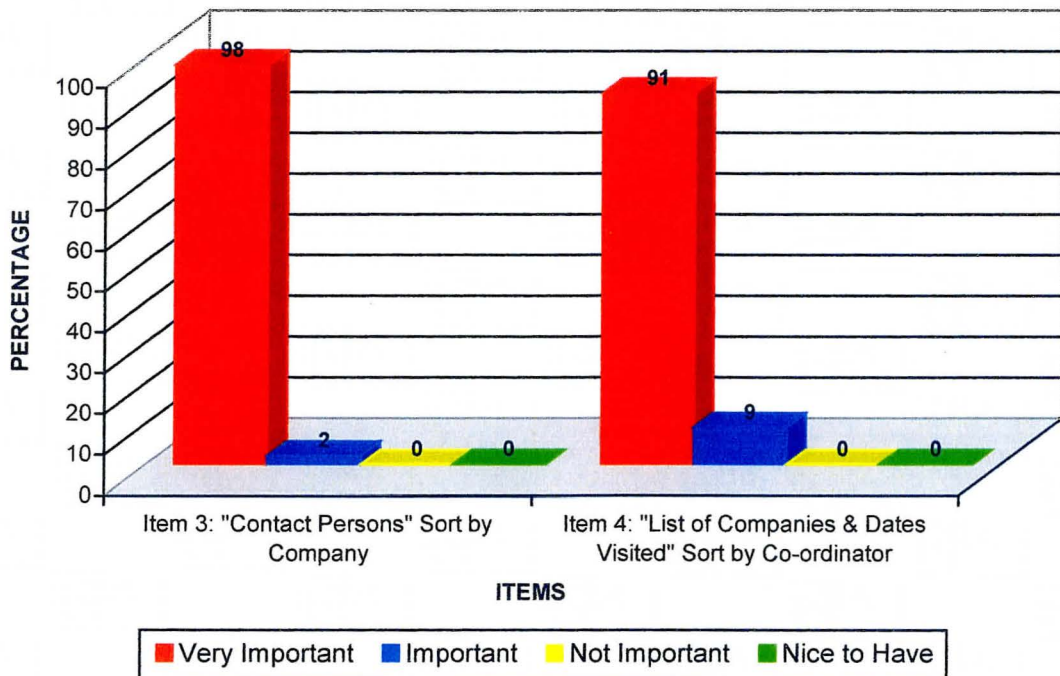
- | | |
|---|---|
| 1. List and history of participating company(ies) | 4. List of companies and dates visited |
| 2. List of active companies | 5. List of students referred to a company |
| 3. Contact persons | |

The results again conclude and confirm the importance of the sort options "By Course" and "By Semester" where applicable, from the lists of data reflecting information on participating co-operative education employers. Diagram 5.6 illustrates this interpretation.

i. Additional Sort Options for Information of Participating Employers of Item 3 and Item 4: Technikons (DIAGRAM 5.7)

Item 3 - "Contact persons", and Item 4 - "List of companies and dates visited", have two additional sort options namely, "By Company" and "By Co-ordinator". Item 3 - "Contact persons", reflected a clear majority for the sort option "By Company"- 98%. Item 4 - "List of companies and dates visited", reflected a clear majority for the sort option "By Co-ordinator" - 91%.

DIAGRAM 5.7
Additional Sort Options for Information of Participating Employers
for Item 3 and Item 4 : Technikons
 - Sample Size : 73 Respondents



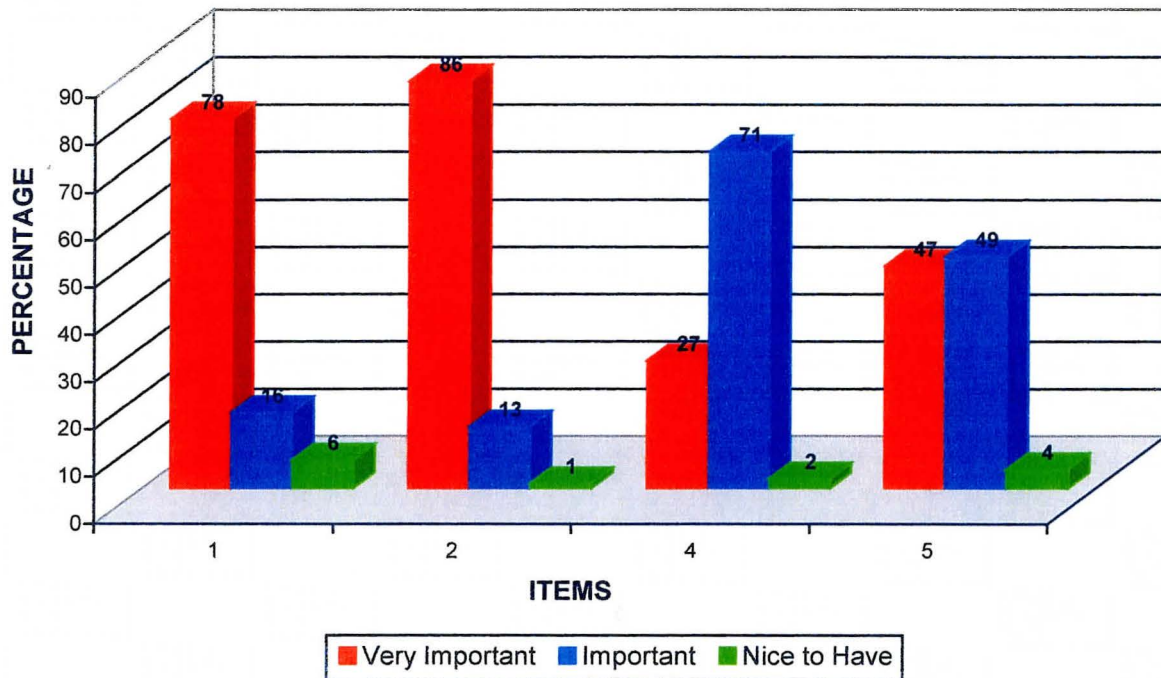
The results conclude and confirm that the importance of the sort options "By Company" and "By Co-ordinator" for the lists of data reflecting information on participating co-operative education employers. Diagram 5.7 illustrates this interpretation.

c) Sorting Participating Employers Information "By Area" and/or "By City" and/or "By Province" of Items 1, 2, 4 and 5: Technikons (DIAGRAM 5.8)

When considering the sort options, "By City" and "By Province", Item one - "List and history of participating companies", and Item two - "List of active companies", indicated all three sort options as "very important". For Item 5 - "List of students referred to a company", the sort option "By Province" was rated as "important" by 76% of the respondents, "very important" by 15%, and "nice-to-have" by 9%. For Item 5 - "List of students referred to a company", the sort option, "By City", was also rated by a majority of respondents (79%) as "very important", and by 21% as "important". For Item 4 - "List of companies and dates visited", the sort options "By City" and "By Province" were rated by the majority (73% and 68% respectively) as "important", with 27% and 27% respectively, rating it as "very important". For sort Items 1, 2 and 5 "By Area" was indicated as "very important" (78%, 83% and 19% respectively) and as "important" (15%, 15% and 81% respectively). The results indicate that the sort options, "By Area, City and Province" score a relatively high level of importance.

NOTE: Item 3 does not reflect the option to sort "By Area" and is thus not included.

DIAGRAM 5.8
Average Scores of Participating Employer Information "By Area" and/or
"By City" and/or "By Province" of Items 1, 2, 4 and 5 : Teknikons
 – Sample Size : 73 Respondents



ITEMS RELATING TO REPORTS ON COMPANIES : Teknikons

- | | |
|---|---|
| 1. List and history of participating company(ies) | 4. List of companies and dates visited |
| 2. List of active companies | 5. List of students referred to a company |

The results conclude and confirm the importance of Items 1, 2, 4 and 5 being sorted "By City and Province", and Items 1 and 2 being sorted "By Area". Furthermore, Item 3 should be sorted "By Company" and Item 4 "By Co-ordinator". Diagram 5.8 illustrates this interpretation.

d) Conclusions of All Items Relating to Participating Company Reports : Technikons

Table 5.4 provides a summative merger of the separate items of the reports on companies. From Table 5.4 can be concluded that:

- All Items 1 to 9 should be included in the management information system for co-operative education
- Items 1 to 5 should be sorted "By Course"
- Items 1, 2, 4 and 5 should be sorted "By Semester", "By City" and "By Province"
- Items 1 and 2 should be further sorted "By Area"
- Item 3 should be sorted "By Company"
- Item 4 should be sorted "By Co-ordinator".

TABLE 5.4

Inclusion of Items and Scope of Sorting: Reports on Participating Companies Information (Technikons)

– Sample Size : 73 Respondents

ITEMS	INCLUDE	SORT ORDER						
		By Course	By Semester	By Area	By City	By Province	By Company	By Co-ordinator
1. List and history of participating company(ies)	YES	Yes	Yes	Yes	Yes	Yes	N/A	N/A
2. List of active companies	YES	Yes	Yes	Yes	Yes	Yes	N/A	N/A
3. Contact persons	YES	Yes	N/A	N/A	N/A	N/A	Yes	N/A
4. List of companies and dates visited	YES	Yes	Yes	Yes	Yes	Yes	N/A	N/A
5. List of students referred to a company	YES	Yes	Yes	Yes	Yes	Yes	N/A	N/A
6. Main activities of a company (sub-disciplines within a course)	YES	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7. Variety of placement positions within a company, in different courses	YES	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8. Accessibility of a company (road/taxi/rail)	YES	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9. Accommodation near the company	YES	N/A	N/A	N/A	N/A	N/A	N/A	N/A

It can be concluded that respondents from international universities did not assign a relatively high value of importance to Item 9 - "Accommodation near the company". Since respondents from both technikons and colleges regarded this item as relatively important, it should be included.

The third section of the questionnaire completed by the co-operative education lecturers of technikons referred to information based on short courses available on the Intranet. This is to strengthen the co-operative education process.

5.3.3 Short Courses Available on the Intranet

Questionnaire 3(a), Table 5.5, investigated the relative importance assigned by the respondents (co-operative education lecturers from technikons responsible for co-operative education) to these items relating to the short courses required on the Intranet.

The numbers in bold and placed in boxes indicate the percentages of respondents who rated the specific list as "very important", "important", "nice to have" or "not important".

TABLE 5.5
Short Courses on the Intranet System : Technikons
Sample Size : 73 Respondents
QUESTIONNAIRE 3(a)
 (Values indicated in this chapter are the arithmetic mean of the raw data,
 expressed as percentages)

3(a) Short Courses on the Intranet System : Technikons	Very Important	Important	Nice to have	Not important
	%	%	%	%
1. Introduction to Co-operative Education				

3(a) Short Courses on the Intranet System : Technikons	Very Important	Important	Nice to have	Not important
	%	%	%	%
(CE) (field, terms, concepts of CE, role and responsibilities of participants in CE)	86	14	0	0
2. Policies and Procedures of the "On-line Placement System"	60	40	0	0
3. Communication Channels	100	0	0	0
4. Self-assessment and Placement Preferences	29	57	14	0
5. Compiling CV / Résumé	57	29	14	0
6. Professional Conduct	86	14	0	0
7. Interviewing Skills	86	14	0	0
8. Work Ethics	72	14	14	0
9. Career Exploration/Mobility	72	28	0	0
10. Workplace Experience	72	14	14	0

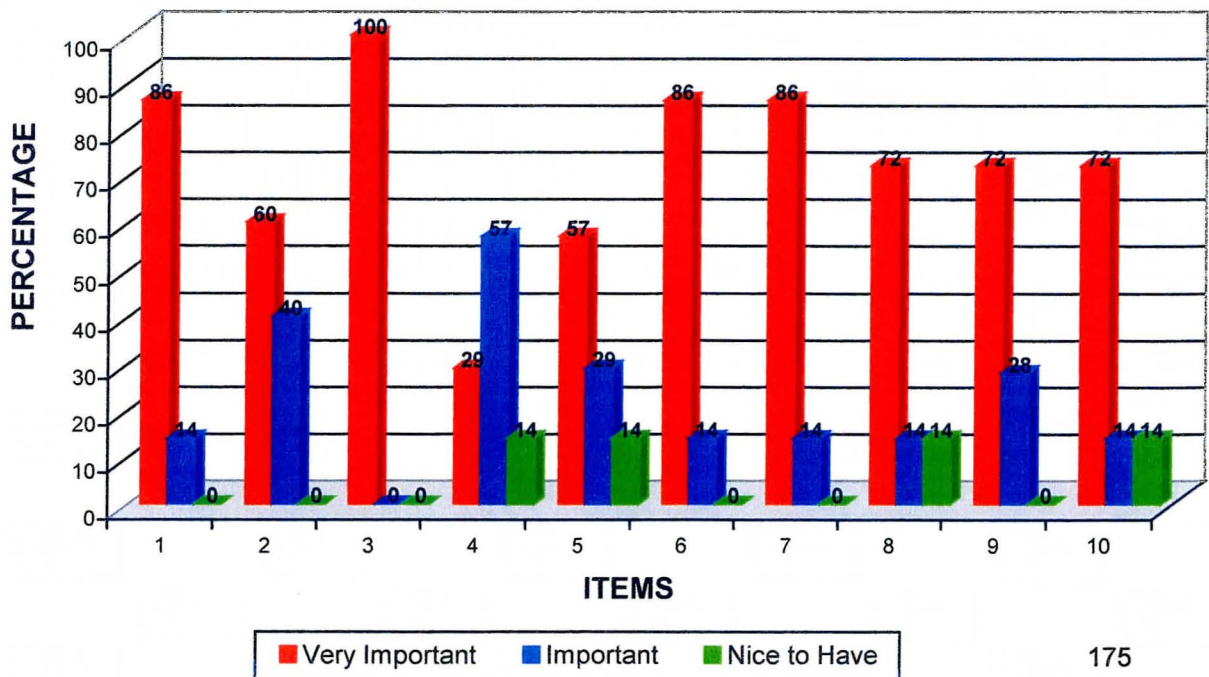
5.3.3.1 Interpretation and Synthesis of Data Relating to Reports on Short Courses Available on the Intranet System : Technikons
- Sample Size : 73 Respondents (Questionnaire 3(a) – ANNEXURE B)

These reports referred to relevant short courses available on the intranet system.

a) Relative Importance of Short Courses (One to Ten) Available on the Intranet System : Technikons (DIAGRAM 5.9)

All short courses were indicated as “very important” by the majority of the respondents. When the two scores “very important” and “important” are grouped together, all short courses scored a clear majority (86% plus). The relatively high level of importance of all these short courses is thus illustrated. None of these short courses was indicated “not important” by any one of the respondents (0% throughout). Short course 3 - “Communication channels”, was judged by all (100%) respondents as “very important”. Diagram 5.9 illustrates this interpretation.

DIAGRAM 5.9
Relative Importance of Short Courses (One to Ten) Available on the Intranet System : Technikons
- Sample Size : 73 Respondents



SHORT COURSES AVAILABLE ON THE INTRANET SYSTEM : Technikons

- | | |
|--|--------------------------------|
| 1. Introduction to co-operative education | 6. Professional conduct |
| 2. Policies and procedures of the "On-line Placement System" | 7. Interviewing skills |
| 3. Communication channels | 8. Work ethics |
| 4. Self-assessment and placement preferences | 9. Career exploration/mobility |
| 5. Compiling CV/Résumé | 10. Workplace experience |

b) Conclusions of All Short Courses Available on the Intranet System: Technikons

Table 5.6 refers to a summative merger of the separate short courses available on the intranet system. From Table 5.6 it can be concluded that:

- All short courses listed in Table 5.6 should be included in a management information system for co-operative education.

TABLE 5.6

Inclusion of Short Courses Available on the Intranet System: Technikons

– Sample Size : 73 Respondents

SHORT COURSES	INCLUDE COURSE
1. Introduction to co-operative education (field, terms, concepts of co-operative education, role and responsibilities of participants in co-operative education)	Yes
2. Policies and procedures of the "On-line Placement System"	Yes
3. Communication channels	Yes
4. Self-assessment and placement preferences	Yes
5. Compiling CV/Résumé	Yes
6. Professional conduct	Yes
7. Interviewing skills	Yes
8. Work ethics	Yes
9. Career exploration/mobility	Yes
10. Workplace experience	Yes

5.4 REPORTING ON THE RESULTS FROM SOUTH AFRICAN COLLEGES

The second sub-group investigated, were the reactions received from respondents attached to colleges in South Africa. These respondents were all academic lecturers responsible for the management of co-operative education. They were requested to indicate the level of importance they assigned to each of these reports as well as the way in which the information should be sorted – if any.

A varied approach towards the management of co-operative education by co-operative education lecturers at colleges in the Republic of South Africa where some form of experiential learning forms part of the college qualification, is reflected in the results reported in this chapter. When investigating all the items collectively, the following interpretations can be made. It is expected that due to the diversity of the types of colleges as well as the spectrum of courses offered, no consistent reflection of requirements is likely to be evident. The technikons with more consistent programmes and management styles reflected a more uniform set of requirements and could thus be more easily grouped.

5.4.1 Students' Reports (Student Information)

Questionnaire 1(b), Table 5.7, investigated the importance assigned by co-operative education lecturers responsible for co-operative education at colleges, to the various items of the student information, as well as the way in which (if any) it should be sorted.

The numbers in bold and placed in boxes indicate the average (expressed as percentages) of respondents who rated the specific list as "very important", "important", "nice to have" or "not important".

TABLE 5.7
Students' Reports : Colleges
Sample Size : 55 Respondents
QUESTIONNAIRE 1(b)

(Values indicated in this chapter are the arithmetic mean of the raw data, expressed as percentages)

1(b) Students' Reports : Colleges	Very Important	Important	Nice to have	Not important
	%	%	%	%
1. List of Students Applying to be Placed :	63	21	12	4
Sort : By Course	100	0	0	0
By Semester	59	24	11	6
By Area	30	40	24	6
By City	18	24	29	29
By Province	12	30	29	29
2. List of Students Applying to be Placed, but do not Qualify :	16	26	10	48
Sort : By Course	30	24	6	40
By Semester	18	18	18	46
By Area	0	36	6	58
By City	0	30	12	58
By Province	0	18	24	58
3. List of Students Qualifying to be Placed :	70	14	10	6
Sort : By Course	94	0	0	6
By Semester	72	12	6	10
By Area	42	30	24	4
By City	42	12	24	22
By Province	24	30	24	22

1(b) Students' Reports : Colleges	Very Important	Important	Nice to have	Not important
	%	%	%	%

4. List of Students Referred for Placement :	68	14	10	8
Sort : By Course	94	0	0	6
By Semester	70	12	6	12
By Area	40	30	24	6
By City	40	12	24	24
By Province	24	30	22	24

5. List of Students Placed by Company :	73	10	5	12
Sort : By Course	100	0	0	0
By Semester	60	12	0	28
By Area	60	18	16	6
By City	48	6	16	30
By Province	36	18	12	34

6. List of Students Registered After Placement:	38	24	7	31
Sort : By Course	67	13	0	20
By Semester	33	20	7	40
By Area	13	40	13	34
By City	13	20	20	47
By Province	13	13	27	47

7. List of Students Placed, but not Registered by Company :	48	12	7	33
Sort : By Course	79	0	0	21
By Semester	43	7	7	43

1(b) Students' Reports : Colleges	Very Important	Important	Nice to have	Not important
	%	%	%	%
By Area	21	29	14	36
By City	7	7	36	50
By Province	7	14	29	50

8. List of Students and Dates Visited by Co-ordinator :	50	22	14	14
Sort : By Course	63	25	6	6
By Semester	50	19	6	25
By Area	38	19	31	12
By City	25	19	25	31
By Province	6	18	38	38

9. List of Students Progress Marks and Final Marks :	70	11	6	13
Sort : By Course	100	0	0	0
By Semester	80	13	0	7
By Area	33	20	13	34
By City	33	0	33	34
By Province	0	7	40	53

10. Summative Report by Student on All Aspects of Experiential Learning e.g.:	79	9	6	6
Sort : Referred	88	12	0	0
Placed	88	0	0	12
Visited	58	24	12	6
Work Reports	76	6	12	6

**5.4.1.1 Interpretation and Synthesis of Data Relating to Students' Reports : Colleges – Sample Size : 55 Respondents
(Questionnaire 1(b) - ANNEXURE C)**

These reports referred to all relevant data of students registered in co-operative education courses. This includes: demographic information, field of study, study progress, placement progress, interests in specific sub-disciplines within their field of study, and short courses completed on the intranet.

The 55 respondents gave a variety of responses regarding the management information system for co-operative education.

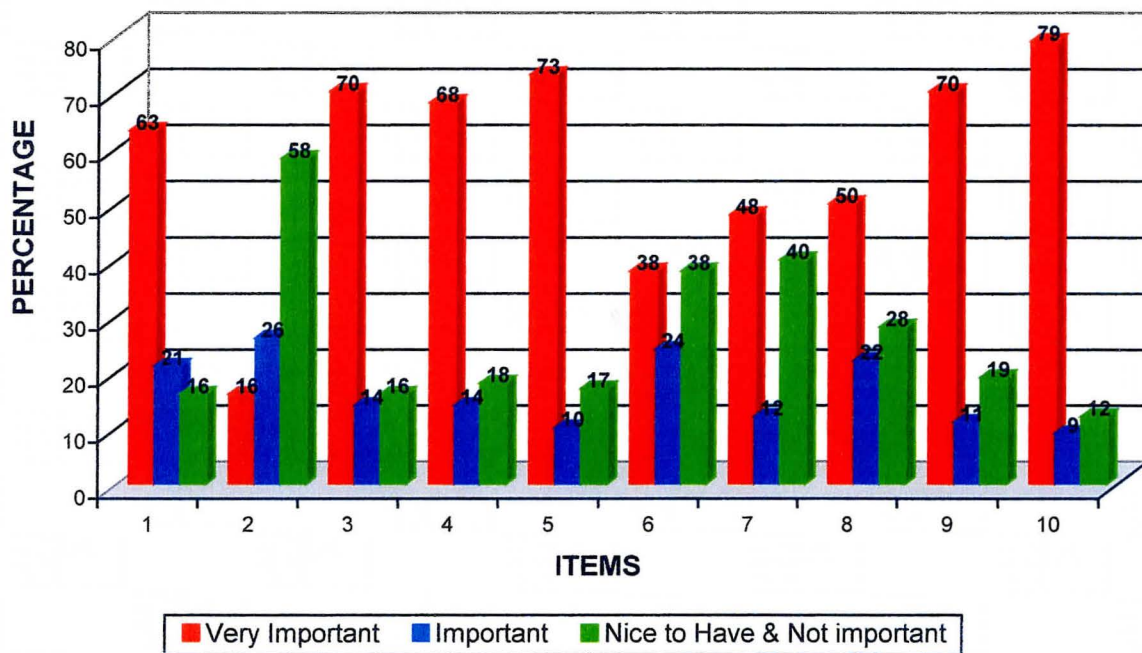
**a) Relative Importance of Items Relating to Students' Reports :
Colleges (DIAGRAM 5.10)**

The fact that several courses at colleges do not regard experiential learning as credit bearing, is evident from the level of importance allocated to Item 2 - "List of students applying to be placed, but not qualifying". A higher count was registered for "not important" (48%) than "very important" (16%). Item 2 - "List of students applying to be placed, but not qualifying", scored the highest percentage (58%) of responses of "nice to have" and "not important" combined. Even with the options "very important" and "important" combined, only 42% of respondents regarded this as relatively important. This comparatively low level of importance can be ascribed to the fact that college co-operative education students often do not have to qualify to do their "placement period". The placement is mostly regarded as a period of work in industry and/or commerce to gain some experience in the "world of work".

In contrast, Items 1, 3, 4, 5, 8, 9 and 10 were indicated by a clear majority of respondents as "very important" (63%, 70%, 68%, 73%, 50%, 70% and 79% respectively). When the options "very important" and "important" are grouped together for Item 6 - "List of students registered

after placement”, and Item 7 - “List of students placed, but not registered by company”, the scores indicate that the majority of respondents see this as relatively important (62% and 60% respectively for Items 6 and 7).

DIAGRAM 5.10
Relative Importance of Items Relating to Students' Reports : Colleges
 – Sample Size : 55 Respondents



ITEMS RELATING TO STUDENTS' REPORTS : Colleges

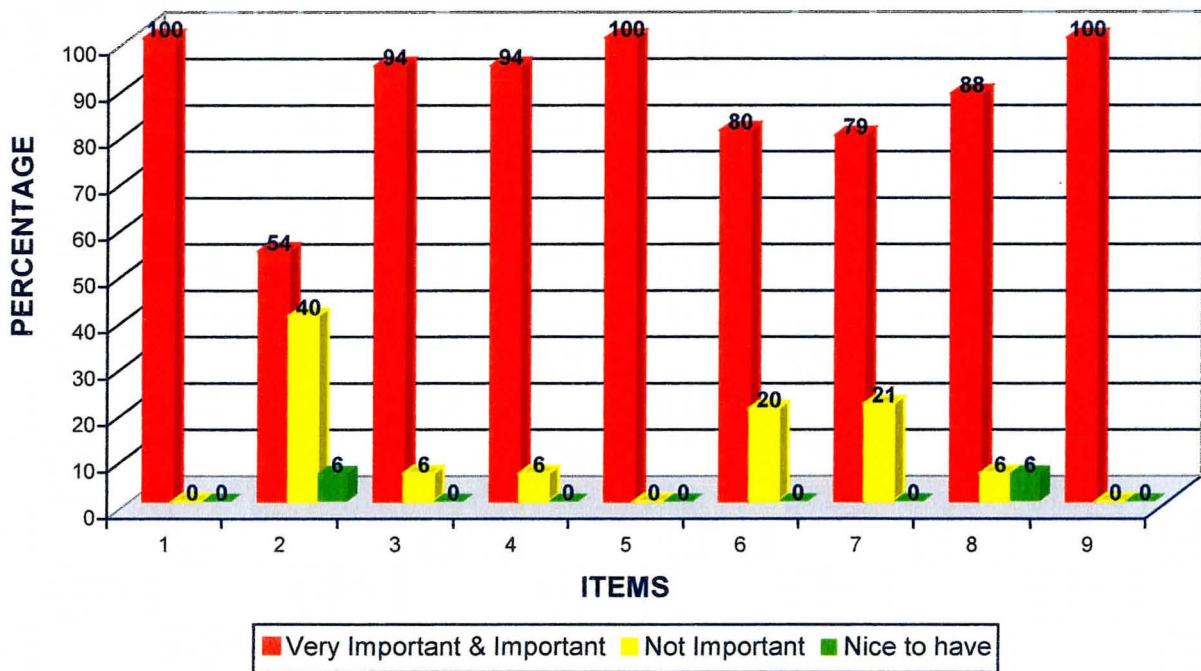
- | | |
|---|---|
| 1. List of students applying to be placed | 6. List of students registered after placement |
| 2. List of students applying to be placed, but not qualifying | 7. List of students placed, but not registered by company |
| 3. List of students qualifying to be placed | 8. List of students and dates visited by co-ordinator |
| 4. List of students referred for placement | 9. List of students progress and final marks |
| 5. List of students placed by company | 10. Report on student history of all aspects of EL |

The results conclude and confirm the importance of all items (except Item 2 - “List of students applying to be placed, but not qualifying”), for the lists of data relating to the co-operative education students. Diagram 5.10 illustrates this interpretation.

**b) Sorting Students' Information "By Course" for Items 1 to 9 :
Colleges (DIAGRAM 5.11)**

If the categories "very important" and "important" are combined, the sort option, "By Course" was judged in all nine items except Item 2 - "List of students applying to be placed but do not qualify", as relatively important. This might be ascribed to the situation at some colleges where students go off campus to "work" for a period, irrespective of their specific academic progress. This period of "work" is not necessarily related to their field of study.

DIAGRAM 5.11
**Sorting Students' Information "By Course" of Items One to Nine :
Colleges**
- Sample Size : 55 Respondents



ITEMS RELATING TO STUDENTS' REPORTS : Colleges

- | | |
|---|---|
| 1. List of students applying to be placed | 6. List of students registered after placement |
| 2. List of students applying to be placed, but not qualifying | 7. List of students placed, but not registered by company |
| 3. List of students qualifying to be placed | 8. List of students and dates visited by co-ordinator |
| 4. List of students referred for placement | 9. List of students progress and final marks |
| 5. List of students placed by company | |

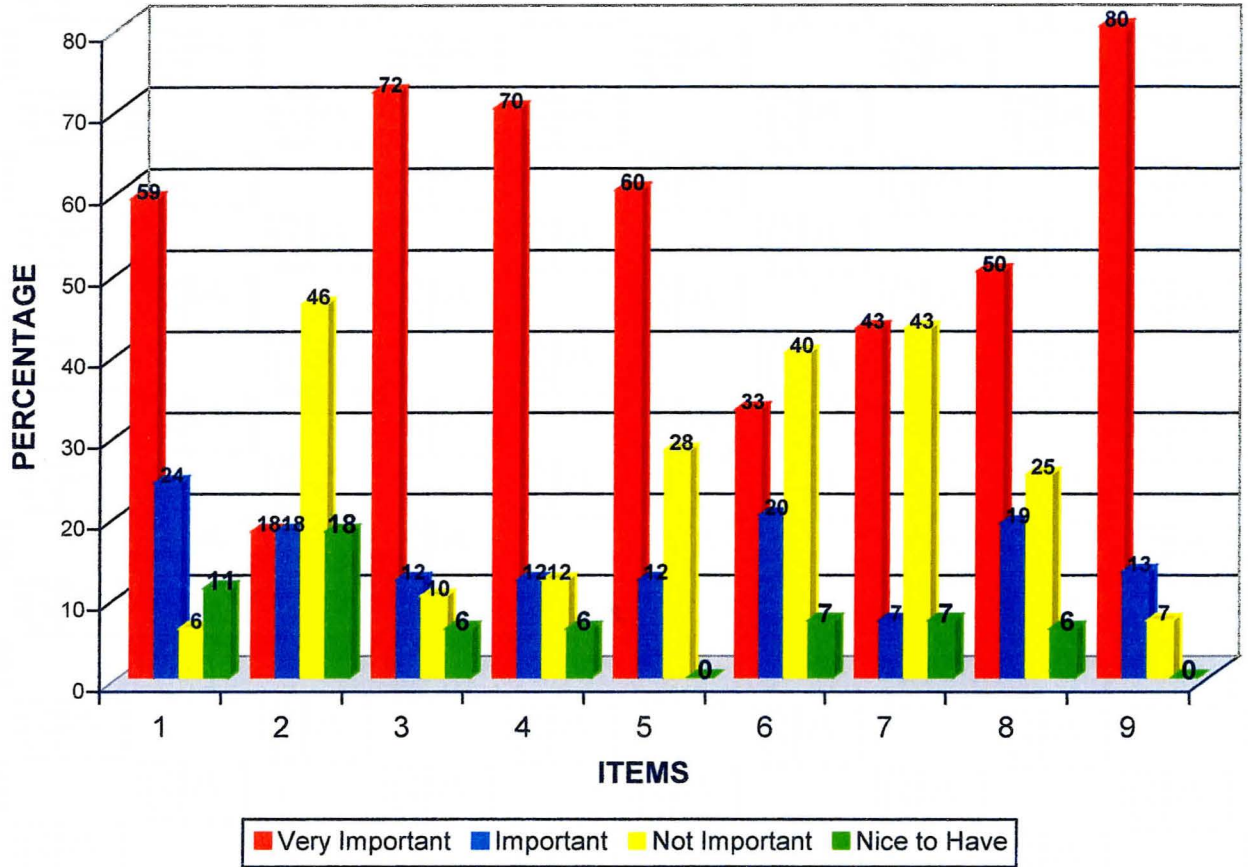
The results confirm the importance of the sort option "By Course" for all nine items on the lists of data relating to students. Diagram 5.11 illustrates this interpretation.

