

AN EVALUATION OF CO-OPERATIVE EDUCATION IN COST ACCOUNTING

AT THE CAPE TECHNIKON

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In fulfilment of the requirements for the degree of

MASTER OF EDUCATION

by

E W Pienaar

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## CHAPTER 1

### INTRODUCTION

#### 1.1 THE TECHNIKONS' TRAINING PHILOSOPHY AND OBJECTIVES

The Advanced Technical Education Act, Act No 40 of 1967, provided for the establishment of Colleges for Advanced Technical Education which preceded today's Technikons. According to section 2 of this act, these institutions were established to offer advanced technical education and training" and "to provide to full-time pupils .... such vocational education ...."

According to the Teaching Policy of the Cape Technikon, the technikon's training has a tertiary and vocational nature and consequently each course developed, is developed for a specific career. It can, therefore, be said that the offerings of a Technikon are career orientated. Career education (Van Zyl 1971, p.27) means that the emphasis in the training is not placed on basic knowledge but on the application thereof in such a manner that the student will appreciate its value in his future career. Meiring & Jacobs (1984, p.11) state that the student will absorb the knowledge in view of the successful application thereof in his career and not in view of the academic-philosophic value of such knowledge. Although the theory may never be neglected, the emphasis will always be placed on the practical application.

Technikon training, therefore, implies that a student makes his choice of career before the commencement of his studies. Study courses are not designed to give the student a wide choice of career after completion of his course. His choice of career is a very specific one, such as a civil engineering technician, or a medical technician, or a graphic designer, or a public relations officer, or a cost accountant etc. The student must acquire knowledge, skills, attitudes and values as required by clearly identified working circumstances. This will be done in such a manner that he or she will be able to work productively and effectively immediately after completion of the course. The managing director of Trust Bank, Dr. Van Wyk (1986, p.3) states that the business community expects students to make a unique and worthwhile contribution from their very first day in full-time employment. This contribution can only be made through the application of the science in which the student was trained. It is obvious that the success of technikon training will be measured by the success of its students in the work situation.

It follows logically that the technikons' training will keep track with the labour requirements of commerce and industry. Education and training cannot merely take place as a matter of interest; it must satisfy the demand for properly qualified employees. As far back as 1971 the Director of the Pretoria College for Advanced Technical Education (now the Technikon Pretoria) (Van Zyl 1971, p.239) wrote that the greatest and most urgent manpower need of commerce, industry and government is

for men and women who have taken career-orientated tertiary courses. It is the technikons' aspiration to fulfill this need.

#### 1.2 CO-OPERATIVE EDUCATION AS A METHOD TO REALISE THE TECHNIKONS' TRAINING OBJECTIVES

The assumption that technikon training should be career orientated implies that there should be co-operation between the educational institution (technikon) on the one hand and practice (commerce and industry) on the other hand. With the assistance of commerce and industry, technikons must accept the responsibility for the training of productive employees. In this training process the most productive and career-orientated teaching methods will have to be used. Very close collaboration should exist between the technikons and commerce and industry. This collaboration is indispensable because of the rapid scientific and technological advancements to which industry must adapt. Meiring & Jacobs (1984, p.10) state that if technikons must operate in a career-orientated manner, there will have to be a continuous cross pollination between vocational education and practice.

There exists a variety of methods whereby practice can be simulated in the class room. These methods are well-known and they do not require attention in this thesis. However, it remains true that there is no substitute for personal experience and from this principle flows the method of co-operative education. (Steyl 1971, p.10)

According to this training method students are subjected to learning situations in the real professional world, over and above normal lectures and laboratory practice. In this manner an integration is brought about between traditional study and practical experience. Co-operative education (Meiring 1980, p.31) provides students with a meaningful interaction with the total environment and provides education with a large measure of reality and relevance.

The specific value of co-operative education lies in the fact that the student experiences and masters the skills required by practice. The student also brings his practical experience back to the class room and this leads to innovation - innovation also on the part of the lecturer who may be inclined to stagnate in a closed academic environment. Co-operative education has a wholesome influence on the innovation which must be continually present in career education. A detailed analysis of the value of co-operative education is made in chapter 2.

The technicians' training objectives can best be attained by placing the student in the professional world and allowing him to experience reality. A system of co-operative education provides the key to the realisation of the technicians' philosophy and objectives.