**c) Sorting Students' Information "By Semester" of Items 1 to 9 :
Colleges (DIAGRAM 5.12)**

Since South African colleges operate mostly on a trimester system, the sort option for Item 2 ("List of students applying to be placed, but do not qualify") and Item 6 ("List of students registered after placement"), "By Semester" also received low support (18% and 33% respectively) as "very important", but a relatively high count of 46% and 40% as "not important". Another factor that might influence this attitude for some respondents from colleges is the fact that this period (of non-credit bearing work) often occur at the end of the students' study period, and hence the time span of the "work" period is probably concluded.

For Items, 1, 3, 4, 5, 8 and 9, sort option, "By Semester" was seen as "very important" by the majority of the respondents. Item 7 – "List of students placed, but not registered by company", provided no clear indication of importance as 50% of respondents reported it as "relatively important" and 50% indicated it as "nice to have" or "not important". These results suggest that the remaining items (Items 2, 6 and 7) are regarded as "relatively important by a conclusive majority of respondents.

DIAGRAM 5.12
Sorting Students' Information "By Semester" of Items One to Nine :
Colleges
 – Sample Size : 55 Respondents



ITEMS RELATING TO STUDENTS' REPORTS : Colleges

- | | |
|---|---|
| 1. List of students applying to be placed | 6. List of students registered after placement |
| 2. List of students applying to be placed, but not qualifying | 7. List of students placed, but not registered by company |
| 3. List of students qualifying to be placed | 8. List of students and dates visited by co-ordinator |
| 4. List of students referred for placement | 9. List of students progress and final marks |
| 5. List of students placed by company | |

The results confirm the importance of the sort option "By Semester" for Items 1, 3, 4, 5 and 8, on the lists of data relating to students. The results of Items 2, 6 and 7 do not indicate a clear majority of respondents reporting it as relatively important, but neither did a clear majority of respondents indicate it as "not important". All items for the lists of data relating to students can thus be interpreted as "relatively important" to be sorted "By Semester". Diagram 5.12 illustrates this interpretation.

**d) Sorting Students' Information "By Area" of Items 1 to 9: Colleges
(DIAGRAM 5.13)**

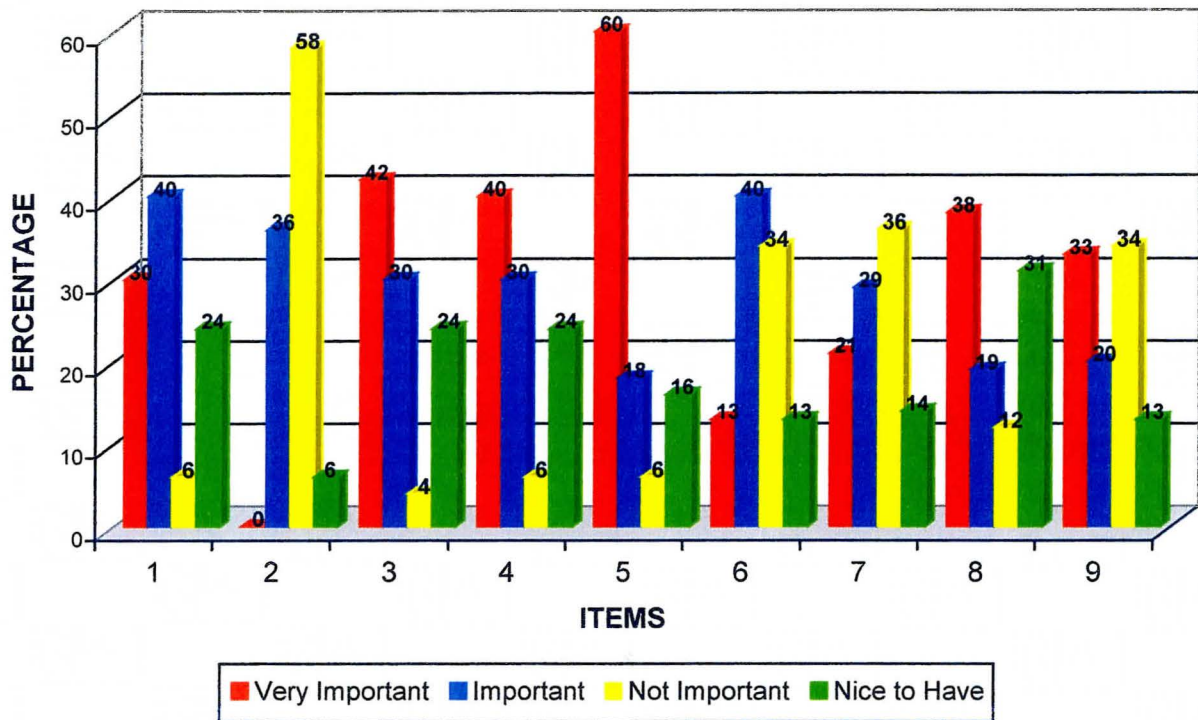
The sort options "By Area" produced a variety of levels of importance. Only Item 3 - "List of students qualifying to be placed", Item 4 - "List of students referred for placement", and Item 5 - "List of students placed by company, were judged by a clear majority to be of high "importance" to be sorted "By Area, City and Province". Item 1 - "List of students applying to be placed", Item 7 - "List of students placed, but not registered by company", Item 8 - "List of students and dates visited by co-ordinator", and Item 9 - "List of students' progress marks and final mark", were ascribed a relatively high level of importance to sort "By Area", but not "By City or Province". Item 2 - "List of students applying to be placed", and Item 6 - "List of students registered after placement", were given a relatively low level of importance to sort by either "By Area, City or Province".

The diversity of colleges may be responsible for this diversity in responses. For example, some colleges have several "satellite" branches scattered across small towns in the area. For these colleges the sort option "By Area, City and Province" might be of more relevance than for colleges situated in a city (or large town).

The interpretation of these results confirm the importance of the sort options "By Area" in Item 1, 3, 4 and 5 (70%, 72%, 70% and 78% respectively), also the lesser importance of Item 6, 7, 8 and 9 (53%, 50%, 57% and 53% respectively) and Item 2 (36%) as important. Diagram 5.13 illustrates this interpretation of the sort option "By Area", and Diagram 5.14 the sort option "By City" and "By Province".

DIAGRAM 5.13
Sorting Students' Information "By Area" of Items One to Nine :
Colleges

- Sample Size : 55 Respondents



ITEMS RELATING TO STUDENTS' REPORTS : Colleges

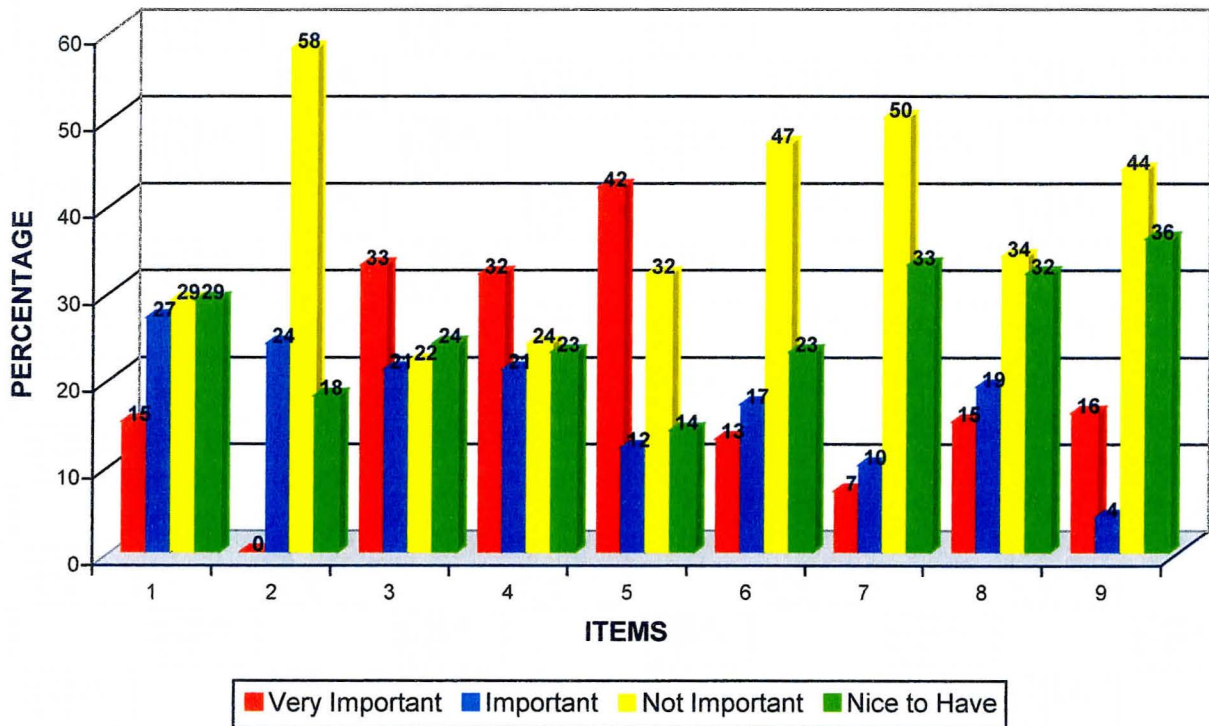
- | | |
|---|---|
| 1. List of students applying to be placed | 6. List of students registered after placement |
| 2. List of students applying to be placed, but not qualifying | 7. List of students placed, but not registered by company |
| 3. List of students qualifying to be placed | 8. List of students and dates visited by co-ordinator |
| 4. List of students referred for placement | 9. List of students progress and final marks |
| 5. List of students placed by company | |

e) Sorting Student Information "By City" and "By Province" for Items 1 to 9, Combined: Colleges (DIAGRAM 5.14)

Although Item 3 - "List of students qualifying to be placed", Item 4 - "List of students referred for placement", and Item 5 - "List of students placed by company", is viewed by a majority of respondents as important (scores on "very important" and "important" combined), the majority is relatively small (54%, 53% and 54%). Similarly, Item 7 - "List of students placed, but not registered by company", was regarded by 50% of respondents as "not important".

It can be concluded that each of the items on the student reports needs to be interpreted individually. Since respondents from technikons value the sort options “By Area, City and Province”, (refer to Section 5.3.3.1, p.160) with a high level of importance, consideration should be given to include this sort option in a management information system for co-operative education. Diagram 5.14 illustrates this interpretation.

DIAGRAM 5.14
Sorting Student Information “By City” and “By Province” of Items
One to Nine, Combined : Colleges
 – Sample Size : 55 Respondents



ITEMS RELATING TO STUDENTS' REPORTS : Colleges

- | | |
|---|---|
| 1. List of students applying to be placed | 6. List of students registered after placement |
| 2. List of students applying to be placed, but not qualifying | 7. List of students placed, but not registered by company |
| 3. List of students qualifying to be placed | 8. List of students and dates visited by co-ordinator |
| 4. List of students referred for placement | 9. List of students progress and final marks |
| 5. List of students placed by company | |

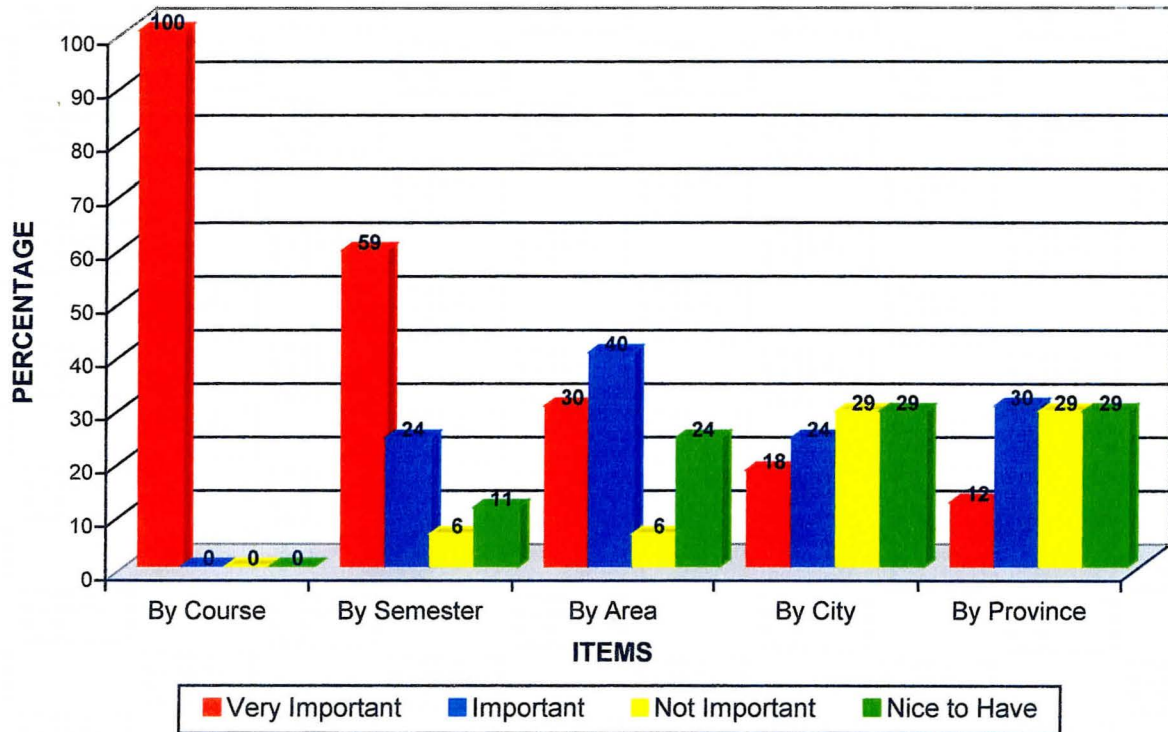
**f) Further Interpretation of Individual Items 1 to 10 of Information
Relating to Students' Reports: Colleges**

Due to the diversity of the levels of importance ascribed to each of the items by respondents from colleges, further interpretation and synthesis is required. When the responses to these items are evaluated individually, the results can be interpreted as follows:

ITEM 1: "Lists of Students Applying to be Placed" (DIAGRAM 5.15)

All the respondents regarded the sort option "By Course" as "very important". The "Semester" sort option can still be regarded as relatively "important" since 59% of respondents regarded it as "very important" and 24% as "important". A total of 83% of respondents thus allocated a relatively high level of importance to it, and only 6% a relatively low level of importance ("not important"). Sorting "By Area" again reveals a relatively high level of importance, since a total of 70% regarded it as relatively "important" (30% "very important" and 40% "important"). Again, only 6% allocated the item a low level of importance ("not important"). Sorting "By City" was not regarded as important, since 42% allocated this a relatively high level of importance, and 58% allocated it a relatively low level of importance. The sort option "By Province" was attributed a similar level of importance, with 42% relatively high, and 58% relatively low.

DIAGRAM 5.15
Sort Options of Item 1 : “Lists of Students Applying to be Placed” :
Colleges
 – Sample Size : 55 Respondents



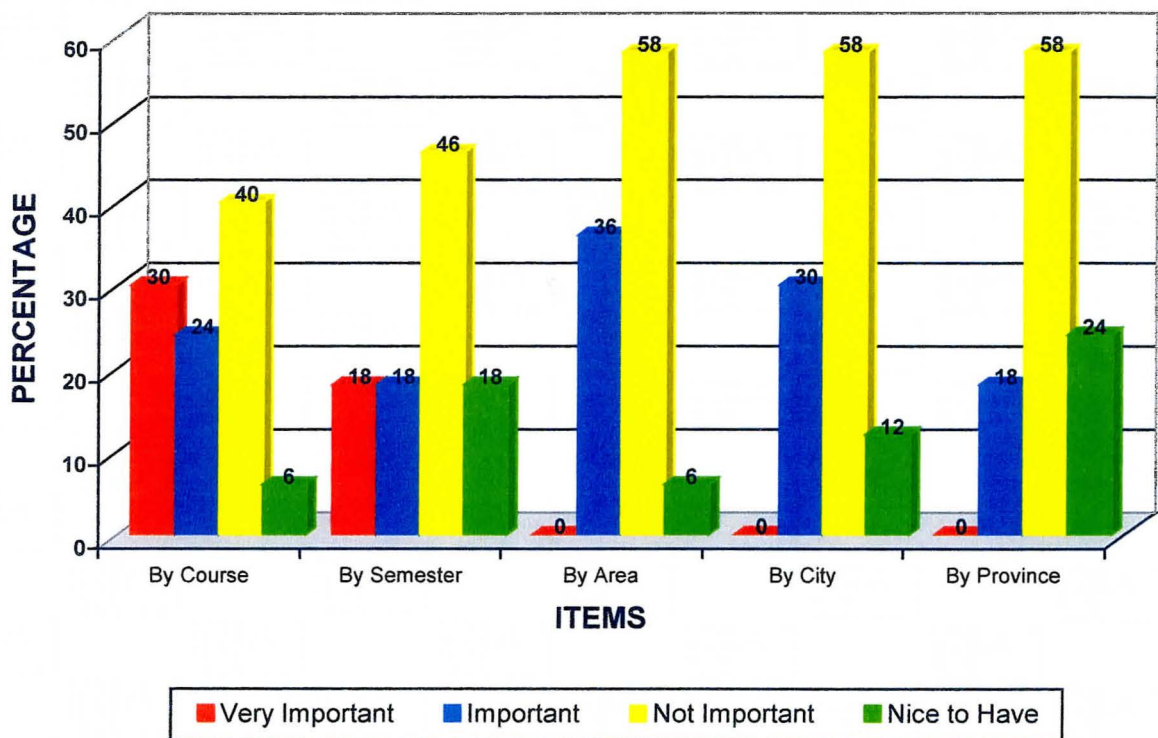
The results confirm the sorting of Item 1 - “List of students applying to be placed”, “By Course”, “By Semester” and “By Area”. Diagram 5.15 illustrates this interpretation.

ITEM 2: “Lists of Students Applying to be Placed, but not Qualifying” (DIAGRAM 5.16)

The sort option “By Course” revealed some importance (54% when “very important” and “important” was grouped together) but also a relatively high level of “not important” (40%). The sort option “By Semester” was not regarded as that important since only 36% of respondents regarded it as relatively important (18% “very important”, and 18% “important”). 46% of respondents regarded this option as “not important”. To sort “By Area” and “By City” and “By Province” were all seen as relatively low in

importance, since in all cases, 58% of respondents regarded it as “not important”. No respondents regarded the sort options “By Area”, “By City” and “By Province” as “very important” and 36%, 30% and 18% respectively, regarded it as “important”.

DIAGRAM 5.16
Sort Options of Item 2 : “Lists of Students Applying to be Placed, but not Qualifying” : Colleges
 – Sample Size : 55 Respondents

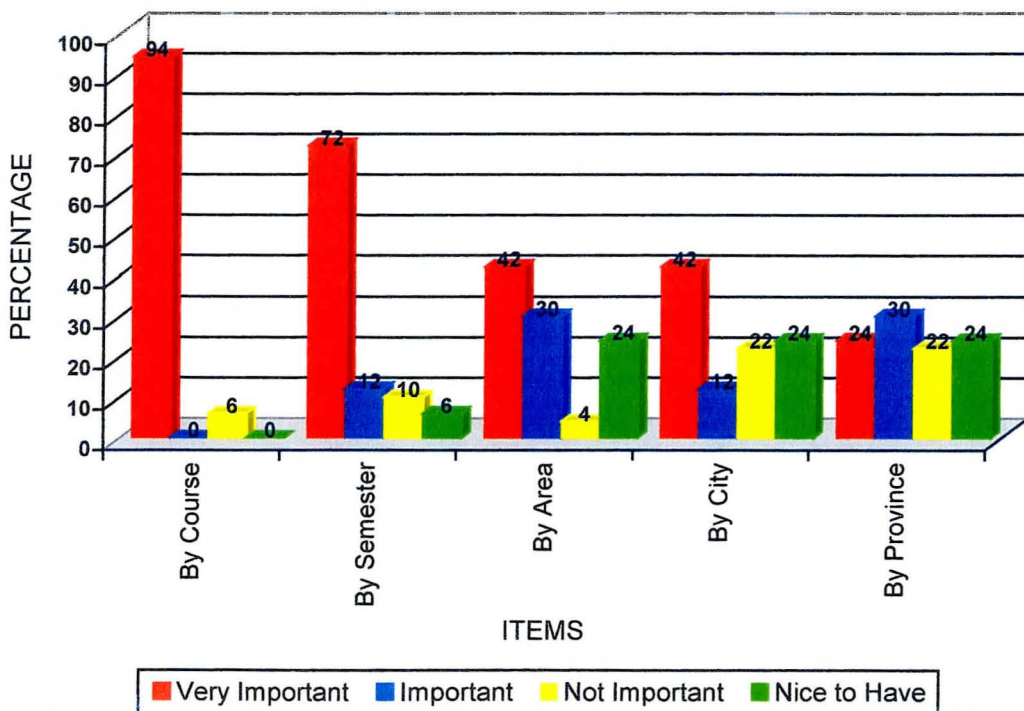


It can be confirmed that for Item 2 - “List of students applying to be placed, but not qualifying”, only the sort option “By Course” is regarded by the respondents as relatively important. Diagram 5.16 illustrates this interpretation.

ITEM 3: “Lists of Students Qualifying to be Placed” (DIAGRAM 5.17)

The sort option “By Course” was regarded by 94% of the respondents as “very important” and only by 6% as “not important”. A relatively high level of perceived importance was thus reported. The sort option “By Semester” also was allocated a high level of importance (84%), with 72% regarding it as “very important”, and 12% as “important”. Only 10% regarded it as “not important”. Sorting “By Area” was again seen as relatively important since 42% regarded it as “very important” and 30% as “important” (a total of 72%). Only 4% of respondents allocated it a relatively low level of importance, and 4% of respondents regarded it as “not important”. The sort option “By City” also received a relatively high rating, (42% “very important” and 12% “important” respectively). Again 22% of respondents ascribe a low level of importance (“not important”). For the sort option “By Province”, 54% of respondents regarded it as important (24% “very important” and 30% “important”). 22% of respondents recorded “not important”.

DIAGRAM 5.17
Sort Options of Item 3 : “Lists of Students' Qualifying to be Placed” :
Colleges
 – Sample Size : 55 Respondents

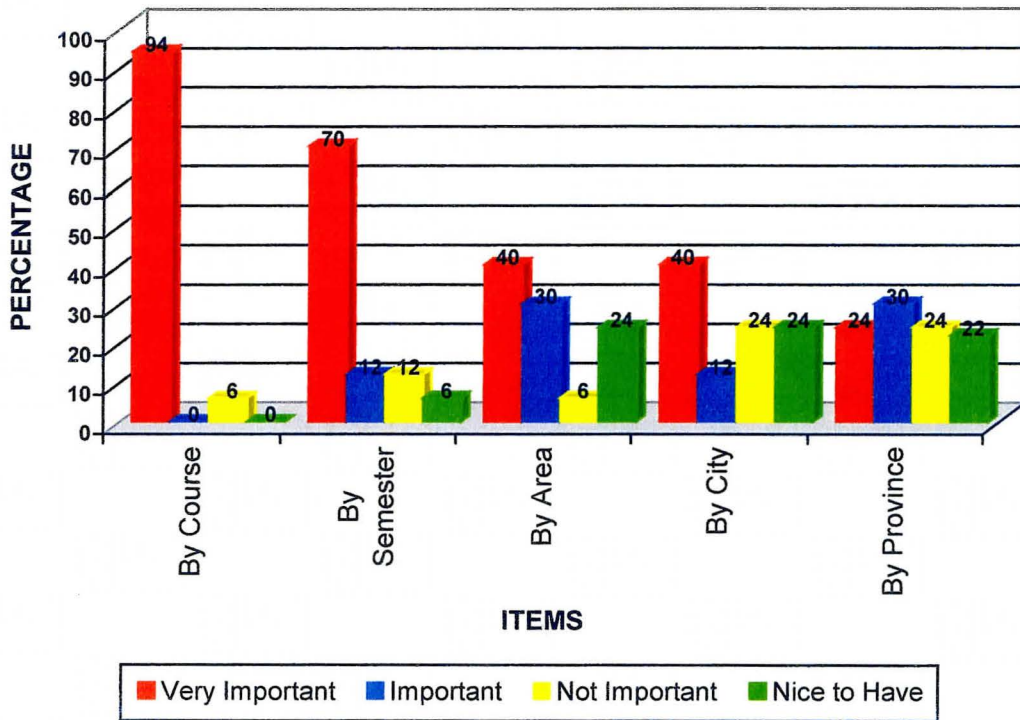


The results of Item 3 - "List of students qualifying to be placed", illustrate and confirm the high importance of sorting "By Course" and "By Semester". It is of relative importance to sort "By Area", but less important to sort "By City" and "By Province". The sort option "By Area" also scores a high level of importance when the two levels of importance ("very important" and "important") are combined. "By City" and "By Province" is regarded as less important when the levels "very important" and "important" are combined. Diagram 5.17 illustrates this interpretation.

ITEM 4: "Lists of Students' Referred for Placement" (DIAGRAM 5.18)

The sort option "By Course" was again regarded as the most important with 94% rating it as "very important", and 6% as "not important". The sort options "By Area" and "By Semester" were both regarded as relatively important. 70% of respondents regarded the sort option "By Semester", "very important" and 12% "important"; 40% and 30% of respondents respectively, reported the sort option "By Area" as "very important" and "important". Only 12% of respondents regarded the "By Semester" sort option as "not important", and 6% regarded the "By Area" sort option as "not important". The sort options "By City" and "By Province" were again regarded as important (40% "very important" and 12% "important" for the "By City" sort option; 24% "very important" and 30% "important" for the "By Province" sort option). 24% of respondents indicate both sort options as "not important".

DIAGRAM 5.18
Sort Options of Item 4 : “Lists of Students’ Referred for Placement” :
Colleges
 – Sample Size : 55 Respondents



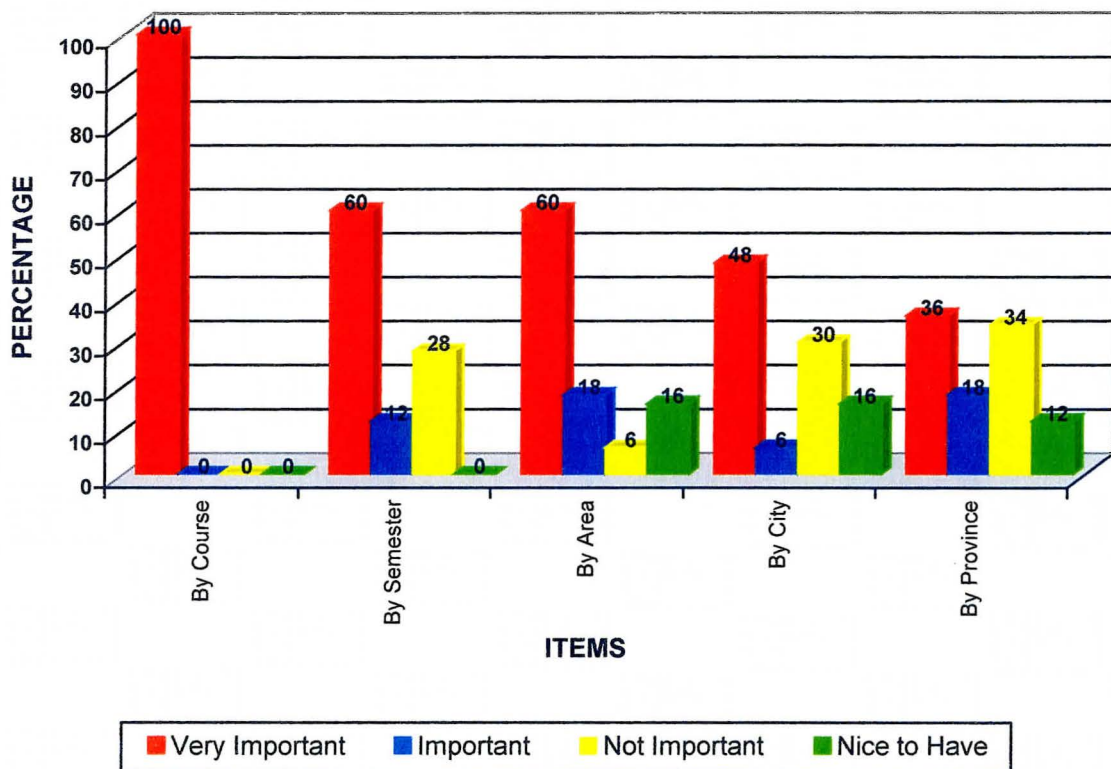
From the results obtained for Item 4 - “List of students referred for placement”, the conclusion confirms that it is “very important” to sort “By Course” and “By Semester”, of relative importance to sort “By Area” and “By City”, but of less importance to sort “By Province”. Diagram 5.18 illustrates this interpretation.

ITEM 5 : “Lists of Students’ Placed By Company” (DIAGRAM 5.19)

The sort option “By Course” was regarded by all respondents (100%) as “very important”. The sort options “By Semester” and “By Area” both received a relatively high rating by respondents regarding it as “very important” (both options 60%, “very important”, 12% and 18% respectively as “important”). 28% of respondents regarded the sort option “By Semester” as “not important”, and only 6% of respondents

regarded the sort option “By Area” as “not important”. For the sort options “By City” and “By Province”, the respondents considered both sort options as relatively less important (30% and 34% of respondents reported it as “not important”). 54% of respondents rated the sort options “By City” and “By Province” as “very important” and “important” combined.

DIAGRAM 5.19
Sort Options of Item 5 : “Lists of Students' Placed By Company” : Colleges
 – Sample Size : 55 Respondents



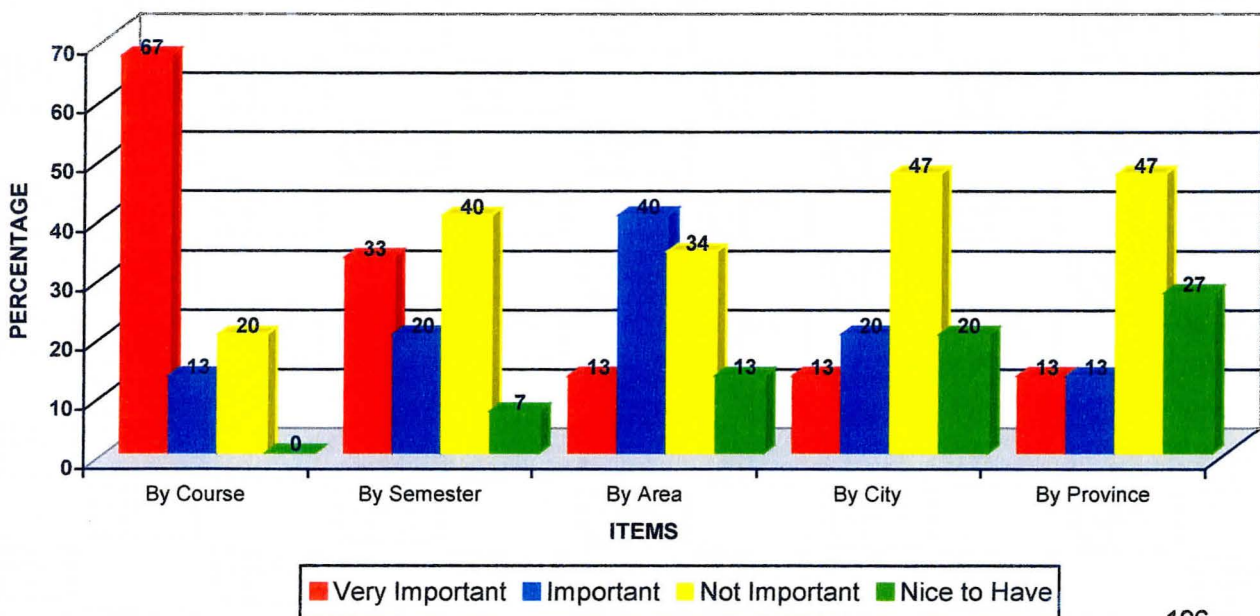
For the Item “List of students placed by company” for data relating to students, the results confirm that the highest level of importance is given to sorting “By Course”, relative importance to sorting “By Semester” and “By Area”, and less importance to sorting “By City” and “By Province”. Diagram 5.19 illustrates this interpretation.

ITEM 6 : "Lists of Students' Registered after Placement"

(DIAGRAM 5.20)

The sort option "By Course" was regarded as relatively high in importance (67% "very important" and 13% "important"). 20% of respondents regarded this sort option as "not important". The sort option "By Semester" was not seen as important, since 33% of the respondents regarded it as "very important", 20% as "important", but 40% of the respondents regarded it as "not important". Similarly, the sort options "By Area", "By City" and "By Province" were not regarded with such a high level of importance: only 13% of respondents regarded it as "very important" and 34%, 47% and 47%, respectively, regarded it as "not important". However, for the sort options "By Area", "By City" and "By Province", 40%, 20% and 13% of respondents, respectively, regarded it as "important". Thus only the sort option "By Area" was reported by a small majority as relatively important (53% - "very important" and "important" combined). The majority (67%) of respondents ("not important" and "nice to have" combined) considered the sort options "By City" and "By Province" as relatively low in importance.

DIAGRAM 5.20
Sort Options of Item 6 : "Lists of Students' Registered after Placement" :
Colleges
- Sample Size : 55 Respondents

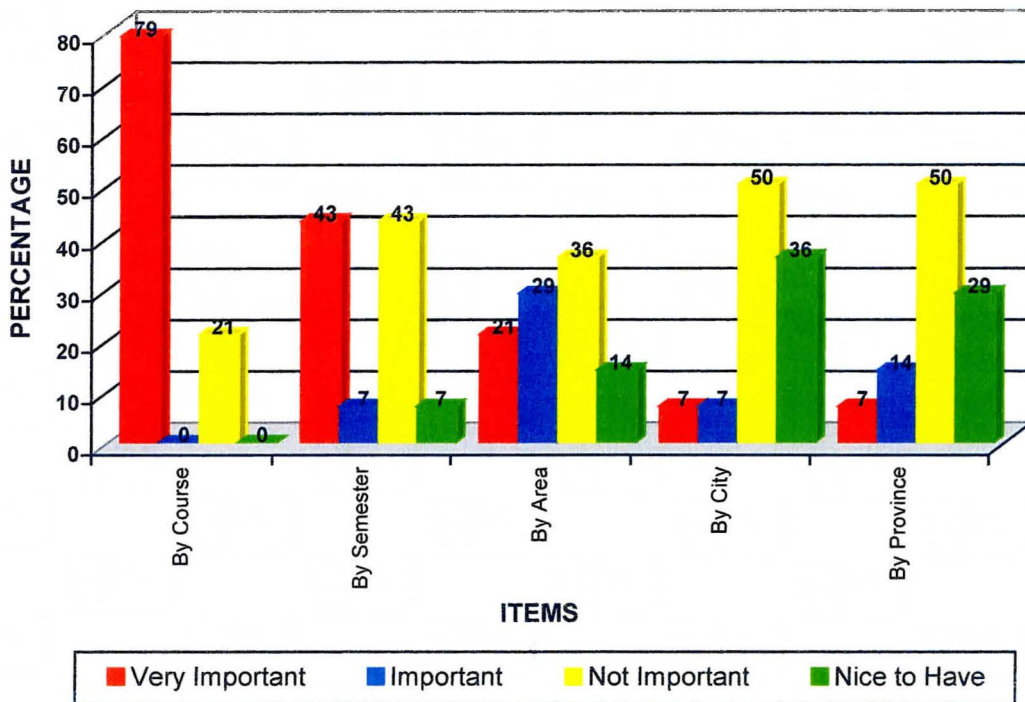


The results confirm the importance of Item 6 - "List of students registered after placement", of data relating to students - being sorted "By Course", "By Semester" and "By Area". Diagram 5.20 illustrates this interpretation.

ITEM 7 : "Lists of Students' Placed, but not Registered by Company" (DIAGRAM 5.21)

The sort option "By Course" was again regarded by the majority of respondents (79%) as "very important". Only 21% regarded it as "not important". For the sort option "By Semester" there was no clear indication of a level of importance. 43% of respondents indicated this sort option as "very important" and 43% regarded the option as "not important". 7% of respondents regarded this option as "important" and 7% as "nice to have". For the sort option "By Area" there was again no conclusive indication as 50% of the respondents indicated it as important and 50% combined indicated it as "nice to have" and "not important" combined. Thus no clear majority of respondents rated the sort option "By Area" as important. The sort option "By City" was not rated with a high level of importance, since only 14% (when "very important" and "important" are combined) of respondents regarded it as important. The majority (86%) of respondents ("not important" and "nice to have" combined) did not regard the sort option "By City" as important. Only 7% of respondents regarded the sort option "By Province" as "very important"; 14% regarded it as "important". However, 50% regarded it as "not important" and another 29% as "nice to have".

DIAGRAM 5.21
Sort Options of Item 7 : “Lists of Students’ Placed, but not Registered by Company” : Colleges
 – Sample Size : 55 Respondents



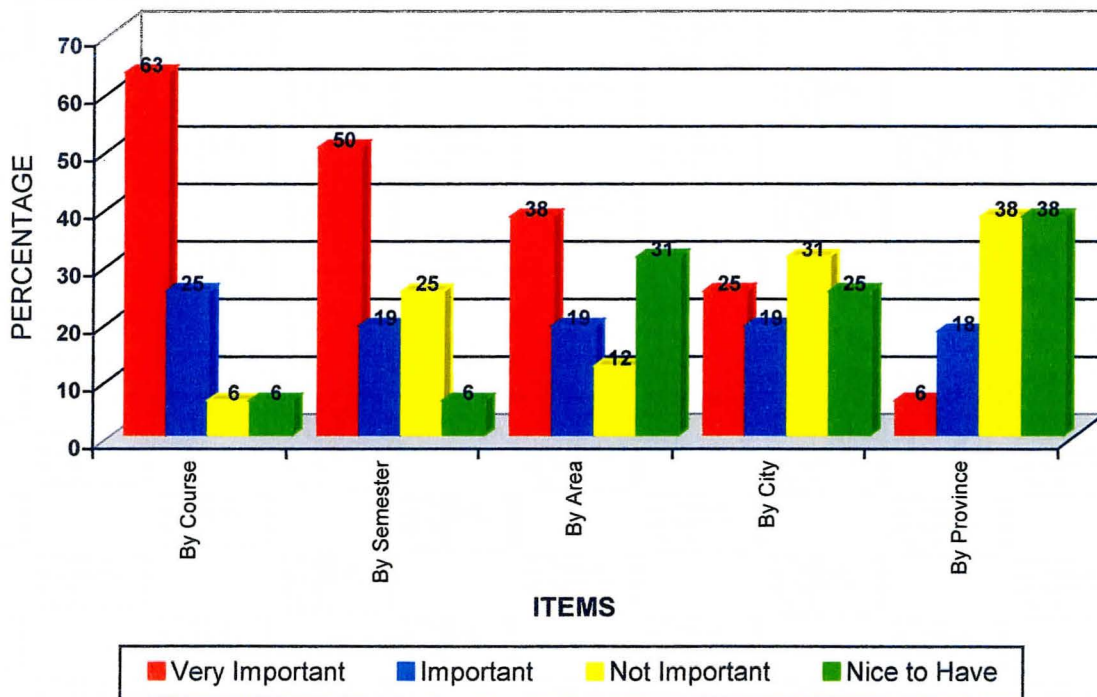
The results confirm the importance of Item 7 - “List of students placed, but not registered by company”, for the lists of data relating to students - being sorted “By Course”, “By Semester” and “By Area”. Diagram 5.21 illustrates this interpretation.

ITEM 8 : “List of Students’ and Dates Visited By Co-ordinator”
 (DIAGRAM 5.22)

Sort Item 8 - “List of students and dates visited by co-ordinator” “By Course”, were regarded as relative important, yet not as high as Items 1, 3, 4, 5, 7 and 9. 63% of respondents regarded this sort option as “very important” and 25% as “important” (a total of 88%). Only 6% of respondents regarded it as “not important”. The sort option “By Semester” received a relatively higher rating of importance by 69% of respondents (50% “very important” and 19% “important”). 25% of respondents indicated that this sort option is “not important”. The “By

Area” sort option received a slightly higher rating (57%) : 38% of respondents regarded it as “very important” and 19% as “important”, 12% of respondents regarded it as “not important” and 31% as “nice to have”. The sort option “By City” was not regarded as important by the respondents, since only 44% of respondents regarded it as important (25% “very important” and 19% “important”), with 31% of respondents regarding it as “not important”, and 25% as a “nice to have”. The “By Province” sort option was not regarded highly since 76% of respondents did not regard it as important (38% “not important” and 38% “nice to have”).

DIAGRAM 5.22
Sort Options of Item 8 : “List of Students’ and Dates Visited By Co-ordinator” :
Colleges
 – Sample Size : 55 Respondents



The results confirm the importance of Item 8 - “List of students and dates visited by co-ordinator”, for the lists of data relating to students, being sorted “By Course”, “By Semester” and “By Area”. Diagram 5.22 illustrates this interpretation.

ITEM 9 : “List of Students’ Progress and Final Marks”

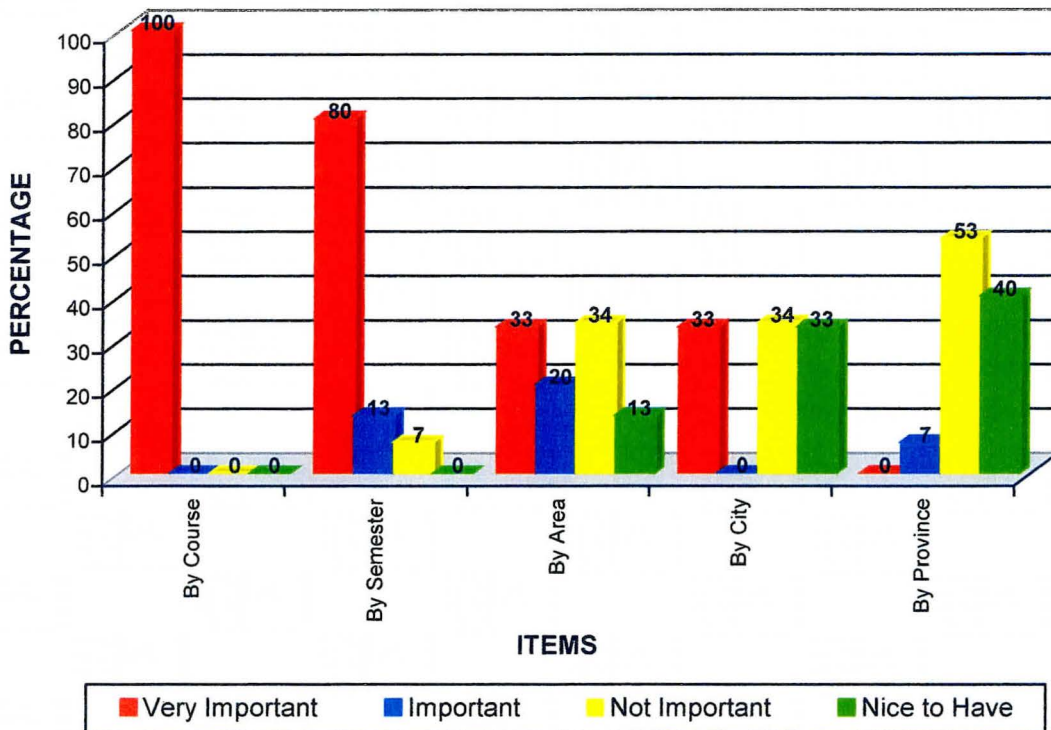
(DIAGRAM 5.23)

The sort option “By Course” received the highest sort order rating with all respondents (100%) regarding it as “very important”. Similarly, a relatively high level of importance was attributed to the sort option “By Semester”: 80% regarded it “very important”, 13% “important” and 7% “not important”. The sort option “By Area” and “By City” was again not given conclusive support since both options were regarded by 33% of respondents as “very important” and by 34% of respondents as “not important”. The sort option “By Province” was not regarded as important, with 53% reporting it as “not important” and 40% as “nice to have”.

DIAGRAM 5.23

Sort Options of Item 9 : “List of Students’ Progress and Final Marks” :
Colleges

– Sample Size : 55 Respondents

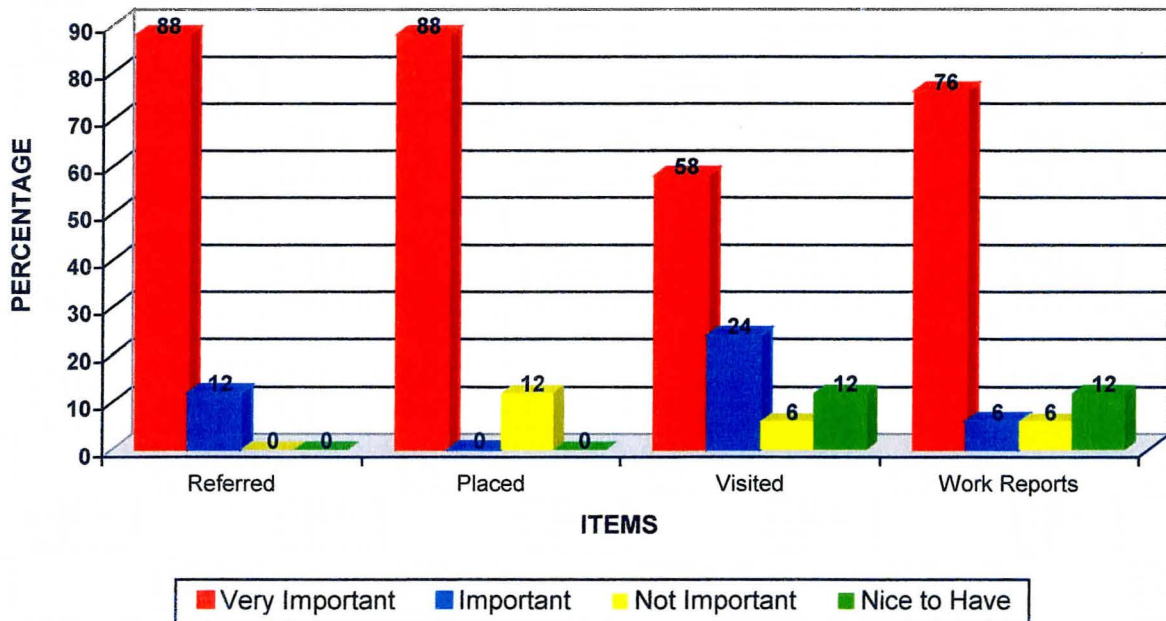


The results confirm the importance of Item 9 - "List of students progress and final marks", for the lists of data relating to students, being sorted "By Course", "By Semester" and "By Area". Diagram 5.23 illustrates this interpretation.

ITEM 10: "Report of Student History on All Aspects of Experiential Learning" Sort as "Referred, Placed, Visited and Work Reports" (DIAGRAM 5.24)

All sort options, "Referred" (100%), "Placed" (88%), "Visited" (82%) and "Work Reports" (82%) were regarded with a relatively high level of importance ("very important" and "important" combined). The sort options given a lower level of importance were "Visited" and "Work Reports", which where in both cases 6% of respondents rated as "not important" and 12% as a "nice to have".

DIAGRAM 5.24
Sort Options of Item 10 : " Student History on All Aspects of Experiential Learning" Sort as "Referred", "Placed", "Visited" and "Work Reports" : Colleges
 - Sample Size : 55 Respondents



The results confirm the importance of Item 10 - "Report of student history on all aspects of experiential learning", for the lists of data relating to students - being sorted "Referred", "Placed", "Visited" and "Work Reports". Diagram 5.24 illustrates this interpretation.

**g) Conclusions of All Items Relating to Students' Reports : Colleges
(Questionnaire 1(b))**

Table 5.8 provides a summative merger of the separate items of the students' reports. From Table 5.8 it can be concluded that :

- All items should be included in the management information system of co-operative education
- All Items 1 to 9 should be sorted "By Course"
- Item 1 should not be sorted "By City and By Province"
- Item 2 should be sorted "By Semester, Area, City and Province"
- Items 3, 4 and 5 are the only items which should be sorted "By Course, Semester, Area, City and By Province"
- Items 6, 7, 8 and 9 should only be sorted "By Course, Semester and By Area", and not "By City and By Province", and
- Item 10 should be sorted as "Referred, Placed, Visited and Work Reports" completed.

TABLE 5.8

Inclusion of Items and Scope of Sorting: Students' Reports (Colleges)

– Sample Size : 55 Respondents

ITEMS	INCLUDE	SORT ORDER								
		By Course	By Semester	By Area	By City	By Province	Referred	Placed	Visited	Work Reports
1. List of students applying to be placed	YES	Yes	Yes	Yes	No	No	N/A	N/A	N/A	N/A
2. List of students applying to be placed, but not qualifying	YES	Yes	No	No	No	No	N/A	N/A	N/A	N/A
3. List of students qualifying to be placed	YES	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A
4. List of students referred for placement	YES	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A
5. List of students placed by company	YES	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A
6. List of students registered after placement	YES	Yes	Yes	Yes	No	No	N/A	N/A	N/A	N/A
7. List of students placed, but not registered by company	YES	Yes	Yes	Yes	No	No	N/A	N/A	N/A	N/A
8. List of students and dates visited by co-ordinator	YES	Yes	Yes	Yes	No	No	N/A	N/A	N/A	N/A
9. List of students progress and final marks	YES	Yes	Yes	Yes	No	No	N/A	N/A	N/A	N/A
10. Report of student history on all aspects of experiential learning	YES	N/A	N/A	N/A	N/A	N/A	Yes	Yes	Yes	Yes

Another key role player in the co-operative education system is the participating company/employer. Information on these participating companies has presented various sort options, and this is discussed next.

5.4.2 Employer Reports

Questionnaire 2(b), Table 5.9 investigated the importance assigned by the respondents (co-operative education lecturers responsible for co-operative education from colleges) of each of these items relating to companies as well as the manner (if any) in which it should be sorted.

The numbers in bold and placed in boxes indicate the average (expressed as a percentage), of respondents who rated the specific list as “very important”, “important”, “nice to have” or “not important”.

TABLE 5.9
Reports on Companies : Colleges
Sample Size : 55 Respondents
QUESTIONNAIRE 2(b)

(Values indicated in this chapter are the arithmetic mean of the raw data,
expressed as percentages)

2(b) Reports on Companies : Colleges	Very Important	Important	Nice to have	Not important
	%	%	%	%
1. List and History of Participating Company(ies):	80	6	0	14
Sort : By Course	100	0	0	0
By Semester	59	12	0	29
By Area	82	0	12	6
By City	59	12	6	23
By Province	48	18	18	16
2. List of Active Companies :	83	6	0	11
Sort : By Course	100	0	0	0
By Semester	65	12	0	23

2(b) Reports on Companies : Colleges	Very Important	Important	Nice to have	Not important
	%	%	%	%
By Area	77	12	5	6
By City	54	12	12	22
By Province	48	17	17	18

3. Contact Persons :	91	6	0	3
Sort : By Company	100	0	0	0
By Course	82	11	0	7

4. List of Companies and Dates Visited :	65	30	0	5
Sort : By Co-ordinator	53	42	0	5
By Course	77	18	0	5
By Semester	47	30	0	23
By City	35	18	23	24
By Province	28	18	29	25

5. List of Students Referred to a Company :	72	15	2	11
Sort : By Course	84	12	4	0
By Semester	59	18	0	23
By Area	65	18	11	6
By City	42	23	22	13
By Province	30	18	34	18

6. Main Activities of a Company (sub-disciplines within a course)	88	12	0	0
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7. Variety of Placement Positions within a Company, in Different Courses	58	17	12	13
--	-----------	-----------	-----------	-----------

2(b) Reports on Companies : Colleges	Very Important	Important	Nice to have	Not important
	%	%	%	%

8. Accessibility of a company (By Road/By Taxi/By Rail)	65	24	11	0
--	----	----	----	---

9. Accommodation Near the Company	59	17	24	0
-----------------------------------	----	----	----	---

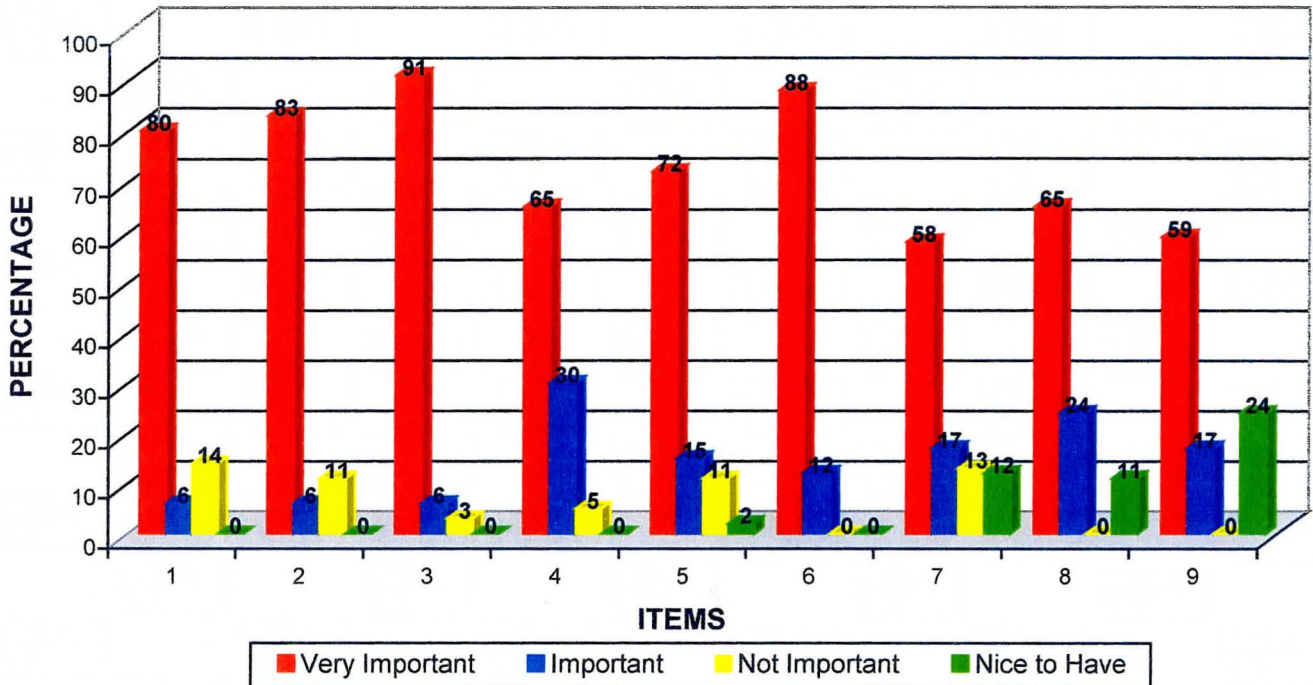
5.4.2.1 Interpretation and Synthesis of Data Relating to Reports on Information of Participating Co-operative Education Employers : Colleges - Sample Size : 55 Respondents (Questionnaire 2(b) – ANNEXURE C)

The reports summarised here referred to all relevant data of employers participating in co-operative education; data such as demographics of companies and students placed and visited in all disciplines. The responses to Questionnaire 2(b) of respondents as reported in this chapter, indicated a relatively uniform approach by the respondents.

a) Relative Importance of Items One to Nine Relating to Reports of Participating Employers: Colleges (DIAGRAM 5.25)

All the items were rated “very important” by a clear majority of respondents. When the two categories, “very important” and “important” were combined, only Item 7 - “Variety of placement positions within a company, in different courses”, and Item 9 - “Accommodation near the company”, scored lower than 80% - 75% and 76% respectively.

DIAGRAM 5.25
Relative Importance of Items One to Nine Relating to Reports of
Participating Employers : Colleges
 – Sample Size : 55 Respondents



ITEMS RELATING TO REPORTS ON COMPANIES : Colleges

- | | |
|---|--|
| 1. List and history of participating company(ies) | 6. Main activities of a company (sub-disciplines within a course) |
| 2. List of active companies | 7. Variety of placement positions within a company, in different courses |
| 3. Contact persons | 8. Accessibility of a company (road/taxi/rail) |
| 4. List of companies and dates visited | 9. Accommodation near the company |
| 5. List of students referred to a company | |

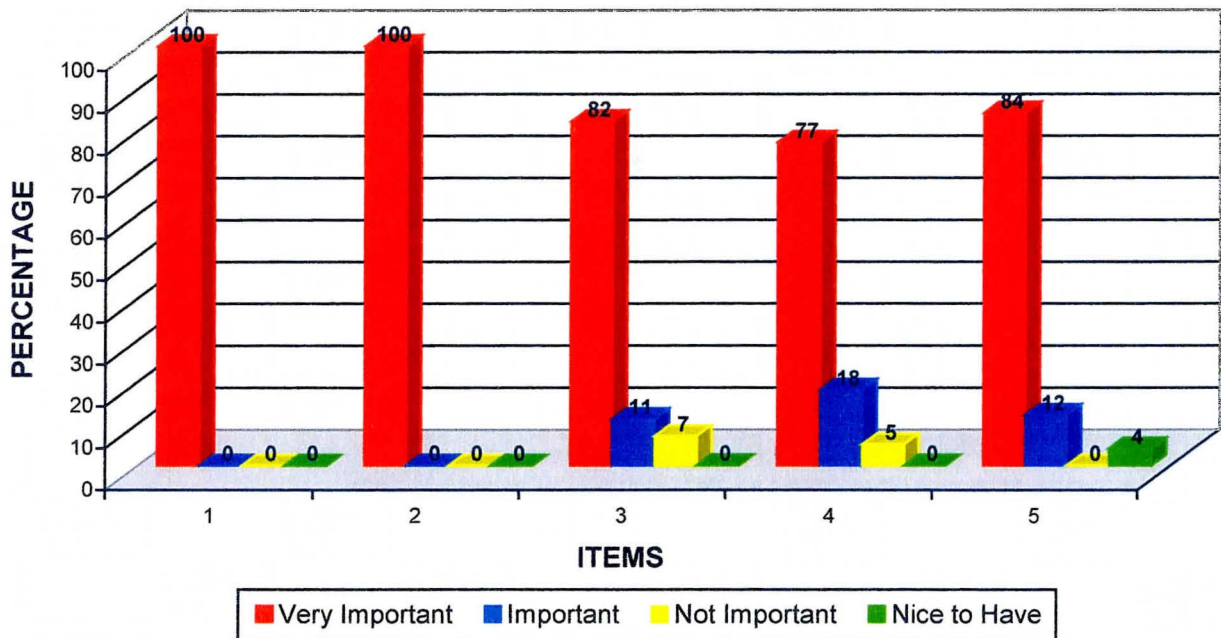
Items 1, 2 and 5 have the same sort options, namely, to sort “By Course”, “By Semester”, “By Area”, “By City” and “By Province”. Item 3 offers the sort options “By Company” and “By Course. Item 4 has the sort options “By Course”, “By Semester”, “By City” and “By Province”.

The results confirm the importance of all nine items for the lists of data relating to participating co-operative education employers. Diagram 5.25 illustrates this interpretation.

b) Sorting Participating Employers Information “By Course” for Items One to Five: Colleges (DIAGRAM 5.26)

The sort option, “By Course”, was rated with a high level of importance when the scores for “very important” and “important” were combined (Items 1, 2, 3, 4 and 5 rated 100%, 100%, 82%, 77% and 84% respectively).

DIAGRAM 5.26
Sorting Participating Employers Information “By Course” of Items One to Five : Colleges
 – Sample Size : 55 Respondents



ITEMS RELATING TO COMPANIES : Colleges

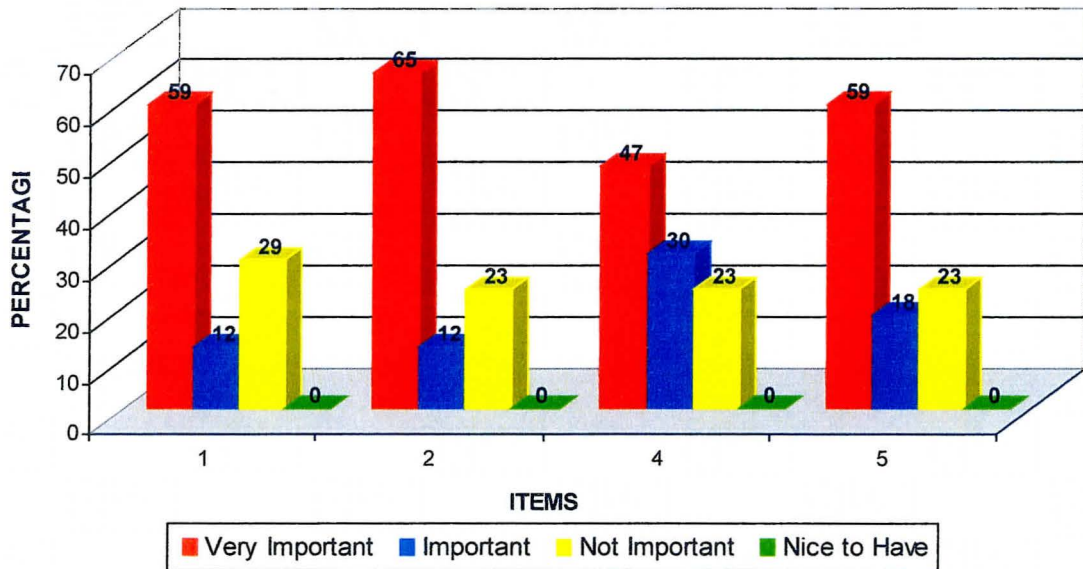
- | | |
|---|---|
| 1. List and history of participating company(ies) | 4. List of companies and dates visited |
| 2. List of active companies | 5. List of students referred to a company |
| 3. Contact persons | |

The results confirm the importance of the sort option “By Course” for the lists of data reflecting information on participating employers. Diagram 5.26 illustrates this interpretation.

c) Sorting Participating Employers' Information "By Semester" for Items One, Two, Four and Five: Colleges (DIAGRAM 5.27)

Only Item 1b - "List and history of participating companies", Item 2 - "List of active companies", Item 4 - "List of companies and dates visited", and Item 5 - "List of students referred to a company", had the sort option "By Semester". When the scores on the degree of importance were grouped, the level of importance of the sort option, "By Semester", was high (Item 1 - 71%, Item 2 - 77%, Item 4 - 77% and Item 5 - 77%). This sort option, however, was rated by a fair sized group as "not important" (Item 1 - 29%, Item 2 - 23%, Item 4 - 23% and Item 5 - 23%).

DIAGRAM 5.27
Sorting Participating Employers' Information "By Semester" for Items One, Two, Four and Five : Colleges
 - Sample Size : 55 Respondents



ITEMS RELATING TO REPORTS ON COMPANIES : Colleges

- | | |
|---|---|
| 1. List and history of participating company(ies) | 4. List of companies and dates visited |
| 2. List of active companies | 5. List of students referred to a company |

The results confirm the importance of Items 1, 2, 4 and 5 relating to data for employers, being sorted "By Semester". Diagram 5.27 illustrates this interpretation.