### 1.3 STATEMENT OF THE PROBLEM AND THE OBJECT OF THIS RESEARCH

While there is no doubt that co-operative education provides the answer to the ideal of applied practical training (Du Plessis & Wells 1984, p.3), the co-operation between the educational institution and practice may take place in various ways. In technikon context the sandwich system, applied in the training of engineering and other technicians, is well-known. These applications, however, are limited to the technological and scientific disciplines. In the humanities ("humanities" used in technikon context) and more specifically the commercial sciences, very little has thus far come of this ideal of co-operative education. Discussions among the various technikons have taken place, but very little flowed from it. Courses are largely theoretical and consequently the technikon objective of practical and career orientated training has not been attained in the commercial areas of study.

An investigation into the effectiveness of university training of cost accountants (Van Niekerk 1971, p.24) reveals that, although their training is regarded as adequate and detailed, the major objection and shortcoming is their lack of practical experience. It sometimes requires a large investment in time and money before such "trained" people can hold their own in practice.

Since 1982 a form of co-operative education has been applied in the training of cost accountants in the School of Accounting of the Cape Technikon. The object of this research is the investi-

gation and description of this application of co-operative education which is generally referred to as "practical work". An evaluation will be made of the following aspects of the training of cost accountants: the curriculum, the practical work that the students are expected to do, career opportunities and the training requirements of practice. It is confidently hoped to make suggestions which may lead to the improvement of the current curriculum of the National Diploma in Cost Accounting, the syllabuses of the subject Industrial Accounting as well as the system of co-operative education that is being used.

#### 1.4 RESEARCH APPROACH AND METHODOLOGY

In the first instance a study was made of the literature available on co-operative education and the various forms it may take. The objective was to highlight those aspects which apply generally to all forms of co-operative education. Aspects such as the introduction of a system of co-operative education, the placement of students, the functions of co-ordinators, the advantages of co-operative education and the evaluation of students' work, were given attention.

Secondly, while it is generally accepted that co-operative education was initiated by Prof. Herman Schneider as far ago as 1906 at the University of Cincinnati in the U.S.A. (Wilson & Lyons, p.1), the training of cost accountants at South African Technikons was only started in 1966. The system of practical work, as applied to the training of cost accountants at the Cape Technikon, only commenced in 1982. So far a very limited

number of students have, therefore, been trained through this system. Questionnaires have been sent to ex-students of this system to obtain their views of the system of practical work and to determine whether they have successfully adapted to professional life and what progress they have made in terms of salary and promotion. Through a questionnaire the views on their practical work have also been obtained from students during their third year of study.

Questionnaires on attitudes have also been completed by second year students and again by the same students in their third year of study. Similar questionnaires on students' attitudes were also completed by lecturers. These questionnaires dealt with the students' attitude towards life, their studies, practical work as well as the careers they are being prepared for. It is hoped that it can be shown that students' attitudes changed significantly during the time they were exposed to practical work.

The second set of questionnaires was completed by employers. These employers were divided into two groups. The first group consists of those employers who participated in the co-operative training system by appointing third year students in their firms, and supervising their progress. The objective was to determine these employers' views on the system, as well as to determine the extent to which the present course satisfies the training requirements of the industry. The second set of employers were those employers who employed the diplomated

students. The opinion of these employers is highly regarded because they represent the firms which eventually reaped the benefits from this co-operative training system.

A third set of questionnaires was completed by those lecturers teaching third year students during their co-operative training period as well as those lecturers responsible for these students' placement - generally referred to as co-ordinators. The objective in this case was to determine the role which co-operative education fulfils in the students' preparation for a career.

In the fourth instance a study has also been made of students' technical reports. These reports are written while the student does his practical work and are particularly valuable in establishing the student's insight into the employer's cost accounting system. In addition these reports also provide an indication of the student's total development as a result of exposure to real work situations; a development which, under this co-operative education system, takes place simultaneously with the student's theoretical training to qualify for his diploma.

Finally, I attended the Fourth World Conference on Co-operative Education in Edinburgh, Scotland during September 1985. This assisted me in gaining an appreciation of co-operative education as applied internationally. A tour of British Universities and Polytechnics, which I undertook after the conference, added to the perspectives gained.

## CHAPTER 2

### CO-OPERATIVE EDUCATION - RELATIVE ADVANTAGES AND IMPLEMENTATION ISSUES

#### 2.1 DEFINITION

The basic principle underlying co-operative education is that optimum personal development can best be achieved through a method of education which combines classroom teaching with regular periods of planned and controlled practical experience away from the academic community (Meiring D.H., 1980, p.31)

Practical experience in co-operative education usually takes the form of paid employment in commerce and industry. This practical experience under supervision in the real professional world for which the student is being prepared, promotes the learning process as well as the students' eventual adjustment in professional life. Over and above the usual lectures, tutorials and excercises, the co-operative method supplies learning situations in the practical world which enables the student to become familiar with theory and practice.

The co-operative method, which integrates study and prac-

tical experience, promotes better preparation for life because it makes education more real.

According to Meiring (1980, p.32) this training method leads to a higher level of learning - a level of learning which develops the whole man because it bridges the gap between academic study and the knowledge a student requires to be productive in his professional life.

Co-operative education is described by the National Commission for Co-operative Education in the USA (quoted by Steyl 1981, p.7) as follows:

"This is an educational plan which integrates classroom experience and practical work experience in industrial, business, government, or service-type work situations. The work experience constitutes a regular and essential element in the educative process, and some minimum amount of work experience and minimum standards of performance are included in the requirements of the institution for the award of a qualification. In addition, there must be liaison between the administration of the institution and the employing firm. The essential criteria are that the work experience be considered an integral part of the education process, and that the institution take a definite responsibility for this integration."

The South African Association for Co-operative Education gives the following definition of co-operative education in its constitution - a definition which essentially corresponds with the definition of the Canadian Association:

"Co-operative education is a teaching or training method which combines on-campus study with off-campus work experience. Students taking co-operative education courses, alternate between periods of study at educational institutions and periods of in-service training. Employment areas are directly related to study areas followed by the students."

At the fourth World Conference on Co-operative Education the President of the World Council for Co-operative Education, Dr. W.R. Longworth gave the following definition of Co-operative Education:

"Co-operative Education is a strategy of applied learning which is a structured programme developed and supervised by an educational institution in collaboration with an employing organisation, in which relevant productive work is an integral part of a student's regular academic programme and is an essential component of the final assesment. Such programmes should normally commence and terminate with an academic period and the work experience component should involve productive work and should comprise a reasonable proportion of the total programme."

The following criteria (Meiring and Jacobs 1984, p.4) are usually applicable:

- The student does productive work and does not only observe;
- the student's progress in his work is monitored by the educational institution;
- both the employer and the educational institution supervises and evaluates the student's work;
- the student must obtain a pass mark in both the theoretical examination and the in-service program to qualify for the award of the certificate or diploma; and
- the student usually receives a remuneration for his service.

These definitions and creteria point towards the existence of a wide variety of forms of co-operative education. Some of these forms and models of co-operative education are being considered in the following section.

## 2.2 ATTENDANCE PATTERNS

Along with the development of co-operative education a variety of course patterns developed. These patterns, which are all directed towards effective training, differ from course to course, and often for the same course, from one educational institution to another. The following are some of the more general attendance patterns:

2.2.1 The traditional training of engineers and accountants, viz a full-time degree course for a number of years followed by

a number of years of in-service training, are some of the earliest examples of co-operative education in which the principle of practical experience was emphasized.

2.2.2 The alternating form of co-operative education (Du Plessis & Wells, 1984, p.4) or the sandwich system as it is generally known, is generally applied in the training of technicians at South African Technikons. In countries such as Great Britain and the United States the sandwich system is also applied in study areas such as Commerce, Management and Accounting. According to this system students alternate periods of full-time study with periods of full-time work of more or less equal duration.

The student body is divided into two in the alternating system. While one group is working in practice, the other group is attending the educational institution. In the next training period the two groups merely change places. The students therefore "alternate" periods of study and work experience. This system has been introduced to ensure that employers will be able to fill their posts continuously and to ensure that the educational institution derives maximum usage from its facilities.

The sandwich system may be subdivided into two main types. The first type is known as the thick sandwich and consists wholly or substantially of full years of academic study alternated with full years of in service training. An example of this would be two years of academic study followed by one year of industrial training and ending with a further one year's academic study.

Variations exists - the only proviso is that the course must start and end with a period of academic study.