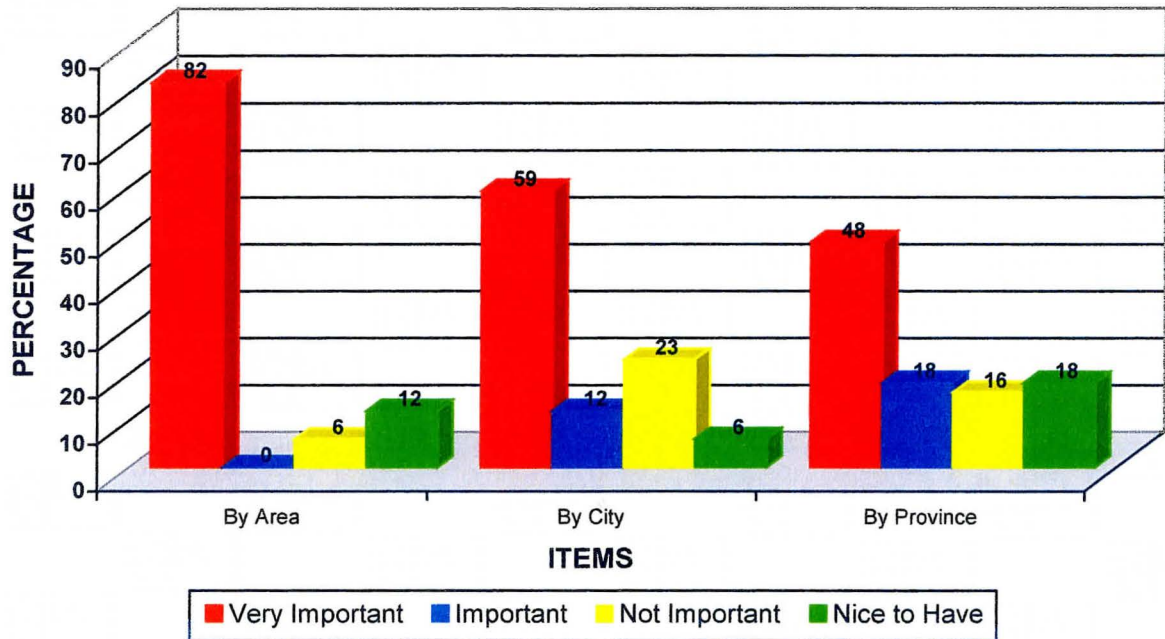
d) Further Interpretation of Individual Items (One to Five) of Information Relating Participating Company(ies) : Colleges

Due to the diversity of the levels of importance ascribed by respondents from colleges to each of the items, further interpretation and synthesis is required. When the responses to the items are evaluated individually, the following interpretations are noted:

ITEM 1: "List and History of Participating Company(ies)" – Sort Options "By Area" and/or "By City" and/or "By Province": Colleges (DIAGRAM 5.28)

The sort options, "By Area", "By City" and "By Province" did not score a consistent rating as regards importance. The first Item - "List and history of participating companies", was rated with a high level of importance (82% as "very important" for the sort option "By Area"; a relative high rating (71%) when "very important" and "important" were combined for the option, sort "By City"). It is noteworthy that 23% of respondents rated this sort option as "not important"; a clear majority (66%) of respondents (but the lowest for a sort option for this item) rated the sort option "By Province", as relatively high in importance when the two options "very important" and "important" area were grouped together. This sort option also received a relatively high level rating of "not important" (16%) and "nice to have" (18%).

DIAGRAM 5.28
ITEM 1 : “List and History of Participating Company(ies)” – Sort Options
“By Area” and/or “By City” and/or “By Province” : Colleges
 – Sample Size : 55 Respondents

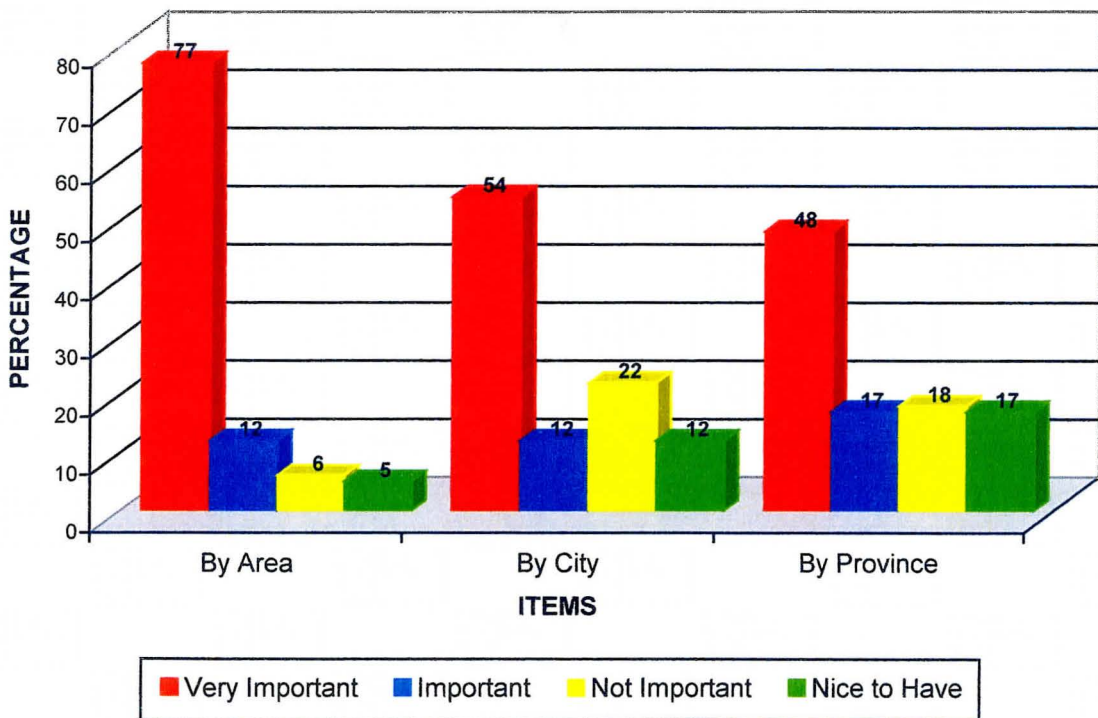


The results confirm the importance of Item 1 - “List and history of participating company(ies)” relating to data of employers, being sorted “By Area”, “By City” and “By Province”. Diagram 5.28 illustrates this interpretation.

ITEM 2 : “List of Active Companies” – Sort Options “By Area” and/or “By City” and/or “By Province” : Colleges (DIAGRAM 5.29)

Item 2 - “List of active companies”, was again rated with a relatively higher level of importance (89%) for the sort option “By Area”, and a lower level of importance (66% and 65% respectively) for the sort options “By City” and “By Province”. The ratings for “not important” and “nice to have” were higher (22% and 18%; 12% and 17%) for the sort options “By City” and “By Province” than for the sort option “By Area” (6% and 5%).

DIAGRAM 5.29
ITEM 2 : “List of Active Companies” – Sort Options “By Area” and/or “By City” and/or “By Province” : Colleges
 – Sample Size : 55 Respondents

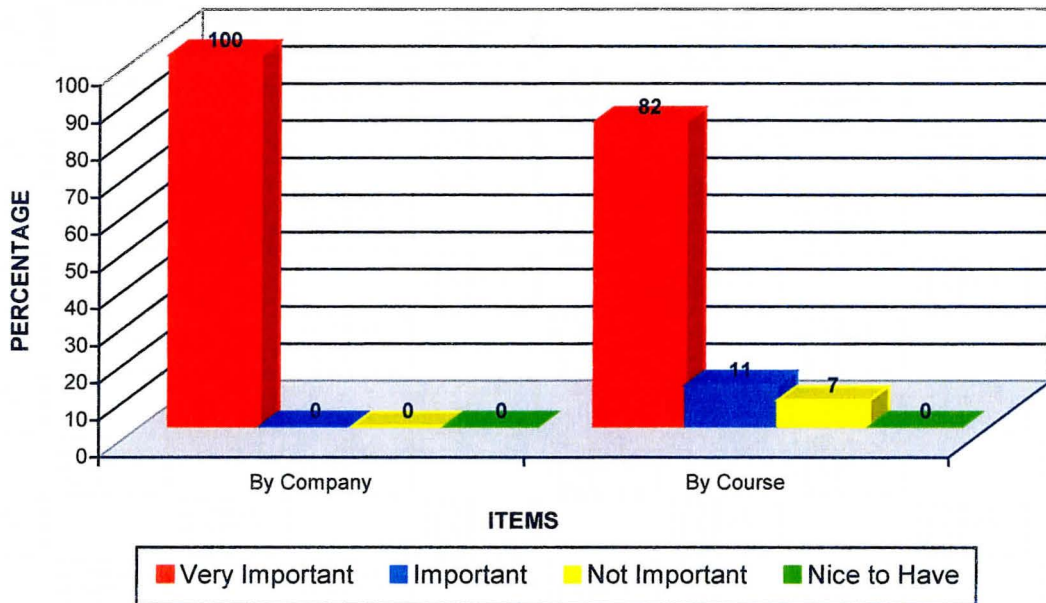


The results confirm the importance of Item 2 - “List of active companies” relating to data of employers, being sorted “By Area”, “By City” and “By Province”. Diagram 5.29 illustrates this interpretation.

ITEM 3: “Contact Persons” – Sort Options “By Company” and/or “By Course”: Colleges (DIAGRAM 5.30)

Item 3 - “Contact persons” relating to data of employers, has a sort option “By Company” which received a 100% “very important” rating. The sort option “By Course” was also rated with a very high level of importance (93%) when the sort options “very important” and “important” were combined.

DIAGRAM 5.30
ITEM 3 : “Contact Persons” – Sort Options “By Company” and/or “By Course” : Colleges
– Sample Size : 55 Respondents

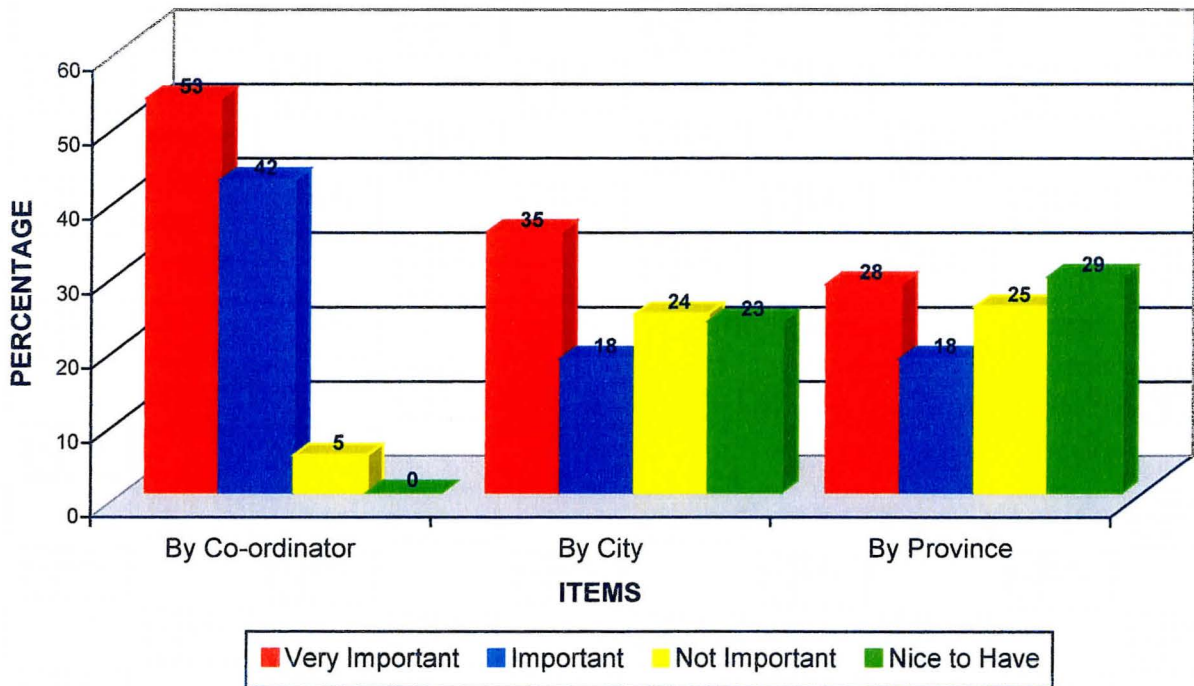


The results confirm the importance of Item 3 - “Contact persons” should be sorted “By Company” and “By Course”. Diagram 5.30 illustrates this interpretation.

**ITEM 4 : “List of Companies and Dates Visited” – Sort Options
 “By Co-ordinator” and/or “By City” and/or “By Province” : Colleges
 (DIAGRAM 5.31)**

Item 4 - “List of companies and dates visited”, has the sort options “By City”, “By Province” and “By Co-ordinator”. The two sort options “By City” and “By Province” were not rated a high level of importance when the categories “very important” and “important” were combined (53% and 46%). When the two categories, “nice to have” and “not important” were combined, the ratings were 47% and 54%. The sort option “By Co-ordinator” was rated with a conclusive 95% for high level of importance.

DIAGRAM 5.31
ITEM 4 : “List of Companies and Dates Visited” – Sort Options “By Co-ordinator” and/or “By City” and/or “By Province” : Colleges
 – Sample Size : 55 Respondents

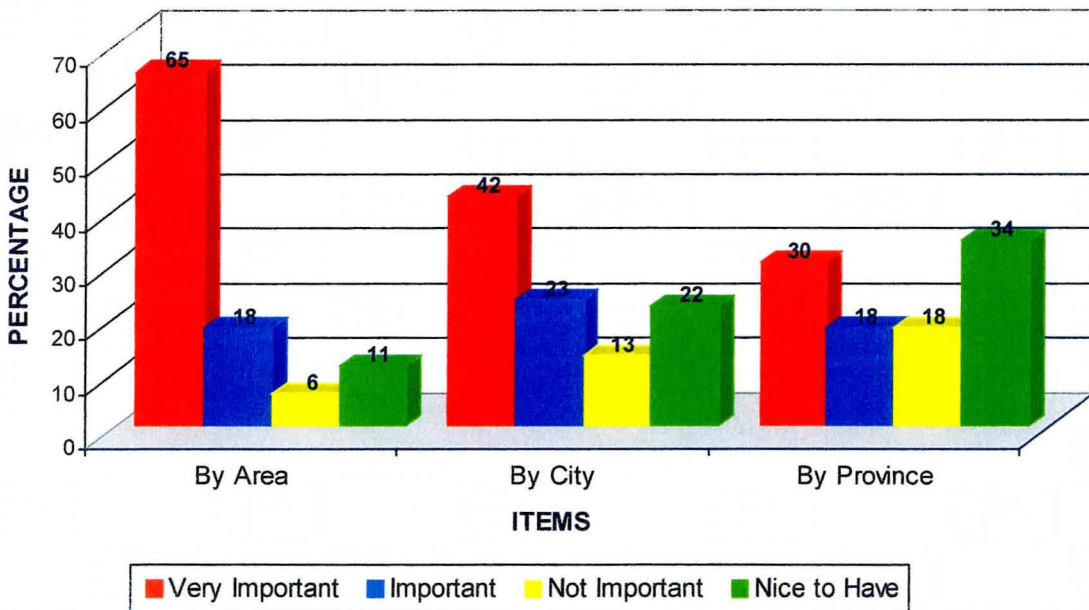


The results confirm the importance of Item 4 - “List of companies and dates visited” relating to data of employers, being sorted only “By Co-ordinator” and “By City”, not “By Province”. Diagram 5.31 illustrates this interpretation.

**ITEM 5: “List of Students Referred to a Company” – Sort Options
 “By Area” and/or “By City” and/or “By Province”: Colleges
 (DIAGRAM 5.32)**

For Item 5 - “List of students referred to a company”, the sort options “By Area” and “By City” were rated by respondents with a high level of importance. When the ratings “very important” and “important” were grouped together, the scores were 83% and 65% respectively. The sort option “By Province”, was again regarded with less importance. When the scores of “very important” and “important” were grouped, the rating was only 48% compared to 52% when the ratings of “nice to have” and “not important” were grouped.

DIAGRAM 5.32
ITEM 5 : “List of Students Referred to a Company” – Sort Options “By Area” and/or “By City” and/or “By Province” : Colleges
 – Sample Size : 55 Respondents



The results confirm the importance of Item 5 - “List of students referred to a company” relating to data for employers, being sorted “By Area” and “By City. It should thus not be sorted “By Province”. Diagram 5.32 illustrates this interpretation.

e) Conclusions of All Items Relating to Participating in Company Reports : Colleges

Table 5.10 refers to a summative merger of the separate items of the reports on companies. From Table 5.10 it is interpreted that:

- All Items 1 to 9 should be included in the management information system for co-operative education
- Items 1 to 5 should be sorted "By Course"
- Items 1, 2, 4 and 5 should be sorted "By Semester", "By City" and "By Province"
- Items 1, 2 and 5 should be further sorted "By Area"
- Item 3 should also be sorted "By Company"
- Item 4 should also be sorted "By Co-ordinator".

TABLE 5.10

Inclusion of Items and Scope of Sorting: Reports on Participating Companies Information : Colleges
 – Sample Size : 55 Respondents

ITEMS	INCLUDE	SORT ORDER						
		By Course	By Semester	By Area	By City	By Province	By Company	By Co-ordinator
1. List and history of participating company(ies)	YES	Yes	Yes	Yes	Yes	Yes	N/A	N/A
2. List of active companies	YES	Yes	Yes	Yes	Yes	Yes	N/A	N/A
3. Contact persons	YES	Yes	N/A	N/A	N/A	N/A	Yes	N/A
4. List of companies and dates visited	YES	Yes	Yes	Yes	Yes	No	N/A	N/A
5. List of students referred to a company	YES	Yes	Yes	Yes	Yes	No	N/A	N/A
6. Main activities of a company (sub-disciplines within a course)	YES	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7. Variety of placement positions within a company, in different courses	YES	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8. Accessibility of a company (road/taxi/rail)	YES	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9. Accommodation near the company	YES	N/A	N/A	N/A	N/A	N/A	N/A	N/A

To strengthen the co-operative education process, the third aspect investigated was the possibility of offering short courses relating to the co-operative education principle on the intranet.

5.4.3 Short Courses on the Intranet

Questionnaire 3(b), Table 5.11, investigated the relative importance assigned by the respondents (co-operative education lecturers from colleges responsible for co-operative education) of these items relating to the short courses required on the Intranet.

The numbers in bold and placed in boxes indicate the average in percentages, of respondents who rated the specific list as “very important”, “important”, “nice to have” or “not important”.

TABLE 5.11
Short Courses on the Intranet System : Colleges
Sample Size : 55 Respondents
QUESTIONNAIRE 3(b)
 (Values indicated in this chapter are the arithmetic mean of the raw data,
 expressed as percentages)

3(b) Short Courses on the Intranet System : Colleges	Very Important	Important	Nice to have	Not important
	%	%	%	%
1. Introduction to Co-operative Education (CE)(field, terms, concepts of CE, role and responsibilities of participants in CE)	65	30	5	0
2. Policies and Procedures of the “On-line Placement System”	65	18	12	5

3(b) Short Courses on the Intranet System : Colleges	Very Important	Important	Nice to have	Not important
	%	%	%	%

3. Communication Channels	84	11	0	5
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4. Self-assessment and Placement Preferences	72	28	0	0
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5. Compiling CV / Résumé	78	22	0	0
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6. Professional Conduct	76	12	6	6
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7. Interviewing Skills	90	10	0	0
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8. Placement Search Technologies and the Professional Conduct in the Search for a Placement	84	10	4	0
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9. Workplace Experience	96	4	0	0
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10. Keeping Up-to-date with Dynamics of Workplace (sexual harassment, conflict management, labour law)	78	16	6	0
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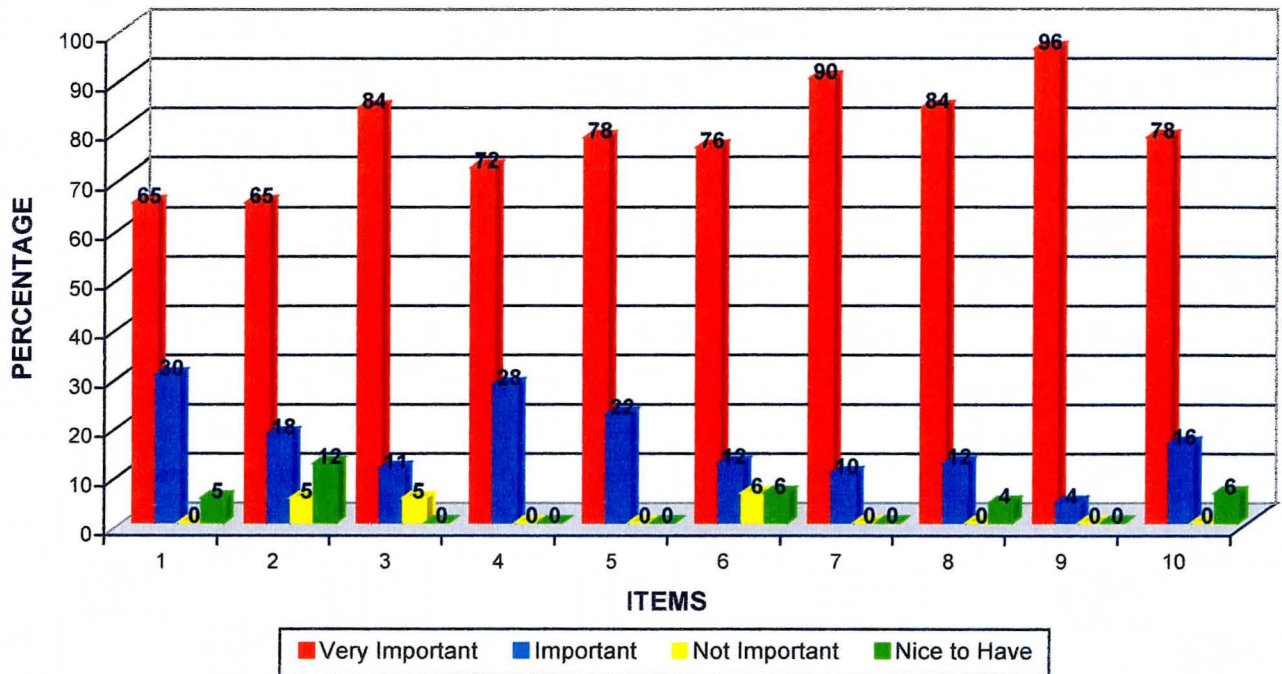
5.4.3.1 Interpretation and Synthesis of Data Relating to Reports of Short Courses Available on the Intranet System : Colleges
– **Sample Size : 55 Respondents** (Questionnaire 3(b) – ANNEXURE C)

The reports on various short courses referred to relevant short courses available on the intranet system.

a) Relative Importance of Short Courses (1 to 10) Available on the Intranet System: Colleges (DIAGRAM 5.33)

All short courses were regarded by the majority of respondents as of relatively high in importance. When the categories “very important” and “important” were grouped together, short course 4 - “Self-assessment and placement preferences”, short course 5 - Compiling a CV/résumé”, short course 7 - “Interviewing skills”, and short course 9 - “Workplace experience”, were regarded by all (100%) respondents as “very important”. Short course 2 - “Policies and procedures of the on-line placement system”, received the lowest combined rating of 83%. Short course 2 - “Policies and procedures of the on-line placement system”, was only rated a very low 12% for the sort order “nice to have” by respondents.

DIAGRAM 5.33
Relative Importance of Short Courses (One to Ten) Available on
the Intranet System : Colleges
 – Sample Size : 55 Respondents



SHORT COURSES AVAILABLE ON THE INTRANET SYSTEM : Colleges

- | | |
|--|--|
| 1. Introduction to co-operative education | 6. Professional conduct |
| 2. Policies and procedures of the "On-line Placement System" | 7. Interviewing skills |
| 3. Communication channels | 8. Placement search technologies and the professional conduct in the search for a placement |
| 4. Self-assessment and placement preferences | 9. Workplace experience |
| 5. Compiling CV/Résumé | 10. Keeping up-to-date with dynamics of workplace (sexual harassment, conflict management, labour law) |

The results confirm the importance of all ten short courses on the intranet system as reported by respondents of various colleges. Diagram 5.33 illustrates this interpretation.

b) Conclusions of All Short Courses Available on the Intranet System : Colleges

Table 5.12 provides a summative merger of the separate short courses available on the intranet system of co-operative education. From Table 5.12 it is concluded that:

- All short courses listed in Table 5.12 above should be included in the management information system for co-operative education.

TABLE 5.12

Inclusion of Short Courses Available on the Intranet System : Colleges

– Sample Size : 55 Respondents

SHORT COURSES	INCLUDE COURSE
1. Introduction to co-operative education (field, terms, concepts of co-operative education, role and responsibilities of participants in co-operative education)	Yes
2. Policies and procedures of the “On-line Placement System”	Yes
3. Communication channels	Yes
4. Self-assessment and placement preferences	Yes
5. Compiling CV/Résumé	Yes
6. Professional conduct	Yes
7. Interviewing skills	Yes
8. Placement search technologies and professional conduct in the search for a placement	Yes
9. Workplace experience	Yes
10. Keeping up-to-date with dynamics of workplace (sexual harassment, conflict management, labour law)	Yes

5.5 RESULTS FROM INTERNATIONAL UNIVERSITIES

The third sub-group investigated was the respondents attached to universities internationally (i.e., outside South Africa). All universities administer co-operative education programmes, and are affiliated to the World Association for Co-operative Education.

To be able to draw some comparison between the South African requirements of a management information system for co-operative education, and systems in some of the established co-operative education systems in use internationally, the results recorded in Chapter 4, are now discussed in detail.

5.5.1 Students' Reports (Student Information)

Questionnaire 1(c), Table 5.13, investigated the importance assigned by co-operative education lecturers responsible for co-operative education at international universities to the various items of the student information.

The numbers in bold and placed in boxes indicate the average (expressed as percentages), of respondents who rated the specific list as "very important", "important", "nice to have" or "not important".

TABLE 5.13**Students' Reports : International Universities**

Sample Size : 77 Respondents

QUESTIONNAIRE 1(c)

(Values indicated in this chapter are the arithmetic mean of the raw data, expressed as percentages)

1(c) Students' Reports : International Universities	Very Important	Important	Nice to have	Not important
	%	%	%	%
1. List of Students Applying to be Placed	56	22	11	11
2. List of Students Applying to be Placed, but not Qualifying	43	14	29	14
3. List of Students Qualifying to be Placed	75	13	0	12
4. List of Students Referred for Placement	22	45	22	11
5. List of Students Placed by Company	78	11	11	0
6. List of Students Registered After Placement	70	20	0	10
7. List of Students Placed, but not Registered by Company	70	20	0	10
8. List of Students and Dates Visited by Co-ordinator	50	30	20	0

1(c) Students' Reports : International Universities	Very Important	Important	Nice to have	Not important
	%	%	%	%

9. List of Students Progress Marks and Final Marks	80	20	0	0
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10. Summative Report by Student on All Aspects of Experiential Learning	88	12	0	0
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5.5.1.1 Interpretation and Synthesis of Data Relating to Students' Reports: International Universities – Sample Size : 77 Respondents (Questionnaire 1(c) - ANNEXURE D)

These reports referred to all relevant data of students registered in co-operative education courses, data such as demographic information, field of study, study progress, placement progress, interests in specific sub-disciplines within their field of study, and short courses completed on the intranet system.

The 77 respondents reported surprisingly similar views to the respondents from South African Colleges, despite differences in their situations.

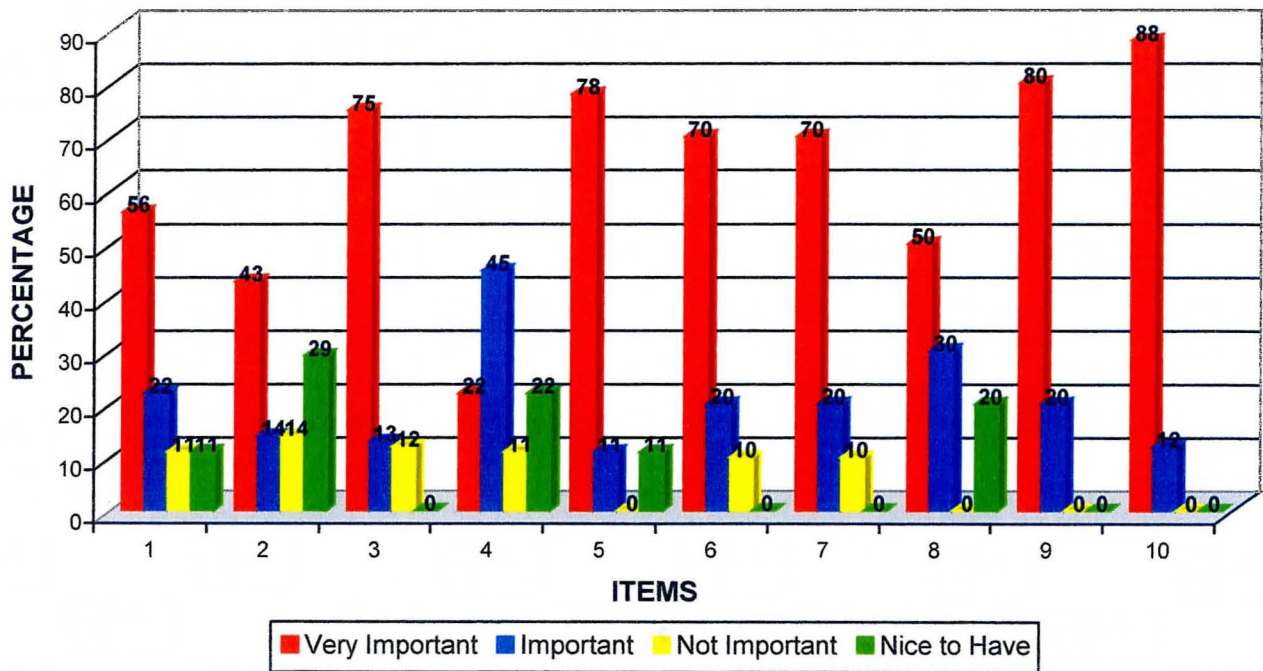
a) Relative Importance of Items Relating to Students' Reports: International Universities (DIAGRAM 5.34)

When the categories "very important" and "important" were grouped together, respondents rated all items with a relative high level of importance.

Two items received a score of 100% - Item 9 - "List of students progress marks and final marks", and Item 10 - "Summative report by student on all aspects of experiential learning". They can thus be regarded as the most important items in the list of students' reports. Both Items 6 and 7 - "List of students registered after placement", and "List of students placed, but not registered by company", were rated important by 90% of respondents. Item 3 - "List of students qualifying to be placed", and Item 5 - "List of students placed by company", were also rated with a relatively high level of importance (88% and 89% respectively). Likewise, Item 8 - List of students and dates visited by co-ordinator, was rated with a high level of importance (80% - "very important" and "important" combined), whereas 20% of respondents regarded it as "nice to have". Although Item 1 - "List of students applying to be placed", was still regarded as relatively important (78% - "very important" and "important" combined), 11% of respondents reported it as both "nice to have" and "not important".

Item 2 - "List of students applying to be placed, but do not qualify", and Item 4 - "List of students referred for placement", were rated a relatively low level of importance (57% and 67% respectively). It should, however, still be regarded as important, since both items were also rated by a low percentage of respondents as "nice to have" (29% and 22% respectively).