The second type is the thin sandwich. This type of course is usually of three or four year's duration and includes periods of academic training which are less than one year long, alternated with two or more similar periods of in service training which individually are also of less than a year's duration. An example of this type would be a three year course of which the first semester each year is devoted to academic study, while the second semester is spent in practice. Variations sometimes take place when a student stays at the academic institution or in practice for longer than a semester, and in so doing, for example, completes two blocks of theory or two blocks of in service training in one year.

Du Plessis (1983, p.80) states that there is a general tendency in the United States as well as in the United Kingdom to move away from the thin sandwich pattern and to give preference to the thick sandwich. It is generally believed that the thick sandwich system is more advantageous to both the student and the employer. It is felt that a higher level of productivity is achieved as a result of the greater continuity which is inherent in the thick sandwich system. This school of thought is gradually gaining ground in South Africa where, in the training of technicians, the thin sandwich system is used mainly.

2.2.3 In the parallel form of Co-operative education (Du Plessis & Wells, p.5) students attend classes for part of the day or week and work in practice during the remainder of the day or week. Students do jobs which are related to their studies. These jobs are obtained at firms which are situated near the educational institution and students are usually paid for their work.

It is noticeable that the parallel form of co-operative education is used in technikon areas of study which originated in later years, or which became co-operative in later years. In other words in all these instances where co-operative education was introduced lately, the parallel method was preferred. The following are a number of examples:

In the three year National Diploma in Food Service Management and Catering students spend the first two years and the second semester of the third year at the Technikon. The first semester of the third year is divided between work in industry and training at the Technikon. Theoretical training and practical experience, therefore, go hand in hand during this semester. At this stage four days per week are spent in industry and one day in the Technikon.

The three year National Diploma in Public Relations is a second typical example of the application of the parallel method of co-operative education. In this case as well, the first two years are spent in the Technikon while students spend their third

year of study in paid employment. Students, however, initially, returned to the Technikon for two afternoons per week and currently return for one full day per week. This academic period is devoted to the students' two major subjects which are completed during the third year. Because of the students' movement between the Technikon and the industry an integration of theory and practice takes place.

A third example worth mentioning here is the "half day arrangement" which is a parallel method of co-operative education applied in the training of Marketing and Sales Managers. Again, the first two years is devoted to academic study in the Technikon. During their third year of study, students attend the Technikon for the first half of each day and then change over to employment during the remainder of the day. Integration of theory and practice on a daily basis, is achieved with this method.

Finally, a fourth example of parallel co-operative education mentioned here is the training provided for the National Diploma in Cost Accounting at the Cape Technikon. Again, the first two years is devoted to academic study in the Technikon. The third year is preceded by a period of one month of continuous employment during the vacation. During the third year students move between the Technikon and the industry. Initially one day per week was spent in industry and the remaining four days at the Technikon. Subsequently, mainly as a result of this research, practical work was extended to two days per week spent in industry while the remaining three days per week were

devoted to the students" two major subjects. Currently third year students alternate weekly periods of academic study with similar periods of practical work. Employment is for a remuneration and is often extended through work during afternoons, weekends and vacations during the student's third year of study.

There are advantages and disadvantages attached to all the above forms of Co-operative education, whether alternating or parallel. It would also appear that some forms of co-operative education are more suitable than others for application in certain disciplines. The problem therefore lies in matching the particular discipline with the particular co-operative education method which is most advantageous to that discipline.

The advantages and disadvantages of co-operative education are considered in the next section. A particular form of co-operative education can only be selected for a particular discipline after carefully weighing up its advantages and disadvantages. After selecting a particular form of co-operative education, an institution will have to make several adjustments to ensure the success of the co-operative program.

### 2.3 THE ADVANTAGES OF CO-OPERATIVE EDUCATION

According to a national study carried out in the USA (Wilson & Lyons 1961, p.145) the advantages of co-operative education may be summarised as follows: "The consensus amongst most practitioners is, and other knowledgeable people in the field agree that co-operative education is viable intellectually, admini-

stratively, economically, and, above all, represents a sound alternative to traditional forms of education programs."

There are always three parties involved in a co-operative education program viz. the student, the employer and the educational institution. All three parties accept certain responsibilities and consequently enjoy certain advantages. The following are the advantages accruing to each one of the parties to co-operative education:

### 2.3.1 ADVANTAGES TO THE STUDENT

- According to a study made by W.A. Stull in the USA, (quoted by Du Plessis 1983, p.57) co-operative education students perform well in the class room. They earn higher marks than non-co-operative students who did not enjoy the advantage of relevant co-operative experience.
- By the combination of work experience with an academic program, theory and practice are integrated and students find that their studies are more meaningful. Where academic study follows on practical experience or where they run concurrently, students realise the relevance of their academic study. According to Meiring (1980, p.59) co-operative students compared to non-co-operative students, are socially and academically more mature and more ready to learn.
- The importance of the acceptance of responsibility is always

emphasized in co-operative education. Since the student is placed in a work situation at a remuneration, and with responsibilities similar to those of ordinary full-time employees, he naturally develops a sense of responsibility which stands him in good stead when he returns to his academic studies. (Heerman 1973, p.37)

- Various authors, including Steyl (1981, p.13), emphasize the fact that the combination of work and study improves the student's motivation. These students see the relationship between the work they are involved in and their academic studies, and consequently they show greater interest in their academic work.
- Through their work experience students get into touch with other employers and get involved in human relations. According to Rosholt (1985, p.3) they learn the importance of understanding other people as well as co-operating with others in the work situation.
- Steyl (1981, p.14) emphasises that co-operative education orientates students in respect of professional life. Students are given the opportunity to investigate their own abilities in respect of real work. Students are exposed to a direct method of career guidance in the actual work that they do, and sometimes in some related fields as well.

- Co-operative education makes tertiary education possible for many young people who may not otherwise be able to afford it to go to an institution of higher education. The earnings of students while they work, makes it possible for them to spend certain periods in academic training. (Rosholt 1985, p.3). This is not only advantageous to the student, but also to the country as a whole with its growing demand for trained people in science, engineering, commerce and the professions (Steyl 1981, p.14).
  
- Co-operative education gives students valuable contacts in professional life. It also gives them a headstart in salary and position once they qualify and start permanent employment (Steyl 1981, p.14).
  
- Heerman (1973, p.38) also mentions some other advantages for the student. These include a reduction in the feeling of isolation which students with a cultural and economic backlog often have; it lays the foundation for a life long mixing of work and study; it helps to narrow the generation gap and it gives the student a first hand opportunity to learn the importance of correct clothing, punctuality, friendliness and good language.
  
- Co-operative education students are given the opportunity of using equipment (Rosholt 1985, p.3) not normally available in educational institutions. It often also puts otherwise unavailable information within their reach.

- A final, and very important advantage of co-operative education is that it facilitates the student's transfer from the life of a student to the life of work. In view of the fact that co-operative students have worked before, they do not experience any problems in adjusting to professional life once they have finished their studies (Steyl 1981, p.14).

### 2.3.2 ADVANTAGES TO THE EMPLOYER

- Co-operative education has very definite advantages for the employer in respect of his manpower planning. (Rosholt 1985, p.4). In any business organisation there exists the problem of the filling of posts caused by the retirement or resignation of employees as well as those posts which originate as a result of projected growth. The co-operative training program provides an ideal solution to this problem in that it provides a source of talented, trained and available students to fill such posts. Even firms with fluctuating manpower requirements may employ co-operative students on a temporary basis, without binding the firm permanently.
- From the above follows the advantage in respect of the recruitment of employees. By accepting co-operative students in the business, the firm is in the ideal position that it can train and evaluate the student in the firm's own work situation, and thereafter, if satisfied, the student may be offered permanent employment (Meiring 1980, p.62).

The employer, therefore, has the opportunity to train selected students in the standards and practices of the particular firm, before offering the student permanent employment.

- For those employers who cannot afford their own training programs, co-operative education provides a very economical alternative method of affording training for their employees (Heerman 1973, p.42).
- Heerman (1973, p.43) states that staff turnover is reduced by co-operative education. An employee who has had the opportunity of advancing through a co-operative training program, has had the opportunity of assessing the firm as well as the particular job. He has had the opportunity of evaluating his own adjustment in the firm and his decision to accept permanent employment is based on experience in the particular job situation. The co-operative student is, therefore, less likely to leave the firm than the non-co-operative student.
- The introduction of young students into the firm often leads to new ideas and methods through the stimulation of fresh thinking - thinking which was not affected by experience of the past. In a similar manner new ideas are carried into the firm by lecturers acting as co-ordinators and who are continuously in touch with other firms with similar problems (Meiring 1980, p.63).