DIAGRAM 5.34
Relative Importance of Items Relating to Students' Reports: International Universities
 – Sample Size : 77 Respondents



ITEMS RELATING TO STUDENTS' REPORTS : International Universities

- | | |
|---|---|
| 1. List of students applying to be placed | 6. List of students registered after placement |
| 2. List of students applying to be placed, but do not qualify | 7. List of students placed, but not registered by company |
| 3. List of students qualifying to be placed | 8. List of students and dates visited by co-ordinator |
| 4. List of students referred for placement | 9. List of students progress and final marks |
| 5. List of students placed by company | 10. Report on student history of all aspects of EL |

The results confirm the importance of all 10 Items for the lists of data relating to students. Diagram 5.34 illustrates this interpretation.

5.5.2 Employer Reports

Questionnaire 2(c), Table 5.14, investigated the importance assigned by the respondents (co-operative education lecturers responsible for co-operative education from international universities) to each of the items relating to the abovementioned topic.

The numbers in bold and placed in boxes indicate the average (expressed as a percentage), of respondents who rated the specific list as “very important”, “important”, “nice to have” or “not important”.

TABLE 5.14

Reports on Companies : International Universities
Sample Size : 77 Respondents

QUESTIONNAIRE 2(c)

(Values indicated in this chapter are the arithmetic mean of the raw data, expressed as percentages)

2(c) Reports on Companies : International Universities	Very Important	Important	Nice to have	Not important
	%	%	%	%
1. List and History of Participating Company(ies)	56	12	32	0
2. List of Active Companies	56	11	33	0
3. Contact Persons	90	10	0	0
4. List of Companies and Dates Visited	50	30	20	0
5. List of Students Referred to a Company	23	44	0	33

2(c) Reports on Companies : International Universities	Very Important	Important	Nice to have	Not important
	%	%	%	%
6. Main Activities of a Company (sub-disciplines within a course)	29	71	0	0
7. Variety of Placement Positions within a Company, in Different Courses	44	34	11	11
8. Accessibility of a Company (By Road/By Taxi/By Rail)	38	13	38	11
9. Accommodation Near the Company	38	11	25	26

5.5.2.1 Interpretation and Synthesis of Data Relating to Reports on Information of Participating Co-operative Education Employers : International Universities – Sample Size : 77 Respondents (Questionnaire 2(c) – ANNEXURE D)

These reports referred to all relevant data of employers participating in co-operative education, data such as demographics of companies, and students placed and visited in all disciplines. The responses to Questionnaire 2(c) as reported in this chapter indicated a relatively uniform approach to co-operative education.

**a) Relative Importance of Items (1 to 9) Relating to Reports of Participating Employers : International Universities
(DIAGRAM 5.35)**

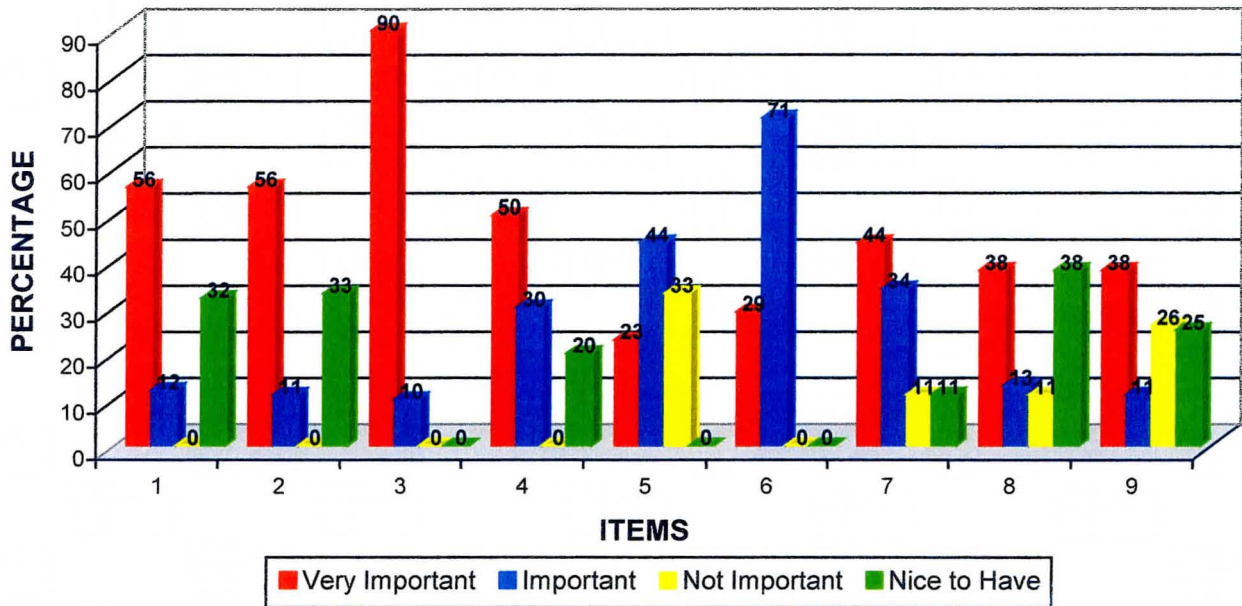
The options of "very important" and "important" were grouped together. A relatively low level of importance was attributed by respondents to all items except Item 8 - "Accessibility of a company" - 51%, and Item 9 - "Accommodation near the company" - 49%. Item 3 - "Contact persons", and Item 6 - "Main activities of a company, sub-disciplines within a course", were both regarded by respondents to be of a high level of importance (100%), and can thus be regarded as the most important items for the list of reports on companies.

Items 1 - "List and history of participating companies", Item 2 - "List of active companies", Item 4 - "List of companies and dates visited", Item 8 - "Accessibility of a company", and Item 9 - "Accommodation near the company", received significant response for "nice to have" (32%, 33%, 20%, 38% and 25% respectively). Item 5 - "List of students referred to a company", was indicated as "not important" by 33% of respondents.

Item 7 - "Variety of placement positions within a company, in different courses" was given a high (78%) level of importance when "very important" and "important" were grouped together. 11% of respondents regarded it as both "nice to have" and "not important".

DIAGRAM 5.35
Relative Importance of Items (One to Nine) Relating to Reports of
Participating Employers : International Universities

- Sample Size : 77 Respondents



ITEMS RELATING TO REPORTS ON COMPANIES : International Universities

- | | |
|---|--|
| 1. List and history of participating company(ies) | 6. Main activities of a company (sub-disciplines within a course) |
| 2. List of active companies | 7. Variety of placement positions within a company, in different courses |
| 3. Contact persons | 8. Accessibility of a company (road/taxi/rail) |
| 4. List of companies and dates visited | 9. Accommodation near the company |
| 5. List of students referred to a company | |

The results confirm the importance of Items 1 to 8 for the lists of data relating to participating co-operative education employers. Item 9 - "Accommodation near company", with a total - "very important and important" - of less than 50% (49%) and a "nice to have and not important", of more than 50% (51%), should thus not be included. Diagram 5.35 illustrates this interpretation.

5.5.3 Short Courses Available on the Intranet System

Questionnaire 3(c), Table 5.15, investigated the relative importance assigned by the respondents (co-operative education lecturers from international universities responsible for co-operative education) to the items relating to the short courses available on the Intranet.

The numbers in bold and placed in boxes indicate the average (expressed as a percentage), of respondents who rated the specific list as “very important”, “important”, “nice to have” or “not important”.

TABLE 5.15
Short Courses on the Intranet System : International Universities
 Sample Size : 77 Respondents

QUESTIONNAIRE 3(c)

(Values indicated in this chapter are the arithmetic mean of the raw data,
 expressed as percentages)

3(c) Short Courses on the Intranet System : International Universities	Very Important	Important	Nice to have	Not important
	%	%	%	%
1. Introduction to Co-operative Education (CE) (field, terms, concepts of CE, role and responsibilities of participants in CE)	29	43	0	28
2. Policies and Procedures of the “On-line Placement System”	34	44	11	11
3. Communication Channels	50	13	25	12

3(c) Short Courses on the Intranet System : International Universities	Very Important	Important	Nice to have	Not Important
	%	%	%	%
4. Self-assessment and Placement Preferences	38	25	37	0
5. Compiling CV / Résumé	25	38	0	37
6. Professional Conduct	45	33	11	11
7. Interviewing Skills	22	67	11	0
8. Workplace Ethics	33	56	0	11
9. Career Exploration/Mobility	56	33	11	0

5.5.3.1 Interpretation and Synthesis of Data Relating to Reports on Short Courses Available on the Intranet System : International Universities (Questionnaire 3(c) – ANNEXURE D)

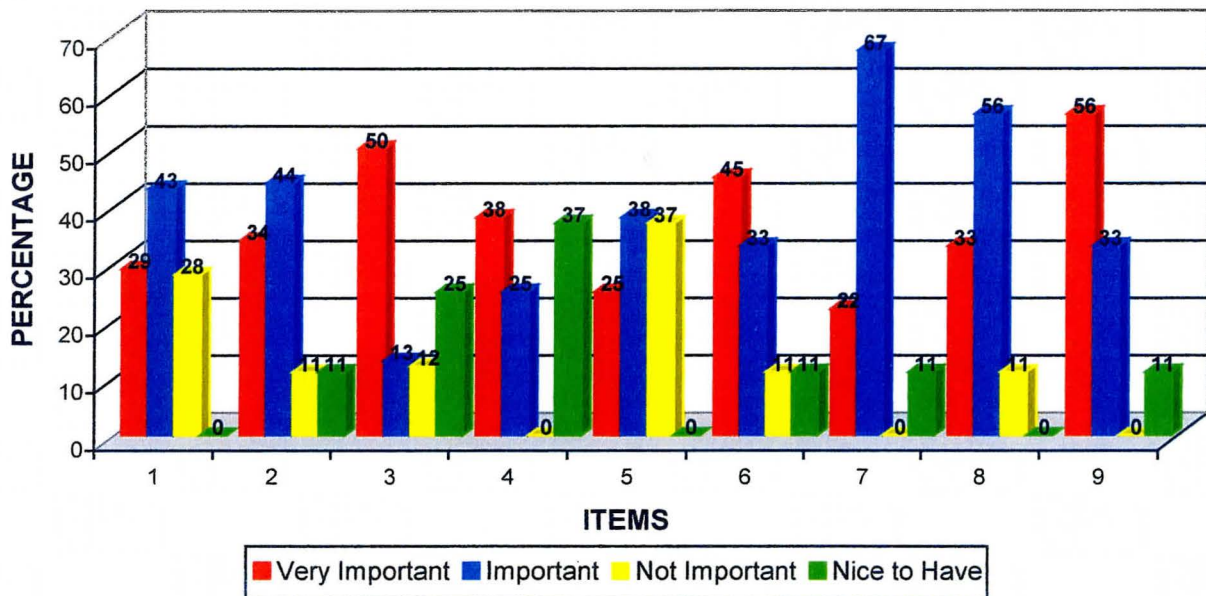
The reports on various short courses referred to relevant short courses available on the intranet system.

a) Relative Importance of Short Courses (One to Nine) Available on the Intranet System : International Universities (DIAGRAM 5.36)

The options “very important” and “important” were grouped together for all nine short courses. Short course 7 - “Interviewing skills” - 89%,

short course 8 - "Workplace ethics" - 89%, and short course 9 - "Career exploration/mobility" - 89%, received the highest level of support. Short course 5 - "Compiling CV/Résumé", was given a relatively high ranking, of "not important" (37%); 63% of the respondents regarded it as relatively important when combining "very important" and "important". A clear majority of respondents regarded all the short courses as important.

DIAGRAM 5.36
Relative Importance of Short Courses (One to Nine) Available on the Intranet System : International Universities
 - Sample Size : 77 Respondents



SHORT COURSES AVAILABLE ON THE INTRANET SYSTEM : International Universities

- | | |
|--|--------------------------------|
| 1. Introduction to co-operative education | 6. Professional conduct |
| 2. Policies and procedures of the "On-line Placement System" | 7. Interviewing skills |
| 3. Communication channels | 8. Workplace experience |
| 4. Self-assessment and placement preferences | 9. Career exploration/mobility |
| 5. Compiling CV/Résumé | |

The results confirm the importance of all nine short courses for the lists of short courses available on the intranet system. Diagram 5.36 illustrates this interpretation.

5.6 SUMMATIVE EVALUATION OF RESPONSES FROM SOUTH AFRICAN TECHNIKONS, COLLEGES AND INTERNATIONAL UNIVERSITIES

The final sub-group investigated was a summary of the reactions of respondents attached to technikons, colleges and international universities as a combined group.

Tables 5.16 (pp.236-240), 5.18 (pp.246-249) and 5.20 (pp.256-257) reflects all the data obtained from the research (technikons, colleges and international universities) collectively. The contents of this table are discussed in detail in this chapter (Interpretation of Data and Synthesis) Section 5.6, pp.234-259 and Chapter 6 (Conclusions and Recommendations) Section 6.2, pp.262-266 and Section 6.3, pp.267-283.

5.6.1 Introduction to Average Values Calculated for Students' Reports : South African Technikons, Colleges & International Universities

From the results listed in Table 5.16 (pp.236-240), a summary of all the responses from co-operative education lecturers from technikons, colleges and international universities, it can be construed that the items as identified with the pilot study and the final questionnaires reflected the items most important to be included in the management information system. Comparing the responses from both technikons and colleges with the international group (the control group with the established experience in operating with a management information system for co-operative education), the instrument upholds the tests for validity, credibility, transferability and confirmability.

From the results listed in Table 5.16 (pp.236-240), it is clear that for all items except Item 2, technikons and colleges reflect a high positive similarity with one another. For Item 2 - "List of Students Applying to be Placed but not

Qualifying”, a negative correlation is reflected (“very important” and “important” combined, technikons reflects 54% and colleges 42%). The qualitative responses indicate that in some courses of certain colleges, students do not have to “qualify” to be placed - hence the “lesser important” and subsequent negative correlation.

The numbers in bold and placed in boxes indicate the average, in percentages, of respondents who rated the specific list as “very important”, “important”, “nice to have” or “not important”.

5.6.1.1 Average Values Calculated for Students’ Reports : South African Technikons, Colleges & International Universities
(Refer to TABLE 5.16)

The content of both Tables 5.2 (pp.162-163 – technikons, 73 respondents), Table 5.8 (p.203 – colleges, 55 respondents) and Section 5.5.1.1(a) (pp.224-226 - international universities, 77 respondents), is combined in Table 5.16 (pp.236-240).

TABLE 5.16

Average Values Calculated for Students' Reports : South African Technikons, Colleges & International Universities

(Values indicated in this chapter are the arithmetic mean of the raw data, expressed as percentages)

(a) Students' Reports	Very Important			Important			Nice to have			Not important		
	%			%			%			%		
	Technikons	Colleges	International	Technikons	Colleges	International	Technikons	Colleges	International	Technikons	Colleges	International
1. List of Students Applying to be Placed :	58	63	56	42	21	22	0	12	11	0	4	11
Sort : By Course	83	100	-	17	0	-	0	0	-	0	0	-
By Semester	79	59	-	21	24	-	0	11	-	0	6	-
By Area	3	30	-	25	40	-	72	24	-	0	6	-
By City	4	18	-	27	24	-	69	29	-	0	29	-
By Province	3	12	-	27	30	-	70	29	-	0	29	-
2. List of Students Applying to be Placed, but not Qualifying:	28	16	43	36	26	14	36	10	29	0	48	14
Sort : By Course	81	30	-	19	24	-	0	6	-	0	40	-
By Semester	80	18	-	20	18	-	0	18	-	0	46	-
By Semester	2	0	-	79	36	-	19	6	-	0	58	-

(a) Students' Reports	Very Important			Important			Nice to have			Not important		
	%			%			%			%		
	Technikons	Colleges	International	Technikons	Colleges	International	Technikons	Colleges	International	Technikons	Colleges	International
By Area	4	0	-	76	30	-	20	12	-	0	58	-
By City	3	0	-	78	18	-	19	24	-	0	58	-
By Province												

3. List of Students Qualifying to be Placed:	59	70	75	25	14	13	8	10	0	8	6	12
Sort : By Course	79	94	-	21	0	-	0	0	-	0	6	-
By Semester	83	72	-	17	12	-	0	6	-	0	10	-
By Area	5	42	-	69	30	-	21	24	-	5	4	-
By City	4	42	-	71	12	-	19	24	-	6	22	-
By Province	6	24	-	68	30	-	22	24	-	4	22	-

4. List of Students Referred for Placement:	50	68	22	36	14	45	7	10	22	7	8	11
Sort : By Course	83	94	-	17	0	-	0	0	-	0	6	-
By Semester	81	70	-	19	12	-	0	6	-	0	12	-
By Area	6	40	-	73	30	-	15	24	-	6	6	-

(a) Students' Reports	Very Important			Important			Nice to have			Not important		
	%			%			%			%		
	Technikons	Colleges	International	Technikons	Colleges	International	Technikons	Colleges	International	Technikons	Colleges	International
By City	4	40	-	71	12	-	22	24	-	3	24	-
By Province	6	24	-	74	30	-	15	22	-	5	24	-

5. List of students Placed by Company:	100	73	78	0	10	11	0	5	11	0	4	0
Sort : By Course	81	100	-	19	0	-	0	0	-	0	0	-
By Semester	83	60	-	17	12	-	0	0	-	0	28	-
By Area	68	60	-	14	18	-	12	16	-	6	6	-
By City	64	48	-	17	6	-	17	16	-	2	30	-
By Province	67	36	-	13	18	-	14	12	-	6	34	-

6. List of Students Registered After Placement:	55	38	70	27	24	20	18	7	0	0	31	10
Sort : By Course	84	67	-	16	13	-	0	0	-	0	20	-
By Semester	81	33	-	19	20	-	0	7	-	0	40	-
By Area	5	13	-	76	40	-	12	13	-	3	34	-
By City	4	13	-	84	20	-	6	20	-	0	47	-

(a) Students' Reports	Very Important			Important			Nice to have			Not important		
	%			%			%			%		
	Technikons	Colleges	International	Technikons	Colleges	International	Technikons	Colleges	International	Technikons	Colleges	International
By Province	6	13	-	69	13	-	21	27	-	3	47	-

7. List of Students Placed, but not Registered by Company:	64	48	70	18	12	20	18	7	0	0	33	10
Sort : By Course	86	79	-	14	0	-	0	0	-	0	21	-
By Semester	81	43	-	19	7	-	0	7	-	0	43	-
By Area	5	21	-	79	29	-	12	14	-	4	36	-
By City	4	7	-	82	7	-	14	36	-	0	50	-
By Province	6	7	-	69	14	-	20	29	-	5	50	-

8. List of Students and Dates Visited by Co-ordinator:	73	50	50	27	22	30	0	14	20	0	14	0
Sort : By Course	83	63	-	17	25	-	0	6	-	0	6	-
By Semester	82	50	-	18	19	-	0	6	-	0	25	-
By Area	76	38	-	14	19	-	7	31	-	3	12	-
By City	81	25	-	16	19	-	3	25	-	0	31	-
By Province	74	6	-	15	18	-	7	38	-	4	38	-

(a) Students' Reports	Very Important			Important			Nice to have			Not important		
	%			%			%			%		
	Technikons	Colleges	International	Technikons	Colleges	International	Technikons	Colleges	International	Technikons	Colleges	International

9. List of Students' Progress Marks and Final Marks:	82	70	80	18	11	20	0	6	0	0	13	0
Sort : By Course	88	100	-	12	0	-	0	0	-	0	0	-
By Semester	86	80	-	14	13	-	0	0	-	0	7	-
By Area	4	33	-	72	20	-	20	13	-	4	34	-
By City	6	33	-	81	0	-	13	33	-	0	34	-
By Province	3	0	-	71	7	-	19	40	-	7	53	-

10. Summative Report by Student on All Aspects of Experiential Learning e.g.:	91	79	88	9	9	22	0	6	0	0	6	0
Sort : Referred	86	88	-	14	12	-	0	0	-	0	0	-
Placed	89	88	-	11	0	-	0	0	-	0	12	-
Visited	82	58	-	18	24	-	0	12	-	0	6	-
Work Reports	88	76	-	12	6	-	0	12	-	0	6	-

5.6.1.2 Inclusion of Students' Reports as Reflected by South African Technikons, Colleges and International Universities

(Refer to TABLE 5.17)

The data in Table 5.17, pp.243-244 indicate that all respondents regard all 10 items to be of importance.

5.6.1.3 Sort Options of Students' Reports as Reflected by South African Technikons, Colleges and International Universities

(a) Sort option "By Course"

- All nine items relating to student data indicate the preference to be sorted "By Course" by both technikon and college respondents.

(b) Sort option "By Semester"

- All items except Item 2 - "List of students applying to be placed, but not qualifying", indicate the preference to be sorted "By Semester" by both technikon and college respondents. Item 2 indicated a preferred sort option of "By Semester" by technikon respondents, but not by college respondents.

(c) Sort option "By Area"

- Item 1 - "List of students applying to be placed": a sort option "By Area" was preferred by college respondents, but not by technikon respondents.

- Item 2 - "List of students applying to be placed, but not qualifying": a sort option of "By Area" was preferred by technikon respondents, but not by college respondents.
- Items 3, 4, 5, 6, 7, 8 and 9: both technikon and college respondents indicated the preferred sort option "By Area".

(d) Sort options "By City" and "By Province"

- Item 1 - "List of students applying to be placed": sort options "By City" and "By Province" was not the preference of both technikon and college respondents.
- Items 2, 6, 7, 8 and 9: sort options "By City" and "By Province" were preferred by technikon respondents, but not by college respondents.
- Items 3, 4 and 5: both technikon and college respondents indicated a preference for sort option "By City".

(e) Report of Students' Co-operative Education History

- For Item 10 - "Report of student history on all aspects of experiential learning", the sort options, "Referred, Placed, visited and Work Reports" were all preferred by both technikon and college respondents.

TABLE 5.17

Inclusion of Students' Reports as Reflected by South African Technikons, Colleges and International Universities

(Respondents - Technikons : 73, Colleges : 55 & International Universities : 77)

ITEMS	INCLUDE			By Course		By Semester		By Area		By City		By Province		Referred		Placed		Visited		Work Reports	
	Technikons	Colleges	International	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges
1. List of students applying to be placed	Y	Y	Y	Y	Y	Y	Y	N	Y	N	N	N	N	-	-	-	-	-	-	-	-
2. List of students applying to be placed, but not qualifying	Y	Y	Y	Y	Y	Y	N	Y	N	Y	N	Y	N	-	-	-	-	-	-	-	-
3. List of students qualifying to be placed	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-
4. List of students referred for placement	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-
5. List of students placed by company	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-
6. List of students registered after placement	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	-	-	-	-	-	-	-	-
7. List of students placed, but not registered	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	-	-	-	-	-	-	-	-

TABLE 5.17

Inclusion of Students' Reports as Reflected by South African Technikons, Colleges and International Universities

(Respondents - Technikons : 73, Colleges : 55 & International Universities : 77)

ITEMS	INCLUDE			By Course		By Semester		By Area		By City		By Province		Referred		Placed		Visited		Work Reports		
	Technikons	Colleges	International	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges	
by company																						
8. List of students and dates visited by co-ordinator	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	-	-	-	-	-	-	-	-	-
9. List of students progress and final marks	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	-	-	-	-	-	-	-	-	-
10. Report of student history on all aspects of experiential learning	Y	Y	Y	-	-	-	-	-	-	-	-	-	-	Y	Y	Y	Y	Y	Y	Y	Y	Y

5.6.2 Introduction to Average Values Calculated for Reports on Participating Companies : South African Technikons, Colleges & International Universities

From the results listed in Table 5.18, pp.246-249, a summary of all the responses from co-operative education lecturers of technikons, colleges and international universities on companies participating in co-operative education, all items from technikons and colleges reflect a high positive correlation.

Comparing the responses from both technikons and colleges with the international group, the instrument upholds the tests for validity, credibility, transferability and conformability.

The numbers in bold and placed in boxes indicate the average, in percentages, of respondents who rated the specific list as "very important", "important", "nice to have" or "not important".

5.6.2.1 Average Values Calculated for Reports on Participating Companies : South African Technikons, Colleges & International Universities (Refer to TABLE 5.18)

The content of both Tables 5.4 (p.172 – technikons, 73 respondents) and Table 5.10 (p.216 – colleges, 55 respondents) and Section 5.5.2 (pp.227-228 - international universities, 77 respondents), is combined in Table 5.18 (pp.246-249).

TABLE 5.18

Average Values Calculated for Reports on Participating Companies : South African Technikons, Colleges & International Universities

(Values indicated in this chapter are the arithmetic mean of the raw data, expressed as percentages)

(b) Reports on Companies	Very Important			Important			Nice to have			Not important		
	%			%			%			%		
	Technikons	Colleges	International	Technikons	Colleges	International	Technikons	Colleges	International	Technikons	Colleges	International
1. List and History of Participating Company(ies):	<u>45</u>	<u>80</u>	<u>56</u>	<u>55</u>	<u>6</u>	<u>12</u>	<u>0</u>	<u>0</u>	<u>32</u>	<u>0</u>	<u>14</u>	<u>0</u>
Sort : By Course	87	100	-	13	0	-	0	0	-	0	0	-
By Semester	85	59	-	15	12	-	0	0	-	0	29	-
By Area	78	82	-	15	0	-	7	12	-	0	6	-
By City	82	59	-	16	12	-	2	6	-	0	23	-
By Province	72	48	-	15	18	-	10	18	-	3	16	-
2. List of Active Companies:	<u>73</u>	<u>83</u>	<u>56</u>	<u>27</u>	<u>6</u>	<u>11</u>	<u>0</u>	<u>0</u>	<u>33</u>	<u>0</u>	<u>11</u>	<u>0</u>
Sort : By Course	95	100	-	5	0	-	0	0	-	0	0	-

(b) Reports on Companies		Very Important			Important			Nice to have			Not important		
		%			%			%			%		
		Technikons	Colleges	International	Technikons	Colleges	International	Technikons	Colleges	International	Technikons	Colleges	International
By Semester	94	65	-	6	12	-	0	0	-	0	23	-	
By Area	83	77	-	15	12	-	2	5	-	0	6	-	
By City	87	54	-	13	12	-	0	12	-	0	22	-	
By Province	84	48	-	13	17	-	3	17	-	0	18	-	

3. Contact Persons:	91	91	90	9	6	10	0	0	0	0	3	0
Sort : By Company	98	100	-	2	0	-	0	0	-	0	0	-
By Course	93	82	-	7	11	-	0	0	-	0	7	-

4. List of Companies and Dates Visited:	64	65	50	36	30	30	0	0	20	0	5	0
Sort : By Co-ordinator	91	53	-	9	42	-	0	0	-	0	5	-
By Course	93	77	-	7	18	-	0	0	-	0	5	-
By Semester	92	47	-	8	30	-	0	0	-	0	23	-
By City	27	35	-	73	18	-	0	23	-	0	24	-

(b) Reports on Companies	Very Important			Important			Nice to have			Not important		
	%			%			%			%		
	Technikons	Colleges	International	Technikons	Colleges	International	Technikons	Colleges	International	Technikons	Colleges	International
By Province	27	27	-	68	18	-	5	29	-	0	25	-

5. List of Students Referred to a Company:	62	73	23	38	15	44	0	2	0	0	0	33
Sort : By Course	82	84	-	18	12	-	0	4	-	0	0	-
By Semester	85	59	-	15	18	-	0	0	-	0	23	-
By Area	9	65	-	81	18	-	0	11	-	0	6	-
By City	79	42	-	21	23	-	0	22	-	0	13	-
By Province	15	30	-	76	18	-	9	34	-	0	18	-

6. Main Activities of a Company (sub-disciplines within a course)	70	88	29	30	12	71	0	0	0	0	0	0
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7. Variety of Placement Positions within a Company, in Different Courses	80	58	34	20	17	34	0	12	11	0	13	11
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(b) Reports on Companies	Very Important			Important			Nice to have			Not important		
	%			%			%			%		
	Technikons	Colleges	International	Technikons	Colleges	International	Technikons	Colleges	International	Technikons	Colleges	International

8. Accessibility of a Company (By Road/By Taxi/By Rail)	90	65	38	10	24	13	0	11	38	0	0	11
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9. Accommodation Near the Company	80	59	38	20	17	11	0	24	25	0	0	26
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5.6.2.2 Inclusion of Reports on Participating Companies as Reflected by South African Technikons, Colleges and International Universities (Refer to TABLE 5.19)

The data in Table 5.19, pp.252-253, indicates indisputably the importance of eight of the nine items for all respondents. Item 9 - "Accommodation near the company", is indicated as an important item for the technikon and college respondents, but not for respondents from international universities.

5.6.2.3 Sort Options of Reports on Participating Companies as Reflected by South African Technikons, Colleges and International Universities

Only the first five items could be sorted by various sort options (see Table 5.19, pp.252-253).

(a) Sort option "By Course"

- The first five items relating to the company data indicates a preference to be sorted "By Course" by both technikon and college respondents.

(b) Sort options "By Semester" and "By City"

- Only Items 1, 2, 4 and 5 offered the sort options "By Semester" and "By City". Respondents from both technikons and colleges indicated a preference for the sort option "By Semester" and "By City".

(c) Sort option "By Area"

- Only Items 1, 2 and 5 offered the sort option "By Area".

- Respondents from both technikons and colleges indicated a preference for the sort option "By Area".

(d) Sort option "By Province"

- Only Items 1, 2, 4 and 5 could be sorted "By Province".
- Respondents from both technikons and colleges indicated a preference for the sort option "By Province" for Items 1 - "List and history of participating company(ies)" and Item 2 - "List of active companies").
- For Items 4 - "List of companies and dates visited", and Item 5 - "List of students referred to a company"; respondents from technikons but not from colleges indicated a preference for this sort option.

(e) Sort option "By Company"

- Only Item 3 - "Contact persons", could be sorted "By Company" and respondents from both technikons and colleges indicated a preference for this sort option.

(f) Sort option "By Co-ordinator"

- Only Item 4 - "List of companies and dates visited" could be sorted "By Co-ordinator". Respondents from both technikons and colleges indicated a preference for this sort option.

TABLE 5.19

Inclusion of Reports on Participating Companies Relating to All Items as Reflected by South African Technikons, Colleges and International Universities

(Respondents - Technikons : 73, Colleges : 55 & International Universities : 77)

ITEMS	INCLUDE			By Course		By Semester		By Area		By City		By Province		By Company		By Co-ordinator	
	Technikons	Colleges	International	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges
1. List and history of participating company(ies)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-
2. List of active companies	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-
3. Contact persons	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	Y	Y	-	-
4. List of companies and dates visited	Y	Y	Y	Y	Y	Y	Y	-	-	Y	Y	Y	N	-	-	Y	Y
5. List of students referred to a company	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	-	-	-	-
6. Main activities of a company (sub-disciplines within a	Y	Y	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 5.19

Inclusion of Reports on Participating Companies Relating to All Items as Reflected by South African Technikons, Colleges and International Universities

(Respondents - Technikons : 73, Colleges : 55 & International Universities : 77)

ITEMS	INCLUDE			By Course		By Semester		By Area		By City		By Province		By Company		By Co-ordinator	
	Technikons	Colleges	International	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges	Technikons	Colleges
course)																	
7. Variety of placement positions within a company, in different courses	Y	Y	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8. Accessibility of a company (road/taxi/rail)	Y	Y	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9. Accommodation near the company	Y	Y	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-

5.6.3 Introduction to Average Values Calculated for Short Courses Available on the Intranet System : South African Technikons, Colleges & International Universities

From the results listed in Table 5.20, pp.256-257, a summary of all the responses from co-operative education lecturers of technikons, colleges and international universities were combined on the "Short Courses on the Intranet System".

When the categories "very important" and "important" were grouped together, Items 1 to 10 are reported by technikons and colleges with a high level of importance. The international universities reported Item 7 – "Interviewing Skills", Item 8 – "Workplace Ethics", and Item 9 – "Career Exploration/Mobility", as "very important". Item 1 – "Introduction to Co-operative Education", Item 2 – "Policies and Procedures of the On-line Placement System", and Item 6 – "Professional Conduct", were reported with a relatively high level of importance. Item 3 – "Communication Channels", Item 4 – "Self-assessment and Placement Preferences", and Item 5 – "Compiling CV/Résumé" were reported as lesser important.