- In view of the fact that the employer is a partner in the education program, he has the opportunity to make an input in the training program. The employer can offer advice in respect of important innovations and changes of curricula and syllabuses. This is made possible by the employer's continuous contact with lecturers. This is an ideal opportunity for the firm to make a positive contribution to the development of the youth of our country. (Heerman 1973, p.43). In this way a firm can also improve its image in the community.
  
- Co-operative education has the advantage that it enables the firm to release its highly trained employees from the more basic and elementary work and apply them to more complicated tasks. Students can then be used for the more elementary tasks which better suit their level of development (Heerman 1973, p.44).

### 2.3.3 ADVANTAGES TO THE EDUCATIONAL INSTITUTION

The advantages to the student are obviously also advantages to the educational institution because the success of its students is the main justification for the continued existence of an educational institution. Over and above those advantages to the student, the following additional advantages to the educational institution may be mentioned - advantages which accrue to the institution as a result of its share in the co-operative education program:

- In view of the fact that co-operative education forces academic and industrial staff to meet and co-operate in the interest of a common goal viz. the training of the future professional people, there naturally originate relationships between them which remove ignorance in respect of each others work and objectives. Academics and practitioners get the opportunity to understand each others problems and to exchange research projects and information. Without this exchange academics would remain ignorant of the problems facing scientists and technologists in this century of technological change. Furthermore, without this exchange, industry would also remain ignorant of the advances made in technological training (Meiring 1980, p.65).
  
- During their periods of work students come into contact with the latest technology and developments. According to Du Plessis (1983, p.57) this enables them to make a valuable contribution to class room discussions. In the process students stimulate each others interest in the subject matter under discussion.
  
- Members of the academic staff who act as co-ordinators, make direct contact with firms and gather valuable information for use in the class room and consequently their teaching improves (Du Plessis 1983, p.58). Through this contact with firms, opportunities are also created for academic staff to do consultation work. Contact is also made with leading businessmen who may be used as guest speakers.

- Contact between lecturers and the industry through co-operative education will provide opportunities for applied research.
- Co-operative education increases the institution's students' chances on employment after completion of their studies. It has been shown in the USA (Du Plessis 1983, p.59) that employers prefer to employ students with experience in their various areas of study.
- In many cases lecturers and students enjoy the privilege of the use of new equipment in industry. Often, as a result of this opportunity, the institution need not buy certain expensive, specialised equipment because students will receive training on that equipment in industry (Rosholt 1985, p.5).
- For the educational institution co-operative education also brings the advantage of better utilisation of its facilities. More students can be accommodated during (say) one year because students are not on the campus continuously.
- Often, according to Meiring (1980, p.66), companies who frequently use the co-operative course system are prepared to contribute financially to an educational institution that will enhance the background and skills of the students they employ. Rosholt (1985, p.5) states that "Co-operative education gives greater acknowledgement to the services

which technikons provide for the community and thereby lays a foundation for the financial and moral support of the community."

- Finally, the educational institution obtains valuable contributions from employers in compiling appropriate career-orientated courses (Rosholt 1985, p.4).

To summarize - All three parties involved in any co-operative education program benefit from the scheme:

The student experiences a more meaningful, relevant, appropriate and purposeful training program. It increases the student's motivation and interest in his course and leads to a greater sense of responsibility. At the completion of his course the student will be well trained, he will possess the necessary skills and be mature enough to start employment as a productive and responsible worker.

The employer may use the co-operative training program to recruit appropriate staff. During the training period the employer will be in a position to assess the students ability, effectiveness, attitude and responsibility. After the training period he will be able to use the student as a productive employee who is familiar with company policy and who can immediately accept responsibility.

The staff of the educational institution are constantly in touch

with employers and consequently they are able to keep up to date on new developments in commerce and industry. Furthermore, a better utilisation of facilities is obtained and often financial support is received as a direct result of the liaison which takes place (Steyl 1981, p.15).