From these data it can be seen that the respondents from the technikons hold a general consensus about the requirements for information relating to the students, the participating employers, and the short courses available on the Intranet. The fact that differences do appear may reflect, amongst other things, the honesty and dedication of the respondents, as well as the impact of the existing managing systems (centralised, decentralised or integrated systems). The results, however, offer clear guidance as to the general requirements of a management information system for co-operative education for technikons.

From the data gathered from the college respondents, it is clear that in general, their requirements coincide with those of the technikons. It would appear that if a system is developed to suite technikon requirements, it will more than fulfill the requirements of colleges. The diversity of responses amongst the

respondents from colleges may be ascribed to the diversity of the number and types of courses offered by colleges, as well as their individual missions.

The data captured from international respondents (i.e., outside South Africa), certainly reinforced the general scope of vision for the management information system for co-operative education in South Africa. As a developing nation, South Africa needs to develop several areas; amongst them, education and specifically, co-operative education. Comparing the proposed management information system for co-operative education in South Africa with the established systems in use in several other countries, verifies the validity of the research.

5.6.3.1 Average Values Calculated for Short Courses Available on the Intranet System : South African Technikons, Colleges & International Universities (Refer to TABLE 5.20)

The contents of both Tables 5.6 (p.176 – technikons, 73 respondents) and Table 5.12 (p.221 – colleges, 55 respondents) and Section 5.5.3 (pp.231-233 - international universities, 77 respondents), is combined in Table 5.20.

TABLE 5.20

Average Values Calculated for Short Courses Available on the Intranet System : South African Technikons, Colleges & International Universities

(Values indicated in this chapter are the arithmetic mean of the raw data, expressed as percentages)

(c) Short Courses on the Intranet System	Very Important			Important			Nice to have			Not important		
	%			%			%			%		
		Colleges	International		Colleges	International		Colleges	International		Colleges	International
1. Introduction to Co-operative Education (field, terms, concepts of co-operative education, role and responsibilities of participants in co-operative education)	86	65	29	14	30	43	0	5	0	0	0	28
2. Policies and Procedures of the "On-line Placement System"	60	65	34	40	18	44	0	12	11	0	5	11
3. Communication Channels	100	84	50	0	11	13	0	0	25	0	5	12
4. Self-assessment and Placement Preferences	29	72	25	57	28	38	14	0	0	0	0	27

(c) Short Courses on the Intranet System	Very Important		Important			Nice to have			Not important			
	%		%			%			%			
		Colleges	International		Colleges	International		Colleges	International		Colleges	International
5. Compiling CV / Résumé	57	78	38	29	22	25	14	0	37	0	0	0
6. Professional Conduct	86	76	45	14	12	33	0	6	11	0	6	11
7. Interviewing Skills	86	90	22	14	10	67	0	0	11	0	0	0
8. Workplace Ethics	72	96	33	14	4	56	14	0	0	0	0	11
9. Career Exploration/Mobility	72	78	56	28	16	33	0	6	11	0	0	0
10. Workplace Experience	72	72	0	14	28	0	14	0	0	0	0	0

5.6.3.2 Inclusion of Short Courses Available on the Intranet System : South African Technikons, Colleges & International Universities

The contents of Table 5.21, p.259, indicates the importance ascribe courses 1 to 7 by all respondents.

- Course 1: Introduction to co-operative education (field, terms, concepts of CE, role and responsibilities of participants in CE)
- Course 2: Policies and procedures of the "On-line Placement System"
- Course 3: Communication channels
- Course 4: Self-assessment and placement preferences
- Course 5: Compiling CV/Résumé
- Course 6: Professional conduct
- Course 7: Interviewing skills

Courses 8 and 9 were options for respondents from technikons and international universities, only. These respondents indicated that these two courses were important.

- Course 8: Workplace ethics
- Course 9: Career exploration/mobility

Course number 10 was an option for respondents from technikons and colleges. These respondents indicated that this course was important.

- Course 10: Workplace experience

Courses 11 and 12 were options for the respondents from colleges, only. These respondents indicated these courses as important.

- Course 11: Placement search technologies and professional conduct in the search for a placement
- Course 12: Keeping up-to-date with dynamics of workplace (sexual harassment, conflict management, labour law).

TABLE 5.21

Inclusion of Short Courses Available on the Intranet System as Reflected by South African Technikons, Colleges and International Universities

(Respondents - Technikons : 73, Colleges : 55 & International Universities : 77)

SHORT COURSES	INCLUDE		
	Technikons	Colleges	International Universities
1. Introduction to co-operative education (field, terms, concepts of CE, role and responsibilities of participants in CE)	Y	Y	Y
2. Policies and procedures of the "On-line Placement System"	Y	Y	Y
3. Communication channels	Y	Y	Y
4. Self-assessment and placement preferences	Y	Y	Y
5. Compiling CV/Résumé	Y	Y	Y
6. Professional conduct	Y	Y	Y
7. Interviewing skills	Y	Y	Y
8. Workplace ethics	Y	N/A	Y
9. Career exploration/mobility	Y	N/A	Y
10. Workplace experience	Y	Y	N/A
11. Placement search technologies and professional conduct in the search for a placement	N/A	Y	N/A
12. Keeping up-to-date with dynamics of workplace (sexual harassment, conflict management, labour law)	N/A	Y	N/A

5.7 SUMMARY

Chapter Four explained the methodology used, some terminology used, the compilation of the measuring instrument. This chapter thus reported the outcomes of the questionnaires received.

The interpretations throughout Chapter 5 relating to the data have been grouped as a summative synthesis in Section 5.6, pp.234-259. The recommendations in Chapter 6 follow from these summative conclusions.

The outcomes of this study are summarised in Table 5.17 (pp.243-244); Table 5.19 (pp.252-253) and Table 5.21 (p.259). From these tables it is evident that a specific structure for the management information system for co-operative education is identified. The elements of the three sub-structures, as well as the sort options required for each of these elements of each of the sub-structures, are identified. From these results recommendations relating to the management information system for co-operative education can now be formulated in Chapter 6.

It needs to be noted that major differences between reactions by technikons, colleges and international institutions, are recorded. Various reasons for this can be speculated on, but this study does not endeavor to identify the reasons for these differences. This could be investigated by further research, due to the reason for the possible differences. South Africa has recently (1994) moved out of the Apartheid Era into one where equal education and work opportunities are available for all its many population groups. In the Republic, education too is facing many changes, especially in the higher education sector where the landscape is changing.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

This chapter analyses the results of the questions as reported in Chapter 4 and the interpretations recorded in Chapter 5, as well as the literature review in Chapter 2 and Chapter 3. The conclusions and recommendations are supported by detailed cross-references.

6.1 INTRODUCTION

In an effort to establish a management information system for co-operative education in South Africa, attention has been drawn to three factors. These factors relating to students' reports, reports on companies and short courses available on the intranet, have - despite being interdependent - been identified separately. Each of the reports relating to students and companies consists of a number of sub-reports referred to as items. This research investigated perceptions surrounding the specific requirements of a management information system for the technikons and colleges in South Africa. These results were compared with the results obtained from a group of practitioners of co-operative education at international universities. This international group of respondents all are practitioners of co-operative education at a university with an established record of expertise in the management of co-operative education.

The fact that not all technikons regard all the factors as equally important can possibly be ascribed to the model of management of the co-operative education system practised in each of these technikons. The possible influence of the model of co-operative education practised could be investigated further.

6.2 CONCLUSIONS

The point of departure of this study was to make a careful analysis of the present requirements to manage co-operative education effectively and efficiently in South African technikons and colleges. The ITS system, which is readily available in South Africa, has several positive characteristics (refer to Chapter 3, Section 3.4.1, pp.110-112). It is, however, not extensively used due to the decentralised systems of managing co-operative education in South African institutions.

In Chapter 1, Section 1.8 (pp.20-21) the objectives of this research are formulated. Conclusions indicating the extent to which the objectives are met, are now reported on.

- **Objective 1.8.1 (p.20) :** *“To complete a situation analysis based on the needs, and demands for a co-operative education management system, both locally and internationally”.*
 - **Conclusion (i) :**
To manage co-operative education, several reports relating to students’ and companies’ information are required. From the literature study in Chapter 2 (Developing an Information Management System) and Chapter 3 (Best Practice in a Management Information System for Co-operative Education) a comprehensive set of variables which impact on the research question (refer to Chapter 1, Section 1.2, pp.7-10) were collected. These were further researched in Chapter 4 (Research Methodology).
 - **Conclusion (ii) :**
The “needs and demands” were manifested in three sections, that is, a set of students’ reports (refer to Section 6.2.1, pp.265-266), **a set of reports on companies** (refer to Section 6.2.2, p.266),

and a series of short courses to be available on the intranet (refer to Section 6.2.3, p.266). Conclusions and recommendations (refer to Sections 6.3.1 to 6.3.4, pp.272-283) focussing on these “needs and demands” could be drawn, based on the results obtained from the research.

- **Objective 1.8.2 (pp.20-21) :** *“To conduct a comparative study of the alternative, limiting existing data systems such as Microsoft Excel, Access, etc. in use both nationally and internationally, based on the situation analysis”.*
 - **Conclusion (iii) :**

From the literature study in Chapter 2 (Developing an Information Management System) it is concluded that : **Various technologies should be in use.** When the availability of these technologies are read in conjunction with the literature study in Chapter 3 (Best Practice in a Management Information System for Co-operative Education), it is evident that educational institutions internationally are using these technologies in their custom designed management information systems for co-operative education.
 - **Conclusion (iv) :**

Refer to Section 6.3.1 (pp.272-275) for “recommendations relating to the operating system”. **To develop this management information system (MIS) in general and the reports required in particular, it is important to define the ultimate objectives and aims of the co-operative education.**
- **Objective 1.8.3 (p.21) :** *“To design an instrument to determine the scope as well as perceptions of the importance of the various elements required within a co-operative education management system in South Africa”.*

○ **Conclusion (v) :**

Each institution, making use of a management information system for co-operative education, should define this aim individually. Each institution can then utilise their specific choice of items relating to “students’ reports” and “reports on companies”, as well as “courses available on the Intranet”. With this choice made the institution can develop the specific management information system for co-operative education which will satisfy their individual needs. The management information system (centralised, decentralised or integrated system) as well as the demographics of the educational institution(s) and the participating companies, are thus of equal importance in this decision.

A summary of these findings are reported in Table 5.16 (pp.236-240) “Students’ Reports”; Table 5.18 (pp.246-249) “Reports on Companies”; and Table 5.20 (pp.256-257) “Short Courses Available on the Intranet”. Detailed interpretation of these results is recorded in Chapter 5 (refer to Section 5.6.1, pp.234-244 “Students’ Reports”; Section 5.6.2, pp.245-253 “Reports on Companies”; Section 5.6.3, pp.254-259 “Short Courses Available on the Intranet”).

The interpretations address both the feasibility of inclusion of these elements as well as the required sort options for each element. The conclusions and recommendations in Chapter 6 are all based on these findings.

- **Objective 1.8.4 (p.21) :** *To develop a conceptual model of an efficient co-operative education management system for co-operative education for South African institutions of Higher Education.*

o **Conclusion (vi) :**

From this research, both qualitatively and quantitatively, an efficient co-operative education management information system for South African institutions was developed.

In this study a comparison is made between the requirements of co-operative education departments internationally, holding experience spanning nearly one hundred years, with the requirements of technikons and colleges in South Africa which are, relatively speaking, still underdeveloped. The questionnaires in Annexures B, C and D were used to identify the relative importance of this research as well as specific sort options required. Based on the outcomes of the questionnaires as reported in Chapter 4, interpreted in Chapter 5, relevant conclusions are drawn.

These conclusions and subsequent recommendations are formulated in Section 6.3 (refer to pp.267-283) to form a basis of the management information system for co-operative education in the South African higher education sector. More detailed discussions relating to each of the elements investigated are now brought to book, conclusions drawn and recommendations offered.

6.2.1 Conclusions Relating to Students' Reports

From Chapter 3, Section 3.4.1 (c)(iii), p.111, it can be concluded that **"students' reports" should form an integral part of a management information system for co-operative education.** The relevance of items one to ten was also established, but the outcome of the survey conducted and reported in Chapter 4 and interpreted in Chapter 5, needs to be established.

The students' reports consist of 10 sub-reports (items). The importance of each of these items is considered individually as well as the sort options available to enhance the management possibilities.

When comparing the above conclusions (with the control group (international respondents), a similar result is recorded. This group of respondents also allocated a relatively low level of importance to Item 2 - "List of students applying to be placed, but do not qualify" (also Item 4 - "List of students referred for placement"), thus supporting the outcome of the research relating to this element.

6.2.2 Conclusions Relating to the Reports on Companies

From Chapter 3, Section 3.4.1 (c), pp.111-112; Chapter 4, Section 4.2.5 (b), pp.132-134, **it can be concluded that** "Reports on companies" should be an integral part of a management information system for co-operative education. The relevance of Items 1 to 9 was also established, but the outcome of the survey conducted and reported in Chapter 4, and interpreted in Chapter 5, needs to be established.

The reports on companies consist of nine sub-reports (Items). The importance of each of these items is considered individually, as well as the sort options available to enhance the management possibilities.

6.2.3 Conclusions Relating to Short Courses on the Intranet

From Chapter 3, Section 3.3.2.1 (b)(ii), p.84, **it can be concluded that** reports on companies should be an integral part of a management information system for Co-operative Education. The relevance of items one to nine was established, but the outcome of the survey conducted and reported in Chapter 4 and interpreted in Chapter 5, needs to be established.

6.3 RECOMMENDATIONS

Departments of co-operative education at universities of technology (technikons) in South Africa, strive to be state-of-the-art in their delivery of experiential learning, lifelong career skills, and systems technology.

These universities of technology focus on a placement system integrating co-operative education experiences and academic programmes, and teaching and prioritising effective career management that empowers students with skills essential for their future careers and lives. The placement system works diligently to provide leading edge service and technology to students and employers so that co-ordinators can be effective and efficient (<http://www.education.gov.za>).

In Section 6.2 (pp.262-266) several conclusions based on the outcomes of the questionnaires as reported in Chapter 5, are reported. To develop a management information system for co-operative education, these conclusions need to be formulated as specific recommendations. These recommendations form the basis on which the entire management information system for co-operative education can then be developed.

When comparing the latest international trend relating to a management information system for co-operative education (refer to Chapter 3, Section 3.3.3, pp.105-109) the only existing nationally operated system in South Africa, has specific shortcomings. These have been researched and are reported on in Table 6.1, pp.268-271 and Sections 6.3.1 to 6.3.4, pp.272-283.

The management information system for co-operative education consists of four interrelated sub-systems namely, an operating sub-system, a students' sub-system, an employer sub-system, and a short course sub-system. To manage these specific tasks of co-operative education lecturers are identified.

TABLE 6.1

Shortcomings of the Present Management Information System in South Africa with Recommendations

INTERNATIONAL MIS (AS PRESENTED BY A SAMPLE OF FIVE UNIVERSITIES)	SOUTH AFRICAN MIS ITS	RECOMMENDATIONS
AIM		
Utilise a state-of-the-art system to promote good practice in integrating student preparation for career exploration/ management into the academic curriculum	The provision of integrated software to support administrative functions relating to students, finances, human resources, payroll and library business processes	To utilize a state-of-the-art, user-friendly system, in all aspects relating to the planning, administering and management of co-operative education
SYSTEM FEATURES		
<ul style="list-style-type: none"> • In-house developed (and maintained) stand-alone, user-friendly product. The system is based on the employer – and student services to assist in planning/ implementing the experiential learning placement process as well as a diary management service • To promote efficiency and quality control. This system, utilizing cutting edge technology, must link the student, employer and short courses on the 	<ul style="list-style-type: none"> • A fully web-enabled, “open-system” which uses the UNIX operating system. Controlled read-only access is available via the internet using standard web browsers • More an information system than a management information system 	Refer to Section 6.3.1, “Recommendations Relating to the Operating System”, pp.272-275

INTERNATIONAL MIS (AS PRESENTED BY A SAMPLE OF FIVE UNIVERSITIES)	SOUTH AFRICAN MIS ITS	RECOMMENDATIONS
<p>intranet sub-systems, through sufficient control mechanisms, with the main database of the institution</p> <ul style="list-style-type: none"> • Several courses relating to preparation, placement for experiential learning, available on the intranet – including the management of students finding their own placements 		
STUDENT SERVICES		
<ul style="list-style-type: none"> • Students interact (through controlled read only and “write” access) totally with the system via the Web (and intranet) • Series of short courses relating to preparation for and actual placement/ career management, on the intranet • The placement process, such as submission of CV’s job descriptions (what, where, when), interviews (when, where, with whom) can be accessed by students (via controlled access) • Access to annual 	<ul style="list-style-type: none"> • It consists of a dedicated recordkeeping system • Student names, numbers and experiential learning placement status is recorded and link to the ITS of the institution • Outcomes of experiential learning, assessment is recorded • Facilitates correspondence with students 	<p>Refer to Section 6.3.2 “Recommendations Relating to Student Reports”, pp.275-278</p>

INTERNATIONAL MIS (AS PRESENTED BY A SAMPLE OF FIVE UNIVERSITIES)	SOUTH AFRICAN MIS ITS	RECOMMENDATIONS
<p>networking nights in other cities</p> <ul style="list-style-type: none"> • Access to sponsored career fairs • Access to career related sites on the internet 		
EMPLOYER SERVICES		
<ul style="list-style-type: none"> • Advertise placements over the Web • Students rank positions and sign up for interviews. • Obtain students' placement preferences. • Optimal pairing process runs • Keep track on the placement process • Career fairs and continuous on-campus advertising 	<ul style="list-style-type: none"> • No dedicated employer system exist • The employer data is recorded in the central co-operative education system • The placement process and status is recorded • Facilitates correspondence with employers 	<p>Refer to Section 6.3.3 "Recommendations Relating to Employers", pp.278-280</p>
SHORT COURSES		
<ul style="list-style-type: none"> • Students are required to participate in (and successfully complete) courses in (and submit assignments), policies and procedures of the entire co-operative education experience • Self-assessment by students to evaluate their 	<ul style="list-style-type: none"> • No formal courses are available on the system 	<p>Refer to Section 6.3.4 "Recommendations Relating to Short Courses", pp.281-283</p>

INTERNATIONAL MIS (AS PRESENTED BY A SAMPLE OF FIVE UNIVERSITIES)	SOUTH AFRICAN MIS ITS	RECOMMENDATIONS
<p>skills, values, personality and interests, résumé writing and critique, placement search strategies, interviewing skills, career exploration, simulated video tape interview with a career consultant.</p>		
CO-OPERATIVE EDUCATION LECTURER		
<ul style="list-style-type: none"> • Organise, administer and access short courses done on the intranet • Prepare students for placement and administer the entire placement process – liaise with students and employers. • Link experiential learning with academic programme • Assess experiential learning outcome • Plan and administer career fairs/networking events. • Keep track to up-date database continuously • Manage the total co-operative education system effectively 	<ul style="list-style-type: none"> • Co-operative education lecturer activities, are recorded • Number of students placed, visited, assessed, are recorded 	<p>Refer to Section 6.4 “Planning a Calender for Co-operative Education Lecturers as Part of the MIS”, pp.283-287</p>

Recommendations relating to these sub-systems (components) are now presented in turn.

6.3.1 Recommendations Relating to the Operating System (refer to Chapter 2, Section 2.2.1.2, pp.40-42; Section 2.3.8.1, p.56; Section 2.3.8.2, pp.56-57; Section 2.3.8.3, pp.57-58)

The management information system for co-operative education in South Africa should incorporate the following features in use internationally.

- a. The management information system for co-operative education should be, as in the MaPPiT system of the Huddersfield University, United Kingdom, a web-based intranet system. The system can be used as a stand-alone system over a local area network (LAN) by many users, and over the Web (refer to Chapter 3, Section 3.3.2.1, p.84; Section 3.4.1 (b), p.111).
- b. The management information system should be, as in the MaPPiT system of the Huddersfield University, United Kingdom, accessible to prospective employers, past employers, active employers, past and present students as well as co-operative education lecturers. The access should be based, as in the MaPPiT system, on a security system with specific firewalls. All employers (prospective, past and active) should have access to information related to co-operative education only. Where information is entered (prospective employers), or updated (past and active employers), this can be captured on temporary files and only be entered onto the system by approved operators of the system (refer to Chapter 2, Section 2.4, pp.59-60 Chapter 3, Section 3.3.2.1, pp.84,85,86).
- c. Students should, as in the MaPPiT system of Huddersfield University, United Kingdom, have access to the MIS via their student number. They should have a "read only" access to certain documents. For the entry and updating of their own information, a temporary file that captures the data can be created and entered onto the system only by approved operators (refer to Chapter 3, Section 3.3.2.1, p.85).

- d. The MIS should, as in the MaPPiT system of the Huddersfield University, United Kingdom, automatically log who enters comments, as well as date and time, keeping a history of events in chronological order (refer to Chapter 3, Section 3.3.2.1, p.86).
- e. The MIS should provide as in the Northeastern University system of Boston, USA, facilities for both employers and students to access, via the Web, information relevant to co-operative education on a read-only basis (refer to Chapter 2). For example, information such as how the operating system relating to the placement process works, evaluation of the placement, short courses offered, seminars and workshops offered and career expos, should be available to employers and students on the Web, and on a read-only basis (refer to Chapter 3, Table 3.3, pp.100&101; Table 3.4 (iii) & (iv), p.103; Section 3.3.2.5 (c)(i), p.104).
- f. Prospective employers should as in the MaPPiT system of the Huddersfield University, United Kingdom, be able to access the Website of the institution and establish contact with the relevant co-operative education co-coordinator (refer to Chapter 3, Section 3.3.2.1 (c)(iv), p.85).
- g. Academic, demographic and other information must be, as in the Education Management Information System of the Australian schools, linked to various elements relating to experiential learning (refer to Chapter 3, Section 3.2(b), p.79; Section 3.2(d), p.80).
- h. Upon registration for experiential learning, the system should as in the Drexel CMC system of the University of Drexel, Philadelphia, USA, assign students to co-ordinators based on their major (refer to Chapter 3, Section 3.3.2.2, p.90).
- i. Participating students should be able to access the website of the institution and establish contact with the relevant co-operative education co-ordinator to:

- as in the MyNEU COOL system of Northeastern University, Boston, USA, deal with problems relating to experiential learning
 - as in the MyNEU COOL system of Northeastern University, Boston, USA, access a co-ordinator's diary for appointments (refer to Chapter 3, Table 3.3, p.101; Section 3.3.2.5 (a)(i), p.102)
 - as in the MyNEU COOL system of Northeastern University, Boston, USA, submit CV for critique (refer to Chapter 3, Table 3.2, p.97) OF update CV for interview purposes (refer to Chapter 3, Section 3.3.2.2 (a)(ii), p.89); Section 3.3.2.5 (a)(iii), p.102)
 - as in the Drexel CMC system of the University of Drexel, Philadelphia, USA, update personal and demographic information, and
 - access placements available, record preferences, and sign up for interviews (refer to Chapter 3, Section 3.3.2.1 (c)(v) & (vi), p.85; Section 3.3.2.2 (a)(ii) & (iv), p.89).
- j. As in the CELS of the University of Waterloo, Canada, as well as the MyNEU COOL system of Northeastern University, Boston, USA, students should be able to interact with the system via the Web to identify available placements and submit a CV (refer to Chapter 3, Section 3.2.2.1 (c)(iii), p.85; Section 3.3.2.3 (i)(a), p.91; Section 3.3.2.5 (a)(ii), p.102).
- k. As in the Drexel CMC system of the University of Drexel, Philadelphia, USA, employers should rank their preference of students who submitted CV's (refer to Chapter 3, Section 3.3.2.2(b), p.89).
- l. As in the Drexel CMC system of the University of Drexel, Philadelphia, USA, students with whom interviews were conducted should rank their preferences of available positions (refer to Chapter 3, Section 3.3.2.2(b), p.89).
- m. As in the system of the Northeastern University, Boston, USA, companies who conduct interviews should be able to submit their rankings of the relevant students on the system (refer to Chapter 3, Table 3.3, p.101).

- n. As in the system of the Drexel University, Philadelphia, USA and the On-campus Recruiting Programme, George Washington University, USA, the system ought to select the best match based on both the student and the company rankings (refer to Chapter 3, Section 3.3.2.2 (b), p.89; Section 3.3.2.4 (1)(c), p.94).
- o. As in the MyNEU COOL system of Northeastern University, Boston, USA, students and employers should be able to track the placement process (refer to Chapter 3, Section 3.3.2.5 (a)(v), p.102).
- p. As in the MaPPiT system of the Huddersfield University, United Kingdom, mail messages should be sent to remind individuals of outstanding tasks and the progress of tasks relating to the placement process (refer to Chapter 3, Section 3.3.2.1, p.84; Chapter 6, Section 6.4, pp.283-287).
- q. As in the MaPPiT system of the Huddersfield University, United Kingdom, a selection of various reports and standardised letters should be available (refer to Chapter 3, Section 3.3.2.1, p.84; Section 3.4.1 (c), pp.111-112; Chapter 4, Section 4.2.5 (iii), p.131).

6.3.2 Recommendations Relating to Student Reports

In Section 6.2.1 (pp.265-266) (Chapter 2, Section 2.3.8.3, pp.57-58; Chapter 3, Section 3.4.1 (c)(iii) p.111; Chapter 4, Section 4.2.5 (i), p.131), the conclusions relating to "student reports" are recorded. To be able to operate this sub-system effectively and efficiently, the following fields of information should be made available:

- a. List of subject codes for experiential learning (refer to Chapter 5, Section 5.2.1 (a)&(d), pp.150&151).
- b. As in the MaPPiT system of the Huddersfield University, United Kingdom and the Co-operative Education Career Services at the University of Waterloo, Canada, relevant demographic information of

student (home and study address, contact telephone number, next of kin, etc.) linked to the management information system for co-operative education (refer to Chapter 3, Section 3.2(d), p.80 ; Section 3.3.2.3 (c) & (d), pp.91-92).

- c. As in the KIDMAP system and the Computerised Administration Systems Environment for Schools in Australia (refer to Chapter 3, Section 3.2(a), p.78), academic history and progress of student linked to the management information system for co-operative education (refer to Chapter 3, Section 3.2(c), p.80; Chapter 4, Section 4.2.5 (a)(ix), p.132).
- d. List of students applying to be placed (refer to Chapter 3, Section 3.4.1 (c)(i), p.111; Chapter 4, Section 4.2.5 (a)(i), p.131; Chapter 6, Conclusion 6.2.1, pp.265-266).
Sort options required: sort information "by course", "by semester" and "by area" (not "by city" and "by province") (refer to Chapter 6, Conclusion 6.2.1, pp.265-266).
- e. List of students applying to be placed but not qualifying (refer to Chapter 3, Section 3.4.1 (c)(i), p.111; Chapter 4, Section 4.2.5 (a)(ii), p.132; Chapter 6, Conclusion 6.2.1, pp.265-266).
Sort options required: sort information "by course", "by semester", "by area", "by city" and "by province" (refer to Chapter 6, Conclusion 6.2.1, pp.265-266).
- f. As in the MaPPiT system of the Huddersfield University, United Kingdom, a list of students qualifying to be placed for experiential learning (refer to Chapter 3, Section 3.3.2.1 (b)(iii) & (c)(ii), pp.84&85 ; Section 3.4.1 (c)(i), p.111 ; Chapter 4, Section 4.2.5 (a)(iii), p.132 ; Chapter 6, Conclusion 6.2.1, pp.265-266).
Sort options required: sort information "by course", "by semester", "by area", "by city" and "by province" (refer to Chapter 6, Conclusion 6.2.1, pp.265-266).
- g. As in the MaPPiT system of the Huddersfield University, United Kingdom, a list of short courses completed by students in preparation for placement (refer to Chapter 3, Section 3.3.2.1 (b)(ii), p.84 ; Section 3.4.1 (c)(ii), p.111 ; Chapter 6, Conclusion 6.2.3, p.266).

- h. As in the MaPPiT system of the Huddersfield University, United Kingdom, a list of students referred for placement** (refer to Chapter 3, Section 3.3.2.1 (b)(iii) & (c)(ii), pp.84&85; Section 3.4.1 (c)(i), p.111 ; Chapter 4, Section 4.2.5 (a)(iv), p.132; Chapter 6, Conclusion 6.2.1, pp.265-266).
Sort options required: sort information “by course”, “by semester”, “by area”, “by city” and “by province” (refer to Chapter 6, Conclusion 6.2.1, pp.265-266).
- i. As in the MaPPiT system of the Huddersfield University, United Kingdom, a list, per company, of students placed** (refer to Chapter 3, Section 3.3.2.1 (b)(iii) & (c)(ii), pp.84&85 ; Section 3.4.1 (c)(i), p.111 ; Chapter 4, Section 4.2.5 (a)(v), p.132; Chapter 6, Conclusion 6.2.1, pp.265-266).
Sort options required: sort information “by course”, “by semester”, “by area”, “by city” and “by province” (refer to Chapter 6, Conclusion 6.2.1, pp.265-266).
- j. As in the MaPPiT system of the Huddersfield University, United Kingdom, a list of students registered after placement** (refer to Chapter 3, Section 3.3.2.1 (b)(iv) & (c)(ii), pp.84&85 ; Section 3.4.1 (c)(i), p.111 ; Chapter 4, Section 4.2.5 (a)(vi), p.132; Chapter 6, Conclusion 6.2.1, pp.265-266).
Sort options required: sort information “by course”, “by semester”, “by area”, “by city” and “by province” (refer to Chapter 6, Conclusion 6.2.1, pp.265-266).
- k. List, per company, of students placed but not registered** (refer to Chapter 3, Section 3.4.1 (c)(i), p.111 ; Chapter 4, Section 4.2.5 (a)(vii), p.132; Chapter 6, Conclusion 6.2.1, pp.265-266).
Sort options required: sort information “by course”, “by semester”, “by area”, “by city” and “by province” (refer to Chapter 6, Conclusion 6.2.1, pp.265-266).
- l. As in the MaPPiT system of the Huddersfield University, United Kingdom, a record of progress made by students in assignments, portfolios, etc** (refer to Chapter 3, Section 3.3.2.1 (b)(iv), p.84 ; Section 3.4.1 (c)(ii), p.111 ; Chapter 4, Section 4.2.5 (a)(ix), p.132; Chapter 6, Conclusion 6.2.1, pp.265-266).
Sort options required: sort information “by course”, “by semester”, “by area”, “by city” and “by province” (refer to Chapter 6, Conclusion 6.2.1, pp.265-266).
- m. As in the MaPPiT system of the Huddersfield University, United Kingdom, a list of students visited** (refer to Chapter 3, Section 3.3.2.1 (b)(iv), p.84 ;

Section 3.4.1 (c)(i), p.111 ; Chapter 4, Section 4.2.5 (a)(viii), p.132; Chapter 6, Conclusion 6.2.1, pp.265-266).

Sort options required: sort information “by course”, “by semester”, “by area”, “by city” and “by province” (refer to Chapter 6, Conclusion 6.2.1, pp.265-266).

- n. As in the MaPPiT system of the Huddersfield University, United Kingdom, a record of final marks of students (refer to Chapter 3, Section 3.3.2.1 (b)(iv), p.84 ; Section 3.4.1 (c)(ii), p.111 ; Chapter 4, Section 4.2.5 (a)(ix), p.132; Chapter 6, Conclusion 6.2.1, pp.265-266).

Sort options required: sort information “by course”, “by semester”, “by area”, “by city” and “by province” (refer to Chapter 6, Conclusion 6.2.1, pp.265-266).

- o. As in the Drexel University Career Management Centre, Philadelphia, USA, account of students’ evaluation of the experiential learning experience (refer to Chapter 3, Section 3.3.2.2, p.90 ; Section 3.4.1 (c)(i), p.111).

- p. As in the MaPPiT system of the Huddersfield University, United Kingdom, history of students relating to all aspects of experiential learning (refer to Chapter 3, Section 3.3.2.1 (b)(iv)&(c)(vii)&(viii), pp.84&85 ; Section 3.4.1 (c)(iii), p.111 ; Chapter 4, Section 4.2.5 (a)(x), p.132; Chapter 6, Conclusion 6.2.1, pp.265-266).

Sort options required: sort information as “referred”, “placed”, “visited” and “work reports” (refer to Chapter 6, Conclusion 6.2.1, pp.265-266).

6.3.3 Recommendations Relating to Employers

In Sections 6.2.2 (p.266) the conclusions relating to the “reports on companies” are recorded (refer also Chapter 3, Section 3.4.1 (c), pp.111-112; Chapter 4, Section 4.2.5 (ii), p.131). To operate this sub-section effectively and efficiently, the following fields of information should be made available:

- a. As in the MaPPiT system of the Huddersfield University, United Kingdom, history of participating companies (refer to Chapter 3, Section 3.3.2.1 b(i), p.84 ; Chapter 4, Section 4.2.5 (b)(i), p.132; Chapter 6, Conclusion 6.2.2, p.266).

Sort options required: sort information "by course", "by semester", "by area", "by city" and "by province" (refer to Chapter 6, Conclusion 6.2.2, p.266).

- b. As in the MaPPiT system of the Huddersfield University, United Kingdom, main activities of a company (sub-disciplines within a COURSE) (refer to Chapter 3, Section 3.2.2.1 (b)(v), p.84; Chapter 4, Section 4.2.5 (b)(vi), p.133 ; Chapter 6, Conclusion 6.2.2, p.266).
- c. As in the George Washington University Career Centre, USA, placement requirements of companies (refer to Chapter 3, Section 3.3.2.4 (1)(a), p.93).
- d. As in the MaPPiT system of the Huddersfield University, United Kingdom, history of liaison of companies with placement officers (refer to Chapter 3, Section 3.3.2.1 (b)(i), p.84).
- e. As in the MaPPiT system of the Huddersfield University, United Kingdom, list of contact persons at companies (refer to Chapter 3, Section 3.3.2.1 (b)(i), p.84 ; Chapter 4, Section 4.2.5 (b)(iii), p.133; Chapter 6, Conclusion 6.2.2, p.266).
Sort options required: sort information "by course" and "by company" (refer to Chapter 6, Conclusion 6.2.2, p.266).
- f. As in the MaPPiT system of the Huddersfield University, United Kingdom, list of active companies (refer to Chapter 3, Section 3.2.2.1 (b)(vi), pp.84-85 ; Chapter 4, Section 4.2.5 (b)(ii), p.133; Chapter 6, Conclusion 6.2.2, p.266).
Sort options required: sort information "by course", "by semester", "by area", "by city" and "by province" (refer to Chapter 6, Conclusion 6.2.2, p.266).
- g. As in the MaPPiT system of the Huddersfield University, United Kingdom, as well as is the Drexel Career Management Centre, Philadelphia, USA, list of various placement positions within a company (refer to Chapter 3, Section 3.2.2.1 (b)(v) & (vi), pp.84-85; Section 3.3.2.2 (a)(i), p.89; Chapter 4, Section 4.2.5 (b)(vii), p.133; Chapter 6, Conclusion 6.2.2, p.266).

- h. As in the George Washington University Career Centre, USA, job description of positions available in various disciplines (refer to Chapter 3, Section 3.3.2.4 (1)(d)(i), p.94; Table 3.4(i)&(ii), p.103).
- i. As in the MaPPiT system of the Huddersfield University, United Kingdom, list of students referred to a company (refer to Chapter 3, Section 3.3.2.1 (b)(vi), pp.84-85 ; Chapter 4, Section 4.2.5 (b)(v), p.133; Chapter 6, Conclusion 6.2.2, p.266).
Sort options required: sort information "by course", "by semester", "by area", "by city" and "by province" (refer to Chapter 6, Conclusion 6.2.2, p.266).
- j. As in the Drexel University Career Management Centre, Philadelphia, USA, as well as the Northeastern University, Boston, USA, list of students selected by companies for on-campus interview schedule (refer to Chapter 3, Section 3.3.2.2 (a)(iii), p.89; Table 3.4 (i) & (ii), p.103).
- k. As in the MaPPiT system of the Huddersfield University, United Kingdom, list and dates of companies visited (refer to Chapter 3, Section 3.2.2.1 (b)(vii), p.85 ; Chapter 4, Section 4.2.5 (a)(viii) & (b)(iv), pp.132&133; Chapter 6, Conclusion 6.2.2, p.266).
Sort options required: Sort information "by course", "by semester", "by city", "by co-ordinator" and "by province" (refer to Chapter 6, Conclusion 6.2.2, p.266).
- l. Details of accessibility of companies (road/taxi/rail) (refer to Chapter 4, Section 4.2.5 (b)(viii), p.133 ; Chapter 6, Conclusion 6.2.2, p.266).
- m. Details of accommodation near the company (refer to Chapter 6, Conclusion 6.2.2, p.266).
- n. As in the MaPPiT system of the Huddersfield University, United Kingdom, as well as in the Drexel University Career Management Centre, Philadelphia, USA, a questionnaire to assist employers to appraise the placement (refer to Chapter 3, Section 3.2.2.1 (b)(vii), p.85; Section 3.3.2.2, p.90 ; Section 3.4.1 (c), pp.111-112).

6.3.4 Recommendations Relating to Short Courses

In Section 6.2.3 (p.266) the conclusions relating to the “short courses on the intranet” are recorded, as in the KIDMAP system and the Computerised Administration Systems Environment for Schools in Australia (refer also Chapter 2, Section 2.1, p.31; Section 2.2.1, p.37; Chapter 3, Section 3.3.2.1 (b)(ii), p.84). To operate this sub-section effectively and efficiently, the following short courses should be made available:

- a. **How to access teaching resources** (refer to Chapter 3, Section 3.2(a), p.78).
- b. **As in the MaPPiT system of the Huddersfield University, United Kingdom, on how all placement activities are managed** (refer to Chapter 3, Section 3.3.2.1, p.83).
- c. **As in the MaPPiT system of the Huddersfield University, United Kingdom and the George Washington Career Management Centre, USA, on introduction to co-operative education (field, terms, concepts of co-operative education, role and responsibilities of participants in co-operative education)** (refer to Chapter 3, Section 3.3.2.1 (a), p.84; Table 3.2, p.97; Chapter 4, Section 4.2.5 (c)(i), p.135; Chapter 6, Conclusion 6.2.3, p.266).
- d. **As in the Drexel University Career Management Centre, Philadelphia, USA, as well as the Co-operative Education Career Services at the University of Waterloo, Canada, the policies and procedures of the “On-line Placement System”** (refer to Chapter 3, Section 3.3.2.2, p.88 ; Section 3.3.2.3 (i)(a), p.91 ; Chapter 4, Section 4.2.5 (c)(ii), p.135 ; Chapter 6, Conclusion 6.2.3, p.266).
- e. **As in the MyNEU COOL system of Northeastern University, Boston, USA, communication channels in co-operative education** (refer to Chapter 3, Section 3.3.2.5 (a), p.102 ; Chapter 4, Section 4.2.5 (c)(iii), p.135 ; Chapter 6, Conclusion 6.2.3, p.266).
- f. **As in the MaPPiT system of the Huddersfield University, United Kingdom and Northeastern University, Boston, USA, on self-**

assessment and placement preferences of students (refer to Chapter 3, Section 3.2.2.1 (c)(ix), p.85; Section 3.3.2.5, p.100; Table 3.3, p.101; Chapter 4, Section 4.2.5 (c)(v), p.135 ; Chapter 6, Conclusion 6.2.3, p.266).

- g. **As in the Drexel University Career Management Centre, Philadelphia, USA, as well as in the Northeastern University, Boston, USA, on how to compile a CV/Résumé** (refer to Chapter 3, Section 3.3.2.2, p.88; Table 3.3, p.101; Chapter 4, Section 4.2.5 (c)(vi), p.135 ; Chapter 6, Conclusion 6.2.3, p.266).
- h. **Professional conduct during experiential learning** (refer to Chapter 4, Section 4.2.5 (c)(vii), p.135 ; Chapter 6, Conclusion 6.2.3, p.266).
- i. **As in the Drexel University Career Management Centre, Philadelphia, USA as well as the Northeastern University, Boston, USA, on interviewing skills** (refer to Chapter 3, Section 3.3.2.2, p.88; Section 3.3.2.5, p.100; Table 3.3, p.101; Chapter 4, Section 4.2.5 (c)(viii), p.135 ; Chapter 6, Conclusion 6.2.3, p.266).
- j. **As in the MaPPiT system of the Huddersfield University, United Kingdom, on workplace ethics** (refer to Chapter 3, Section 3.2.2.1 (c)(i), p.85 ; Chapter 4, Section 4.2.5 (c)(ix), p.135; Chapter 6, Conclusion 6.2.3, p.266).
- k. **Career exploration/mobility as in the George Washington Career Management Centre, USA and the Northeastern University, Boston, USA** (refer to Chapter 3, Section 3.3.2.4 (2), p.97; Table 3.2, p.97; Section 3.3.2.5, p.100 ; Table 3.3, p.101; Chapter 4, Section 4.2.5 (c)(x), p.135; Chapter 6, Conclusion 6.2.3, p.266).
- l. **As in the MaPPiT system of the Huddersfield University, United Kingdom, on evaluation of your workplace experience** (refer to Chapter 3, Section 3.2.2.1 (b)(viii) & (ix), p.85; Chapter 4, Section 4.2.5 (c)(xi), p.135 ; Chapter 6, Conclusion 6.2.3, p.266).
- m. **As in the Northeastern University, Boston, USA and the Co-operative Education Career Services at the University of Waterloo, Canada, on placement search technologies and professional conduct in the search for a placement** (refer to Chapter 3, Section 3.3.2.3 (i)(a), p.91; Table 3.3, p.101; Section 3.3.2.5 (a)(ii), p.102; Chapter 6, Conclusion 6.2.3, p.266).

- n. As in the MaPPiT system of the Huddersfield University, United Kingdom and the Northeastern University, Boston, USA, on keeping up-to-date with dynamics of workplace (sexual harassment, conflict management, labour law) (refer to Chapter 3, Section 3.2.2.1 (c)(i), p.85; Section 3.3.2.5, p.100; Chapter 6, Conclusion 6.2.3, p.266).

The management information system for co-operative education is defined in the preceding recommendations (refer to Section 6.3, pp.267-283). To be able to operate this MIS effectively and efficiently, a generic calendar for co-operative education lecturers is proposed.

6.4 PLANNING A CALENDER FOR CO-OPERATIVE EDUCATION

Once the data is accurately kept up to date and the management information system for co-operative education is fully operational, planning operational activities is one of the management advantages. Managing the information system can be broken into various tasks.

The following is a suggested calendar, based on the South African academic year, which might be used by various institutions as a development template, to compile a calendar suitable for individual co-operative education lecturers. As such then, managing the information from this newly developed management information system can be put to use in the real-life application there-of by compiling a calendar of activities for each co-operative education lecturer. This calendar should be electronically linked between the management information system and the co-operative education lecturer's diary, as in the MaPPiT system of the Huddersfield University, United Kingdom (refer to Chapter 3, Section 3.3.2.1, p.84; Section 3.3.2.1 (c)(i), p.85; Chapter 6, Recommendation 6.3.1 (p), p.275).

TABLE 6.2

Generic Electronic Calendar for Co-operative Education Lecturers

PROGRAM ACTIVITIES	CO-ORDINATOR/ STUDENT/EMPLOYER ACTIVITIES	INSTRUCTIONAL/CLASS ROOM ACTIVITIES
JANUARY		
<p>Review budget and purchase requirements</p> <p>Review or establish Advisory Council membership</p> <p>Make tentative plans for meetings</p> <p>Discuss year's plans with Head of Department</p> <p>Prepare/update brochures for printing</p> <p>Replenish supply of business cards</p>	<p>Identify and interview students enrolled in programme</p> <p>Identify students' career goals for use in placement</p> <p>Select appropriate training stations</p> <p>Begin to prepare training agreements and plans</p> <p>Start student placements</p>	<p>Review classroom instructional materials</p> <p>Update reference books and materials</p> <p>Set up folders for new students</p> <p>Plan and complete bulletin board displays</p> <p>Develop list of guest speakers</p>
FEBRUARY		
<p>Promote programme to faculty</p> <p>Make final arrangements for first Advisory Council meeting</p> <p>Attend local professional meetings (Work Experiences, Co-ordinators Association, Chamber of Commerce Industrial Association and Personnel Society)</p>	<p>Continue to select training stations, place students, and prepare training agreements and plans</p> <p>Arrange and prepare students for employer/employee interviews</p> <p>Plan placement-related instruction</p> <p>Start student evaluation sessions with employer</p> <p>"Trouble-shoot" on any initial student placements</p>	<p>Correlate instruction to on-the-job responsibilities</p> <p>Discuss year-end employer/employee banquet</p> <p>Set up grade book and other departmental records</p>

PROGRAM ACTIVITIES	CO-ORDINATOR/ STUDENT/EMPLOYER ACTIVITIES	INSTRUCTIONAL/CLASS ROOM ACTIVITIES
MARCH		
Conduct Advisory Council meetings	Continue student placement and evaluations Revise training plans as needed Visit students at placement positions	Correlate instruction to placement responsibilities Bring in guest speakers Change bulletin board
APRIL		
Complete first 10-week report on student placement Plan for next advisory council meeting Distribute Advisory Council minutes and agenda for next meeting Prepare/update new promotional programme materials Attend professional meetings	Continue student evaluations Select new training sites, if needed Contact new employers to promote new training stations	Correlate instruction to placement responsibilities Change bulletin board (allow students to make displays) Check students' progress with other subject teachers Discuss employer/employee banquet Arrange student/employer interaction and evaluation
MAY		
Conduct Advisory Council meeting	Make necessary employment changes Revise training plans Continue contacting new employers for future participation	Bring in guest speakers Change bulletin boards

PROGRAM ACTIVITIES	CO-ORDINATOR/ STUDENT/EMPLOYER ACTIVITIES	INSTRUCTIONAL/CLASS ROOM ACTIVITIES
JUNE		
<p>Start new recruiting via assemblies and brochures</p> <p>Plan for next Advisory Council meeting</p> <p>Attend professional meetings</p>	<p>Continue student evaluation</p> <p>Review student career objectives</p>	<p>Correlate instruction to placement responsibilities</p>
JULY		
<p>Conduct Advisory Council meeting</p> <p>Conduct group sessions with prospective co-operative education students</p>	<p>Check to see if all training agreements and plans are up-to-date</p> <p>Develop new employer contacts</p> <p>Check on labour law developments</p>	<p>Correlate instruction to placement responsibilities</p>
AUGUST		
<p>Plan for next Advisory Council meeting</p> <p>Interview prospective students</p> <p>Bring all academic staff up-to-date on programme activities</p>	<p>Have individual conferences, review first semester grades, and discuss any student problems</p> <p>Maintain employer contacts</p>	<p>Correlate instruction to placement responsibilities</p>
SEPTEMBER		
<p>Make public student accomplishments</p> <p>Plan for year's last Advisory Council meeting</p> <p>Attend professional</p>	<p>Select new training sites</p> <p>Place students</p> <p>Review training plans</p> <p>Follow up on future opportunities of students</p>	<p>Correlate instruction to job responsibilities</p> <p>Complete banquet plans</p> <p>Continue encouraging student organisation activities</p>

PROGRAM ACTIVITIES	CO-ORDINATOR/ STUDENT/EMPLOYER ACTIVITIES	INSTRUCTIONAL/CLASS ROOM ACTIVITIES
meetings Complete final screening of students for next year	with employers	
OCTOBER		
Hold annual banquet Hold year's last Advisory Council meeting Meet with next year's co- operative education students Order supplies for next year	Complete final student evaluations Make plans for each student's work site after graduation	Correlate instruction to placement responsibilities Write letters of appreciation to employers (preferably completed by students)
NOVEMBER		
Make community survey to develop new training stations Make list of anticipated needs, recommendations, and problems Prepare and submit next year's budget	Contact new employers Begin placement of new students Develop training agreements and plans Complete final evaluation	Evaluate course with students Complete grade and credit reports Update curriculum as needed

6.5 CLOSING REMARKS

6.5.1 The Elements of a Management Information System for Co-operative Education

Courses offered at newly formed institutes of higher education in South Africa, need to be managed to cater for the amalgamation of academic universities, technikons and colleges in the new educational dispensation.

The universities of technology (technikons) in South Africa ascribe to the co-operative education model in most of their courses. In this model of education, the key element is the experiential learning component which is seen as an integral part of the total education philosophy. To manage this component, requires careful management of information. For this management element, the details required in a management information system have now been developed and reported on here.

Although colleges in South Africa appear to focus more on experiential learning as an opportunity to "work" in the same field of study with less (to some extent) of an emphasis on a predetermined and planned learning experience, their specific needs also were able to be incorporated into the design of this management information system.

With this study a scientifically-based justifiable management information system for co-operative education was developed. This system is based on the requirements and preferences of practitioners of co-operative education at technikons and colleges with regards to the required student reports, reports on companies and short courses to be offered on the intranet. Variables which require special attention are: the extended interaction between all sectors of commerce, industry, public and the universities of technology (technikons) and colleges; the structured and planned preparation of students for this experiential learning phase with clear aims and objectives and the placement of students for

experiential learning taking the needs, demands and preferences of both the students and placement positions into account.

The development of a management information system for co-operative education has been done according to accepted qualitative and quantitative models and procedures. As an end result, the factors (with their items) which should form the core of such a management information system have been determined. The conclusions relating to relevant elements of the research are offered below.

A new system should, as in the KIDMAP system and the Computerised Administration Systems Environment for Schools in Australia : (Refer to Chapter 3, Section 3.2 (a), p.79)

- utilise the latest technologies
- manage information
- control quality operational information
- link to the MIS of the institution as an extended integral part thereof and
- produce management information on-line.

Figures 6.1 "Diagrammatic Representation of the Elements of the Management Information System for Co-operative Education", illustrates the various elements and their individual links to the management information system for co-operative education, as well as the integrated link between the management information system for co-operative education and the management information system of the institution.

Figure 6.1(a) illustrates how the management information system for co-operative education links to the **academic sector** of the academic institution.

Figure 6.1(b) illustrates how the management information system for co-operative education links to the **student sector** of the academic institution.

Figure 6.1(c) illustrates how the management information system for co-operative education links to the **employer sector** supporting the academic institution.

Figure 6.1(d) summarise and illustrates how the management information system for co-operative education links to the **academic sector, student sector and employer sector**, of the specific academic institution.

A computer program based on all the recommendations in Chapter 6 (refer to Recommendations, Section 6.3, pp.267-283) can now be developed for the management information system for co-operative education.

FIGURE 6.1(a)

Diagrammatic Representation of the Elements of the Management Information System for Co-operative Education

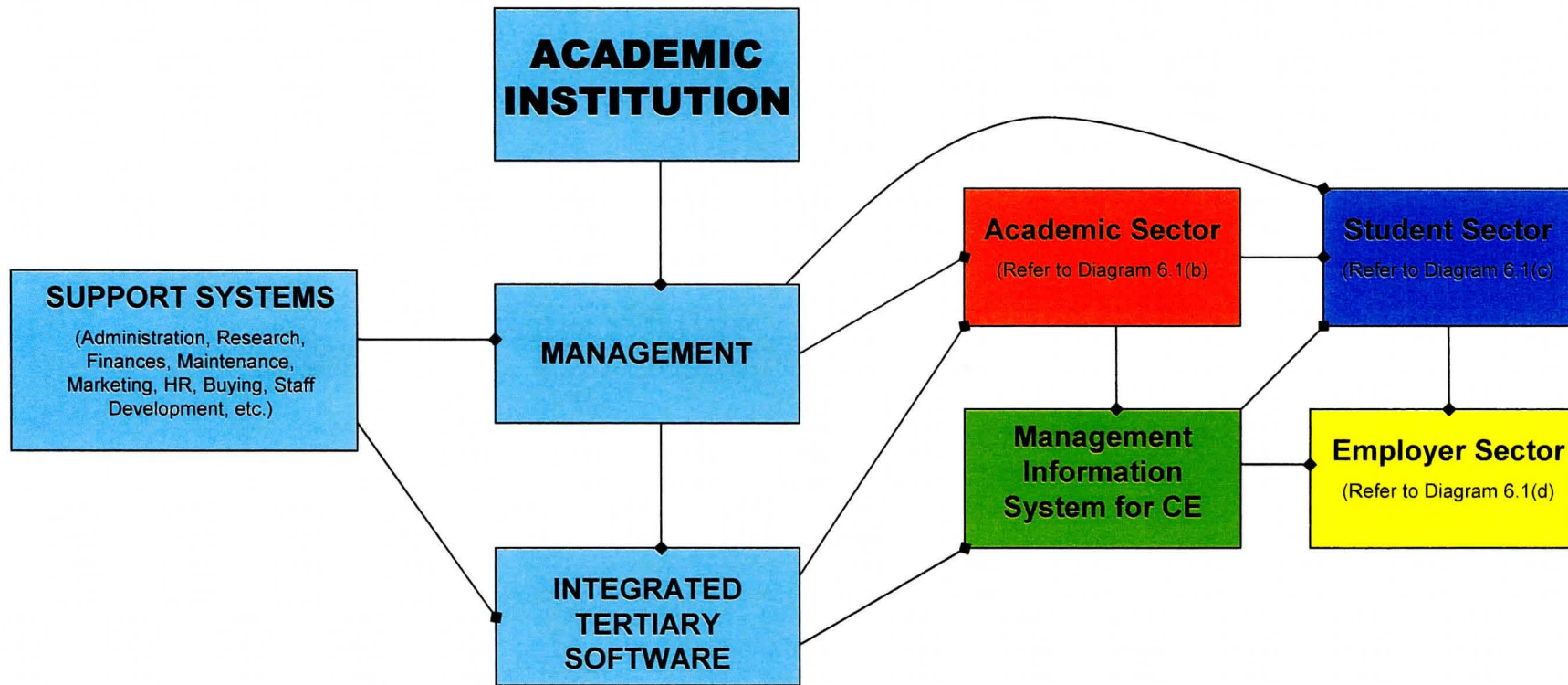


FIGURE 6.1(b)

Diagrammatic Representation of the Elements of the Management Information System for Co-operative Education

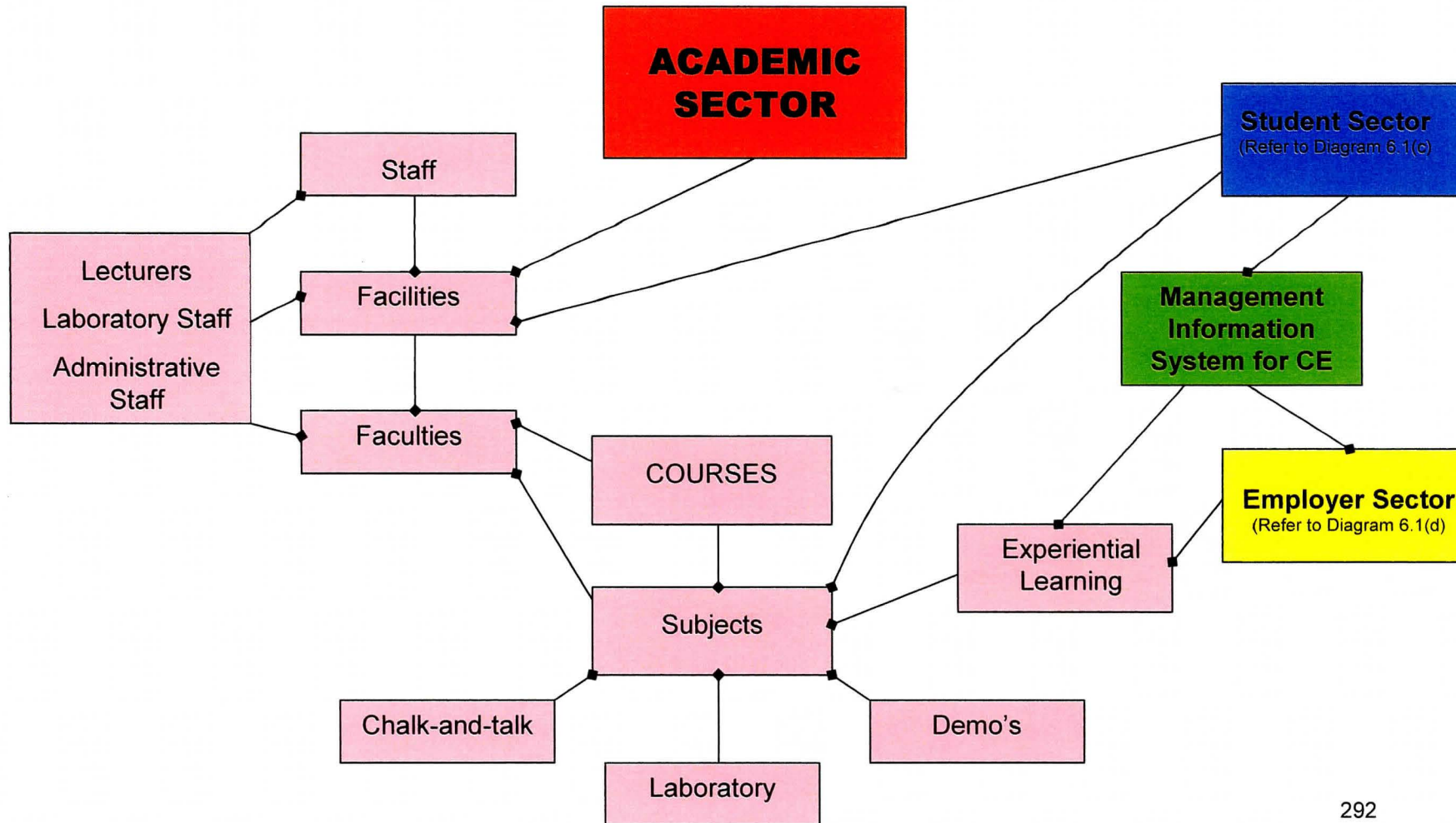


FIGURE 6.1(c)

Diagrammatic Representation of the Elements of the Management Information System for Co-operative Education

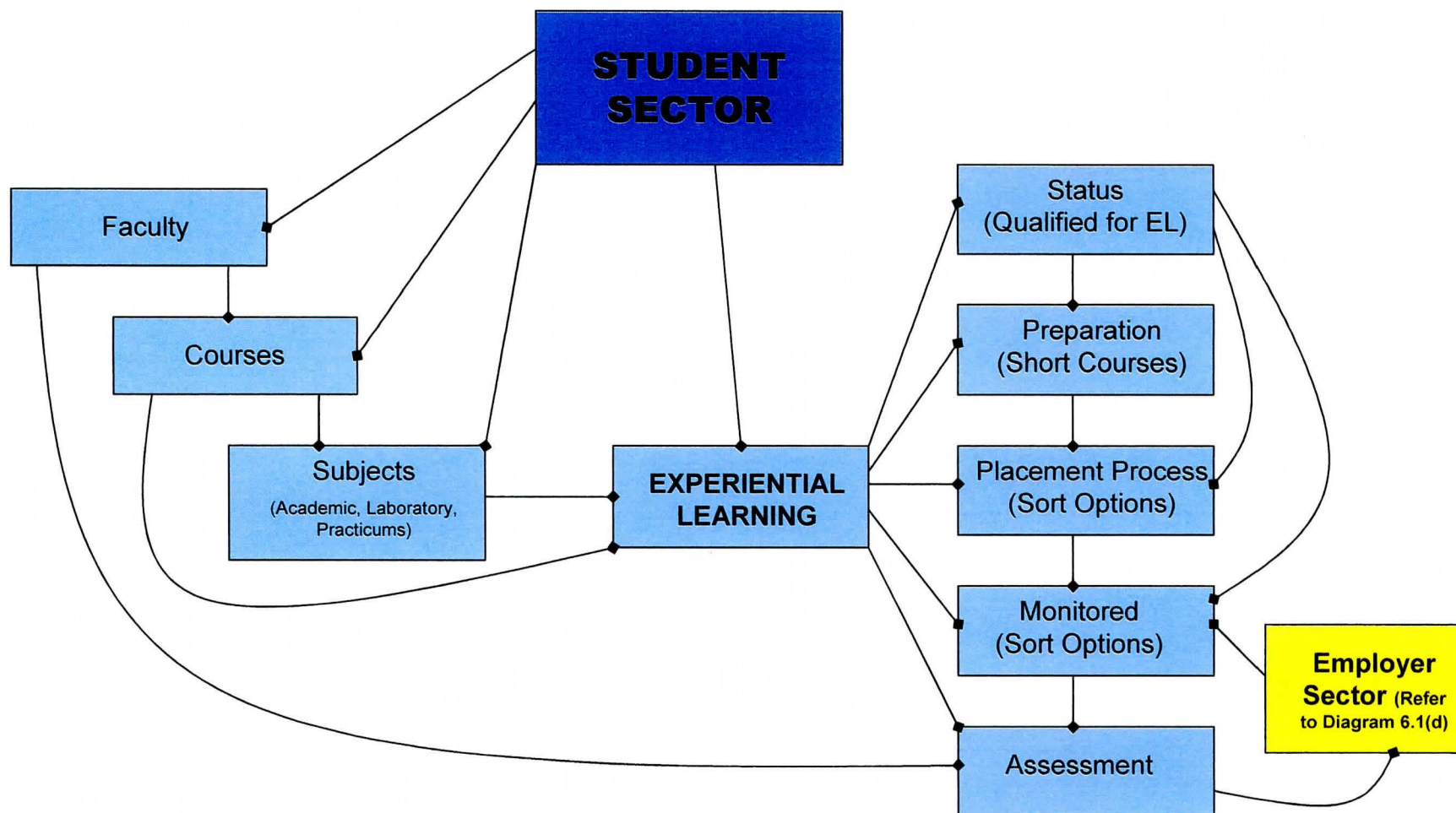
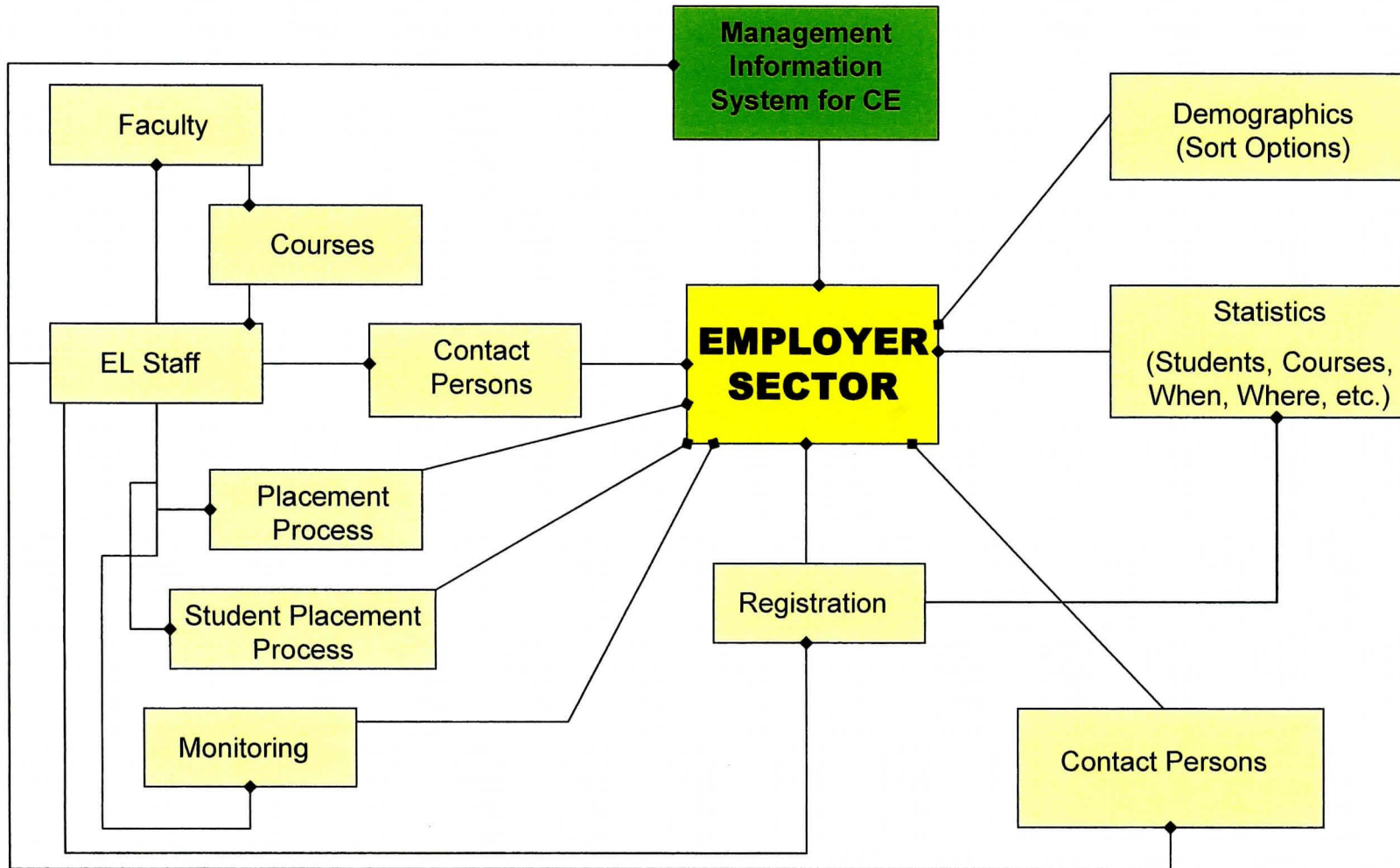


FIGURE 6.1(d)

Diagrammatic Representation of the Elements of the Management Information System for Co-operative Education



6.5.2 The Future of Co-operative Education

In this thesis an effort was made to investigate one of a diverse-faceted approach to education – a management information system for co-operative education. Even in this one facet – the administration of co-operative education, several situations needs more in-depth investigation. “Based on the absence of information and **limited research** on co-operative education programme administration, it is clear that the co-operative practitioners, whether faculty or staff, rely on their professional organisations for formal training and developmental activities” (Lazarus & Oloroso, 2004:186). This does not happen in South Africa yet.