#### 2.4 THE DISADVANTAGES OF NON-CO-OPERATIVE EDUCATION OR TRADITIONAL LEARNING

Traditional learning, in other words, full-time attendance of school, college, university etc. has many disadvantages. Many of these disadvantages are referred to by Finkelstein & Gaier (1985) in an article which appeared in "Transition Learning." "Transition Learning" represents a school of thought which concerns itself with the problems involved in the process of transition between the roles of learner and worker. The following are some of these disadvantages of traditional learning:

- Traditional learning has the disadvantage of insulating students within the campus walls, thereby excluding such students from the real life outside the educational institution.
- Finkelstein & Gaier (1985) showed that students of traditional study courses are, as a result of their economic dependence, emotionally more dependent than non-students.
- Student status also has a negative impact on identity forma-

tion. Prolonged student status appears to contribute significantly to feelings of less adequacy and worth in general social interaction and relationships.

- Prolonged student status also has a negative effect on vocational maturity.

While young adults are reaching puberty earlier (Finkelstein & Gaier 1985, p.110), extended periods of student status causes them to remain dependent and immature. A study of the advantages of co-operative education in the previous section indicates the extent to which the disadvantages of traditional learning may be overcome by the introduction of a system of co-operative education - a system which overcomes the time and place boundedness of traditional full-time study.

The negative consequences of not moving to a system of co-operative education are quite clear. We cannot continue to confine students to camps because it is too detrimental for their personal development.

## 2.5 THE IMPLEMENTATION OF A PROGRAM OF CO-OPERATIVE EDUCATION

The introduction of a program of co-operative education should be preceded by the following decisions and important conditions for successful implementation:

Firstly, it must be decided whether co-operative education is feasible for the particular educational institution and whether it is consistent with its basic mission. It has already been shown that co-operative education is a must for the technikons to carry out its basic task of practical and career orientated education i.e. vocational education.

Secondly, the objectives of the co-operative training program must be determined. The most important objective of co-operative education must be educational in nature. It would often be possible through co-operative education to attain objectives of a secondary nature such as the negotiation of an attractive remuneration for students. The most important educational objective viz. that the student must learn, must always be given priority. Furthermore, there should be general acceptance of the broad objectives of co-operative education - acceptance by all the parties involved viz. the employer, the educational institution and the students. It is obviously important that program objectives must be clearly set out (Du Plessis 1983, p.57). In addition it must be noted that the success of the system will depend largely on the enthusiasm of the academic staff involved.

Thirdly, it must be decided which particular attendance pattern will be most appropriate. The various forms which both the alternating and the parallel system may assume, have already been discussed. There exist a variety of possibilities and it is important not to assume that a system which was used success-

fully in one discipline, will necessarily be successful in other disciplines. Wilson and Lyons (1961, p.10) report the results of a committee which investigated co-operative education in the USA, as follows: The most effective co-operative training programs are those programs which were thoroughly planned in respect of objectives, type of work experience, rotation of work and study and the particular student that is served in co-operation with employers. These aspects are all planned so as to derive maximum benefit from the program. When co-operative education is viewed as a basic concept whereby theory and practice are brought together in education, and when flexible procedures are developed in place of a rigid pattern, the program which follows will have the best chance on success. It is consequently recommended that imagination is used in the development of a co-operative training program which will adjust to local conditions and the particular discipline for which it is designed.

Finally, attention must be given to the type of student that will be accommodated in the co-operative training program. Meiring (1980, p.40) distinguishes two types viz. industry-based and institution-based students. The first type of student include those students who are already employed. These students are released for certain periods to attend the educational institution. The employer does not only provide the extra-mural experience, but also continues to pay the students' salary during the academic period.

Institution-based students are usually admitted to the tertiary educational institution immediately after completion of secondary education. Sometimes, however, a period of military training is completed before admission to the tertiary institution. Once the student (institution-based) is registered at the educational institution it becomes the responsibility of the institution to place the student in a suitable work station. (Davies 1985, p.8) The student then usually earns a salary only for time spent at the work station and not for periods of class attendance.

According to Du Plessis (1983, p.69) the tendency in both the USA and the UK is towards a co-operative education system in which the students are institution-based and the responsibility for their placement, therefore, rests with the institution.

The placement of students, the co-ordination of the students' work experience and the question of academic credit for work experience are highlighted in the next sections.

Other aspects of the co-operative education program which deserve attention, but which are not considered in detail in this thesis, are the marketing of the institutions co-operative program, the recruitment of students for the program, the development of the necessary administrative forms and records and, finally, the establishment of an advisory committee consisting of lecturers and employers for each co-operative program.