What does the future hold? This is a concern for institutions and practitioners around the world. The future of co-operative education in each case will be determined by their own contexts, their educational requirements (demanded by the “users” of their “product”) business and commerce and the accurate analysis of forces that affect them. The real issue is not the concerns of the institutions and practitioners but the ability of this approach to education to deliver market-ready employees for the demands of today, but also able to adapt and develop new innovations to solve the challenges of tomorrow.

Freeman (1998), as quoted in Aitchison and Gotlieb (2004), suggests that some triggers affecting educational innovation are, amongst others: finances, improvement (and availability) of communication technologies, attitudes of students, different learning styles in the “world of work” and in the institutional context, use and availability of technology in both programme design and delivery as well as programme management (Aitchison & Gotlieb, 2004:261).

Innovation in the immediate and near future has to focus on the development and proper utilisation of existing and new web-based technologies relating to the development of educational product as well as in management processes that support its delivery. Involving the other role players (employers and students) in a constructive way to establish market analysis, creating

appropriate learning environments that are now increasingly available when utilising the technologies available, is essential and need further investigation. Detailed planning, based on the market needs in both the short and medium term (not the long term) is vital. "The global economy has made largely extinct the notion of a 'job for life'". The imperative now is employability for life (DES, 2003:11).

If we operate in the global market then our national educational perceptions needs urgent attention. The possibility to link the statistics (needs and requirements) of all the "customers" as well as those of the educational institutions actively involved in the co-operative education principle nationally, should be investigated. This newly established management information system, could form the bases for such an investigation.

It should be possible as envisaged by Aitchison and Gottlieb (2004) for a to design a complete complex, national system, evolving where the whole process of selecting students, recommending them for placement, the actual placement selection process, the compilation and management of a database of employers and students, workplace agreements and learning contracts up to aspects of mentoring, performance appraisals and assessment are all managed and reported on-line. "The processes for data management, relationship management and recruitment have all been renewed and revitalised through one or more technologies and new educational programmes have been created for this increasingly complex technological 'world of work'" (Aitchison & Gottlieb, 2004:265).

Coll and Eames (2004) bring these arguments into a clear focus with their statement that the best, most idealistic notions of the theory and practice of co-operative education may be lost if the administration falls down (Coll & Eames, 2004:278).

To bring the future of co-operative education in sharp focus, some new (but urgent) ideas are reported. To research these ideas should be given high

national priority as it not only impact on co-operative education, but the increase productivity and efficiency of the labour market and labour force.

The planning, administering and management of co-operative education should be done on a national scale. The labour market, the available (potential) labour force as well as the facilities should be determined and supported by legislation.

- Labour market needs should be determined and continuously updated.
 - Competencies and skills required, level, industries/commerce, geographic areas and upgradeability of competencies to assure lifelong employability.
 - The theories as well as the application thereof through the utilization (or development of) cutting edge technologies.
- Student (also prospective) population should be determined and continuously updated.
 - Needs and preferences to be established also the demographics, recognition of prior learning, skills, attitudes and personalities.
- Education and training needs – the scope thereof the demographics – extent thereof and the efficiency thereof.

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REFER TO RELEVANT PAGES IN CHAPTER 1		CRITICAL ACTIVITIES																					
		STUDENT SUB-SYSTEM																					
17	Industry appointments	Initially applying to be placed										EMPLOYER SUB-SYSTEM											
17	Training needs	Applied to be placed but do not qualify										History of participating companies											
19	Company information: placement offers	Qualified to be placed										Active companies											
		Referred for placement										Contact person/company											
		Placed/company										Companies and dates visited											
		Registered after placement										Students referred to a company											
		Placed but not registered										Main activities of a company											
		Dates visited/company										Variety of placement positions within a company, in different courses											
		Progress marks and final mark										Accessibility of a company											
		Summative report per student on all aspects of experiential learning										SHORT COURSE SUB-SYSTEM											
		History of participating companies										Introduction to co-operative education											
		Active companies										Policies and procedures of the "On-line Placement System"											
		Contact person/company										Available communication channels											
		Companies and dates visited										Recognition of prior learning of co-operative education											
		Students referred to a company										Self-assessment and placement preferences											
		Main activities of a company										Compiling a CV/résumé											
		Variety of placement positions within a company, in different courses										Professional conduct											
		Accessibility of a company										Interviewing skills											
		Introduction to co-operative education										Work ethic											
		Policies and procedures of the "On-line Placement System"										Career exploration/mobility											
		Available communication channels										Workplace experience											
		Recognition of prior learning of co-operative education																					
		Self-assessment and placement preferences																					
		Compiling a CV/résumé																					
		Professional conduct																					
		Interviewing skills																					
		Work ethic																					
		Career exploration/mobility																					
		Workplace experience																					

**SUB-SYSTEMS (Student, Employer & Short Courses) AS MAPPED OUT
BY CRITICAL ACTIVITIES
Final Phase – Chapter 3**

ANNEXURE a(ii)

REFER TO RELEVANT PAGES IN CHAPTER 3		CRITICAL ACTIVITIES										STUDENT SUB-SYSTEM										EMPLOYER SUB-SYSTEM								SHORT COURSE SUB-SYSTEM							
71	Record student information	Initially applying to be placed	Applied to be placed but do not qualify	Qualified to be placed	Referred for placement	Placed/company	Registered after placement	Placed but not registered	Dates visited/company	Progress marks and final mark	Summative report per student on all aspects of experiential learning	History of participating companies	Active companies	Contact person/company	Companies and dates visited	Students referred to a company	Main activities of a company	Variety of placement positions within a company, in different courses	Accessibility of a company	Introduction to co-operative education	Policies and procedures of the "On-line Placement System"	Available communication channels	Recognition of prior learning of co-operative education	Self-assessment and placement preferences	Compiling a CV/résumé	Professional conduct	Interviewing skills	Work ethic	Career exploration/mobility	Workplace experience							
73	Academic information	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓																										
75	References issued about students			✓		✓			✓	✓	✓				✓																						
76	Track placement progress	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓																						
77	Check details companies applied to					✓					✓				✓																						
79	Apply for jobs		✓		✓		✓								✓																						
81	Assign students to co-ordinator	✓			✓	✓	✓	✓			✓						✓																				
83	Approve students own work experience arrangements			✓		✓			✓	✓																											
102	Record number of students to facilitate	✓		✓	✓	✓	✓	✓	✓	✓	✓																										
71	Assess student progress																																				
76	Monitoring placements								✓	✓				✓																							

REFER TO RELEVANT PAGES IN CHAPTER 3		CRITICAL ACTIVITIES																			
78	Secure a placement	Initially applying to be placed																			
80	Job posting service	Applied to be placed but do not qualify																			
80	Employer-directed résumé searching	Qualified to be placed																			
80	Employers select for interview	Referred for placement																			
80	Learners review interview selections	Placed/company																			
80	Automatic pairing	Registered after placement																			
82	Students view scheduled interviews	Placed but not registered																			
82	Bulletin board news	Dates visited/company																			
83	Provide student telephone numbers and email	Progress marks and final mark																			
83	Provide student reference material	Summative report per student on all aspects of experiential learning																			
85	Provide contact information	History of participating companies																			
85	Run career fairs	Active companies																			
85	Match résumés to jobs	Contact person/company																			
87	Advertise vacancies	Companies and dates visited																			
87	Promote employer visibility on campus	Students referred to a company																			
90	Maintain job database	Main activities of a company																			
95	Recognise employers	Variety of placement positions within a company, in different courses																			
		Accessibility of a company																			
		Introduction to co-operative education																			
		Policies and procedures of the "On-line Placement System"																			
		Available communication channels																			
		Recognition of prior learning of co-operative education																			
		Self-assessment and placement preferences																			
		Compiling a CV/résumé																			
		Professional conduct																			
		Interviewing skills																			
		Work ethic																			
		Career exploration/mobility																			
		Workplace experience																			

REFER TO RELEVANT PAGES IN CHAPTER 3		CRITICAL ACTIVITIES										
		STUDENT SUB-SYSTEM										
		Initially applying to be placed	Applied to be placed but do not qualify	Qualified to be placed	Referred for placement	Placed/company	Registered after placement	Placed but not registered	Dates visited/company	Progress marks and final mark	Summative report per student on all aspects of experiential learning	
		EMPLOYER SUB-SYSTEM										
		History of participating companies	Active companies	Contact person/company	Companies and dates visited	Students referred to a company	Main activities of a company	Variety of placement positions within a company, in different courses	Accessibility of a company	SHORT COURSE SUB-SYSTEM		
		Introduction to co-operative education	Policies and procedures of the "On-line Placement System"	Available communication channels	Recognition of prior learning of co-operative education	Self-assessment and placement preferences	Compiling a CV/résumé	Professional conduct	Interviewing skills	Work ethic	Career exploration/mobility	Workplace experience
79	Integrate co-op experience and academic programmes			✓						✓		
79	Review co-op experience											
102	Support learning activities			✓						✓		
102	Support skill acquisition						✓					
75	Support for liaison with placement providers											
78	Develop and monitor a placement											
102	Record visits by co-ordinators								✓			
104	Organise work site visits											
77	List companies dealt with											
77	Update contact information											
102	Register participating employers											
102	Record industry participants											
102	Record number of overseers											
77	View details of other students if "public"											

10 July 2001

Dear Colleague

The history to develop a Management Information System for co-operative education, does not reflect the real need, urgency and the total commitment of the practitioners of co-operative education. In an effort to solve this problem, I have registered the following research project :

**A CONCEPTUAL MODEL FOR A
CO-OPERATIVE EDUCATION MANAGEMENT SYSTEM
FOR TERTIARY INSTITUTIONS**

PROBLEM STATEMENT

No standard Management Information System exists for Co-operative Education in Higher Education Institutions. Ad hoc systems from various institutions, lead to insufficient and ineffective service to the employer community and inappropriate quality assurance/control.

IDENTIFY ELEMENT FOR INSTRUMENT

This questionnaire is a pilot study to determine the scope as well as the importance of the various elements required within a MIS. Your participation and honest contributions are vital for the success of this project. Kindly complete the attached questionnaire and return it to Aneen Koch, Co-operative Education, Cape Technikon, P O Box 652, Cape Town, 8000, South Africa. Your quick response will be highly appreciated.

We will keep you informed on the progress of the project.

Yours sincerely

Aneen Koch (Ms)

CO-OPERATIVE EDUCATION

Pilot Study by Aneen Koch, Cape Technikon, SOUTH AFRICA

MANAGEMENT INFORMATION SYSTEM (MIS)

NAME OF INSTITUTION	
CONTACT PERSON	
E-MAIL ADDRESS	

ADDITIONAL INFORMATION

1. Please note that this questionnaire focuses on :

(a) Reports required for :

- Day to day management of co-operative education by both the co-ordinator/councillor and/or the next higher level to whom the co-ordinator/councillor reports
- Quality assurance of co-operative education
- Quality control of co-operative education (Accreditation Board/Bodies)

(b) an Internet system for the management of placements of students

(c) short courses necessary for the orientation of students prior to placement

(d) information of companies.

2. In the list of reports, the sort selection in brackets, eg: course/semester/area/province, refers to the following :

Please refer to item 1, "List of students applying to be placed" can be sorted for :

- one course, a selection of courses or all the courses;
- similarly it can be sorted for a specific semester (or terms), a grouping of semesters (or terms) – start semester (or term), end semester (or term) – eg: 99/1 or 99/2 to 01/1;
- so can this list also be sorted per one industrial/commercial area or a group of areas – also per city or a group of cities – and one province, a selection of provinces or all the provinces;
- please note that international placements will simply be added as "provinces".

(a) STUDENTS' REPORTS (Student number plus study address and address of next of kin)	VERY IMPORTANT	IMPORTANT	NICE TO HAVE	NOT IMPORTANT
1. List of students applying to be placed (course/semester/area/city/province)				
2. List of students applying to be placed, but do not qualify (course/semester/area/city/province)				
3. List of students qualifying to be placed (course/semester/area/city/province)				
4. List of students referred for placement (course/semester/area/city/province)				
5. List of students placed/company (course/semester/area/city/province)				
6. List of students registered after placement (course/semester/area/city/province)				
7. List of students placed, but not registered/company (company address/course/semester/area/city/province)				
8. List of students and dates visited/co-ordinator (course/semester/area/city/province)				
9. List of students progress marks and final mark (company address/course/semester/area/city/province)				
10. Summative report per student on all aspects of experiential learning eg. referred, placed, visited, reports, etc.				

(b) REPORTS ON COMPANIES (Postal and Physical addresses)	VERY IMPORTANT	IMPORTANT	NICE TO HAVE	NOT IMPORTANT
1. List and history of participating company(ies) (course/area/city/province)				
2. List of active companies (course/semester/area/city/province)				
3. Contact persons per company/course (area/city/province)				
4. List of companies and dates visited/co-ordinator				

(semester/city/province)				
5. List of students referred to a company (course/semester/area/city/province)				

(c) SHORT COURSES ON THE INTRANET SYSTEM	VERY IMPORTANT	IMPORTANT	NICE TO HAVE	NOT IMPORTANT
1. The Internet				
2. Policies and procedures of the "Online Placement System"				
3. Communication channels				
4. Compiling CV/Résumé				
5. CV/Résumé committed to system				
6. Career counselling such as in, sub-disciplines within a course and an indication of their first, second and third choices				
7. Placement search techniques and the professional conduct in the search for a placement				
8. Interviewing skills				
9. Work ethics				
10. Career exploration/mobility				

INFORMATION OF COMPANIES	VERY IMPORTANT	IMPORTANT	NICE TO HAVE	NOT IMPORTANT
1. Main activities (sub-disciplines within a course)				
2. Variety of placement positions in different courses				
3. Placement offers (course/semester/area/city/province)				
4. Area/City/Province				
5. Accessibility (road/taxi/rail)				

Your participation is highly appreciated!

Aneen Koch

CO-OPERATIVE EDUCATION MANAGEMENT INFORMATION SYSTEM

A Conceptual Model for a Co-operative Education Management Information System for Tertiary Institutions in South Africa

Researcher : ANEEN KOCH
Cape Peninsula University of Technology, Cape Town

E-mail : kocha@cput.ac.za

SURVEY FOR MANAGERS AND PRACTITIONERS OF CO-OPERATIVE EDUCATION AT TECHNIKONS

Dear Colleague

Internationally various systems to administer and manage the total co-operative education system are in use. The co-operative education models internationally differ to a large extent. Ad hoc systems often lead to insufficient and ineffective service to the employer community and inappropriate quality assurance. This publication will provide guidance to managers and practitioners of co-operative education when selecting elements and systems of a Management Information System for Co-operative Education.

This questionnaire is a final study to verify the scope as well as the importance of the various elements required within a MIS. Your participation and honest contributions are vital for the success of this project. Kindly complete the attached questionnaire and return it to Aneen Koch, Co-operative Education, Cape Peninsula University of Technology (Cape Technikon), P O Box 652, Cape Town, 8000. Your quick response will be highly appreciated.

Please note that this questionnaire focuses on :

- (a) Reports required for :
- Day to day management of co-operative education by both the co-ordinator/ councilor and/or the next higher level to whom the co-ordinator/councilor reports
 - Quality assurance of co-operative education
 - Quality control of co-operative education (Accreditation Boards/Bodies)
- (b) An Intranet system for the management of placements of students
- (c) Short courses necessary for the orientation of students prior to placement
- (d) Information of companies.

We will keep you informed on the progress of the project.

A. RESPONDENT'S INFORMATION :

Respondent's Name :

Position & Title :

Institution's Name :

City :

E-mail :

Web Site Address :

Course(s) Programme(s) involved with :

Is the course/programme credit bearing?

YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
-----	--------------------------	----	--------------------------

If "YES" is it

(a) Additive credits

(b) Non-additive credits

Number of students by placement :

Number of placements by academic year :

Number of placements by course/programme :

In the list of reports, the sort selection in brackets, e.g.: course/semester/area/province, refers to the following :

Please refer to Section B "Reports Required", Item 1, "List of students applying to be placed" can be sorted for :

- One course, a selection of courses or all the courses;
- Similarly it can be sorted for a specific semester (or terms), a grouping of semesters (or terms) – start semester (or term), end semester (or term) – e.g. 02/1 or 02/2 to 03/1;
- This list can also be sorted by one industrial/commercial area or a group of areas – also by city or a group of cities – and one province, a selection of provinces or all the provinces;
- Please note that international placements will simply be added as "provinces".

B. REPORTS REQUIRED

PLEASE ASSIGN A LEVEL OF IMPORTANCE RATING TO EACH OF THE FOLLOWING

- (a) Reports, and
(b) Sort Options

(a) Students' Reports	Very important	Important	Nice to Have	Not Important
(Student number plus study address and address of next of kin)				
1. List of students applying to be placed : Sort By : Course Semester Area City Province	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2. List of students applying to be placed, but do not qualify : Sort By : Course Semester Area City Province	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
3. List of students qualifying to be placed : Sort By : Course Semester Area City Province	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
4. List of students referred for placement : Sort By : Course Semester Area City Province	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
5. List of students placed by company : Sort By : Course Semester Area City Province	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
6. List of students registered after placement : Sort By : Course Semester Area City Province	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

(a) Students' Reports		Very important	Important	Nice to Have	Not Important
(Student number plus study address and address of next of kin)					
7. List of students placed, but not registered by company : Sort By : Course Semester Area City Province	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
8. List of students and dates visited by co-ordinator : Sort By : Course Semester Area City Province	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
9. List of students progress and final marks : Sort By : Course Semester Area City Province	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
10. Summative report by student on all aspects of Experiential Learning : Sort : Referred Placed Visited Work Reports	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
11. OTHER :	<input type="text"/> <input type="text"/> <input type="text"/>				

(b) Reports on Companies		Very important	Important	Nice to Have	Not Important
(Postal and physical address)					
1. List and history of participating company(ies) : Sort By : Course Semester Area City Province	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2. List of active companies : Sort By : Course Semester Area City Province	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

(b) Reports on Companies		Very important	Important	Nice to Have	Not important
(Postal and physical address)					
3. Contact persons :	Sort By : Company Course	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
4. List of companies and dates visited :	Sort By : Co-ordinator Course Semester City Province	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
5. List of students referred to a company :	Sort By : Course Semester Area City Province	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
6. Main activities of a company (sub-disciplines within a course)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Variety of placement positions within a company, in different courses		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Accessibility of a company (By road/By taxi/By rail)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Accommodation near the company		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. OTHER :					

(c) Short Courses on the Intranet System		Very important	Important	Nice to Have	Not important
1. Introduction to co-operative education (CE) (field, terms, concepts of CE, role and responsibilities of participants in CE)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Policies and procedures of the "Online Placement System"		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(c) Short Courses on the Intranet System		Very important	Important	Nice to Have	Not Important
3. Communication channels		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Self-assessment and placement preferences		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Compiling CV/résumé		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Professional conduct		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Interviewing skills		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Work ethics		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Career exploration/mobility		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Workplace experience		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. OTHER :					

Your participation is highly appreciated!

Aneen Koch

CO-OPERATIVE EDUCATION MANAGEMENT INFORMATION SYSTEM

A Conceptual Model for a Co-operative Education Management Information System for Tertiary Institutions in South Africa

Researcher : ANEEN KOCH
Cape Peninsula University of Technology, Cape Town

E-mail : kocha@cput.ac.za

SURVEY FOR MANAGERS AND PRACTITIONERS OF CO-OPERATIVE EDUCATION AT COLLEGES

Dear Colleague

Internationally various systems to administer and manage the total co-operative education system are in use. The co-operative education models internationally differ to a large extent. Ad hoc systems often lead to insufficient and ineffective service to the employer community and inappropriate quality assurance. This publication will provide guidance to managers and practitioners of co-operative education when selecting elements and systems of a Management Information System for Co-operative Education.

This questionnaire is a final study to verify the scope as well as the importance of the various elements required within a MIS. Your participation and honest contributions are vital for the success of this project. Kindly complete the attached questionnaire and return it to Aneen Koch, Co-operative Education, Cape Peninsula University of Technology (Cape Technikon), P O Box 652, Cape Town, 8000. Your quick response will be highly appreciated.

Please note that this questionnaire focuses on :

- (a) Reports required for :
- Day to day management of co-operative education by both the co-ordinator/ councilor and/or the next higher level to whom the co-ordinator/councilor reports
 - Quality assurance of co-operative education
 - Quality control of co-operative education (Accreditation Boards/Bodies)
- (b) An Intranet system for the management of placements of students
- (c) Short courses necessary for the orientation of students prior to placement
- (d) Information of companies.

We will keep you informed on the progress of the project.

A. RESPONDENT'S INFORMATION :

Respondent's Name :

Position & Title :

Institution's Name :

City :

E-mail :

Web Site Address :

Course(s) Programme(s) involved with :

Is the course/programme credit bearing?

YES	<input type="text"/>	NO	<input type="text"/>
-----	----------------------	----	----------------------

If "YES" is it

(a) Additive credits

(b) Non-additive credits

Number of students by placement :

Number of placements by academic year :

Number of placements by course/programme :

In the list of reports, the sort selection in brackets, e.g.: course/semester/area/province, refers to the following :

Please refer to Section B "Reports Required", Item 1, "List of students applying to be placed" can be sorted for :

- One course, a selection of courses or all the courses;
- Similarly it can be sorted for a specific semester (or terms), a grouping of semesters (or terms) – start semester (or term), end semester (or term) – e.g. 02/1 or 02/2 to 03/1;
- This list can also be sorted by one industrial/commercial area or a group of areas – also by city or a group of cities – and one province, a selection of provinces or all the provinces;
- Please note that international placements will simply be added as "provinces".

B. REPORTS REQUIRED

PLEASE ASSIGN A LEVEL OF IMPORTANCE RATING TO EACH OF THE FOLLOWING

- (a) Reports, and
- (b) Sort Options

(a) Students' Reports	Very important	Important	Nice to Have	Not Important
(Student number plus study address and address of next of kin)				
1. List of students applying to be placed : Sort By : Course Semester Area City Province	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2. List of students applying to be placed, but do not qualify : Sort By : Course Semester Area City Province	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
3. List of students qualifying to be placed : Sort By : Course Semester Area City Province	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
4. List of students referred for placement : Sort By : Course Semester Area City Province	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
5. List of students placed by company : Sort By : Course Semester Area City Province	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
6. List of students registered after placement : Sort By : Course Semester Area City Province	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

(a) Students' Reports		Very important	Important	Nice to Have	Not Important
(Student number plus study address and address of next of kin)					
7. List of students placed, but not registered by company :		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sort By :	Course	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Semester	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	City	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Province	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. List of students and dates visited by co-ordinator :		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sort By :	Course	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Semester	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	City	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Province	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. List of students progress and final marks :		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sort By :	Course	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Semester	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	City	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Province	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Summative report by student on all aspects of Experiential Learning :		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sort :	Referred	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Placed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Visited	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Work Reports	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. OTHER :					

(b) Reports on Companies		Very important	Important	Nice to Have	Not Important
(Postal and physical address)					
1. List and history of participating company(ies) :		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sort By :	Course	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Semester	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	City	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Province	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. List of active companies :		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sort By :	Course	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Semester	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	City	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Province	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(b) Reports on Companies (Postal and physical address)	Very important	Important	Nice to Have	Not Important
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3. Contact persons : Sort By : Company Course	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. List of companies and dates visited : Sort By : Co-ordinator Course Semester City Province	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. List of students referred to a company : Sort By : Course Semester Area City Province	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Main activities of a company (sub-disciplines within a course)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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7. Variety of placement positions within a company, in different courses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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8. Accessibility of a company (By road/By taxi/By rail)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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9. Accommodation near the company	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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10. OTHER :				

(c) Short Courses on the Intranet System	Very important	Important	Nice to Have	Not Important
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1. Introduction to co-operative education (CE) (field, terms, concepts of CE, role and responsibilities of participants in CE)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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2. Policies and procedures of the "Online Placement System"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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3. Communication channels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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(c) Short Courses on the Intranet System		Very important	Important	Nice to Have	Not Important
4. Self-assessment and placement preferences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Compiling CV/Résumé	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Professional conduct	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7. Interviewing skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8. Placement search technologies and the professional conduct in the search for a placement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9. Workplace experience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
10. Keeping up-to-date with dynamics of workplace (sexual harassment, conflict management, labor law)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
11. OTHER :					

Your participation is highly appreciated!

Aneen Koch

CO-OPERATIVE EDUCATION MANAGEMENT INFORMATION SYSTEM

A Conceptual Model for a Co-operative Education Management Information System for Tertiary Institutions in South Africa

Researcher : ANEEN KOCH
Cape Peninsula University of Technology, Cape Town, SOUTH AFRICA

E-mail : kocha@cput.ac.za

SURVEY FOR MANAGERS AND PRACTITIONERS OF CO-OPERATIVE EDUCATION AT INTERNATIONAL UNIVERSITIES

Dear Colleague

Internationally various systems to administer and manage the total co-operative education system are in use. The co-operative education models internationally differ to a large extent. Ad hoc systems often lead to insufficient and ineffective service to the employer community and inappropriate quality assurance. This publication will provide guidance to managers and practitioners of co-operative education when selecting elements and systems of a Management Information System for Co-operative Education.

This questionnaire is a final study to verify the scope as well as the importance of the various elements required within a MIS. Your participation and honest contributions are vital for the success of this project. Kindly complete the attached questionnaire and return it to Aneen Koch, Co-operative Education, Cape Peninsula University of Technology (Cape Technikon), P O Box 652, Cape Town, 8000, South Africa. Your quick response will be highly appreciated.

Please note that this questionnaire focuses on :

- (a) Reports required for :
- Day to day management of co-operative education by both the co-ordinator/ councilor and/or the next higher level to whom the co-ordinator/councilor reports
 - Quality assurance of co-operative education
 - Quality control of co-operative education (Accreditation Boards/Bodies)
- (b) An Intranet system for the management of placements of students
- (c) Short courses necessary for the orientation of students prior to placement
- (d) Information of companies.

We will keep you informed on the progress of the project.

A. RESPONDENT'S INFORMATION :

Respondent's Name :

Position & Title :

Institution's Name :

City :

E-mail :

Web Site Address :

Course(s) Programme(s) involved with :

Is the course/programme credit bearing?

YES	<input type="text"/>	NO	<input type="text"/>
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If "YES" is it

(a) Additive credits

(b) Non-additive credits

Number of students by placement :

Number of placements by academic year :

Number of placements by course/programme :

In the list of reports, the sort selection in brackets, e.g.: course/semester/area/province, refers to the following :

Please refer to Section B "Reports Required", Item 1, "List of students applying to be placed" can be sorted for :

- One course, a selection of courses or all the courses;
- Similarly it can be sorted for a specific semester (or terms), a grouping of semesters (or terms) – start semester (or term), end semester (or term) – e.g. 02/1 or 02/2 to 03/1;
- This list can also be sorted by one industrial/commercial area or a group of areas – also by city or a group of cities – and one province, a selection of provinces or all the provinces;
- Please note that international placements will simply be added as "provinces".

B. REPORTS REQUIRED

PLEASE ASSIGN A LEVEL OF IMPORTANCE RATING TO EACH OF THE FOLLOWING

- (a) Reports, and
- (b) Sort Options

(a) Students' Reports		Very important	Important	Nice to Have	Not important
(Student number plus study address and address of next of kin)					
1.	List of students applying to be placed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	List of students applying to be placed, but do not qualify	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	List of students qualifying to be placed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	List of students referred for placement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	List of students placed by company	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	List of students registered after placement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	List of students placed, but not registered by company	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	List of students and dates visited by co-ordinator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	List of students progress and final marks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	Summative report by student on all aspects of Experiential Learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. OTHER :					

(b) Reports on Companies		Very important	Important	Nice to Have	Not important
(Postal and physical address)					
1.	List and history of participating company(ies)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	List of active companies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(b) Reports on Companies (Postal and physical address)		Very important	Important	Nice to Have	Not Important
3. Contact persons		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. List of companies and dates visited		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. List of students referred to a company		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Main activities of a company (sub-disciplines within a course)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Variety of placement positions within a company, in different courses		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Accessibility of a company (By road/By Taxi/By Rail)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Accommodation near the company		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. OTHER :					

(c) Short Courses on the Intranet System		Very important	Important	Nice to Have	Not Important
1. Introduction to co-operative education (CE) (field, terms, concepts of CE, role and responsibilities of participants in CE)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Policies and procedures of the "Online Placement System"		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Communication channels		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Self-assessment and placement preferences		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Compiling CV/Résumé		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Professional conduct		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(c) Short Courses on the Intranet System		Very important	Important	Nice to Have	Not Important
7. Interviewing skills		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Workplace ethics		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Career exploration/mobility		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. OTHER :					

Your participation is highly appreciated!

Aneen Koch