## 2.6 THE PLACEMENT OF STUDENTS

One of the most important functions of the co-ordinator of co-operative education is the placement of students in work stations which suit their individual needs and interests (Steyl 1985, p.36). Proper placement of students is one of the most important factors which will determine the success of the co-operative training program. It would be fatal to try to achieve the objectives of a course through the placement of students in work stations which are not compatible with their basic aptitudes, career interests and personal characteristics.

Work stations must be very carefully selected to ensure that the individual student's aptitude and interests correspond with the requirements of the work station. (Mitchell 1978, p.69)

Meiring (1980, p.48) distinguishes the following requirements which a placement must satisfy:

- The student must learn through experience and not only through observation. The emphasis must be on practical experience.
- The work must be relevant to the student's level of development, previous experience, course of study and academic year.

- The intellectual and other demands of the work station should increase as the student progresses through his academic curriculum. Towards the end of his course the student should work with more senior officials in the firm than at the beginning and he should be enabled to tackle problems with which graduates are usually confronted.
  
- A student's experience should be as wide as possible, although limitations may be placed on the width of the experience because it is expected that a student-employee would fulfill a basic role viz. that the student should be a productive member of the firm.
  
- A student should not only be given the work that nobody else wants. This does not exclude routine work. Even such routine work could be of value to a student because it at least gives an insight into the problems of those people whose work is limited to routine.

Only when students are placed in work stations which comply with the above criteria can we talk about co-operative education in the true sense of the word. If these criteria cannot be satisfied it will be better not to place students, but to keep them on the campus. Students must be sensibly placed so that their aptitudes, interests and personal characteristics can be linked to the requirements of the various work stations (Tromp 1984, p.3). This process of placement requires a co-ordinator with insight and the ability to indentify students in respect of the named characteristics.

## 2.7 THE CO-ORDINATION OF CO-OPERATIVE TRAINING PROGRAMS

### 2.7.1 DEFINITION OF CO-ORDINATION

Tromp (1984, p.6) defines co-ordination as the development of an harmonious relationship between training at the work station and training in the class room with the object of providing the student with the best possible preparation for his chosen career.

The co-operative training program can only succeed if students' activities at the work station and at the educational institution are co-ordinated in such a manner that maximum opportunities are created for training.

The co-ordinator may be described as the person (attached to the educational institution) with the total responsibility for the administration and co-ordination of the co-operative education program and to whom students are at all times responsible.

### 2.7.2 CENTRALISED AND DECENTRALISED CO-ORDINATION

In a centralised organisation of co-ordination the administration and supervision of the program take place at a central point, called the Department of Co-operative Education or the Student Placement Office. In this situation a co-ordinator would on his own be responsible for the interviewing, counselling, placement, evaluation and all educational aspects of the in service training program (Du Plessis 1983, p.72).

The advantages of centralised co-ordination include the following:

- Co-ordinators with the necessary experience and skills may advise and place students. Employees with high academic qualifications may be used for this task.
- Co-ordinators in a centralised organisation do not have conflicting interests such as lecturing and research which may demand their time.
- By allocating a prominent place on the campus to the Department of Co-operative Education, the institution may exhibit its commitment to the principle of co-operative education.

In a decentralised organisation the responsibility for co-ordination is shared by a co-ordinator and a member of the academic staff, or the co-ordination is handled in total by members of the academic staff who work partly as lecturers and partly as co-ordinators.

The advantages of decentralised co-ordination are as follows:

- When academic staff are centrally involved it ensures the proper development of co-operative work experience as an integral part of the academic program (Cooper & Siemensma 1985)

- Decentralised co-ordination creates a narrower link between academic staff and practitioners. Academic staff, therefore, remain in touch with practice.
- In service training programs can be better designed to suit a particular course or major subject.
- Academic staff get to know students and their assignments better and can, therefore, apply more of the co-operative experiences in the class room.
- Contact with students is much easier because academic staff see students regularly in the class room.

It would appear that a large number of educational institutions in the USA and the UK use a mixture of the centralised and decentralised systems. A compromise is obtained by the establishment of an office which co-ordinates the co-operative education efforts of academic staff in the various faculties and departments. The advantages of both centralised and decentralised co-ordination are retained in the process. The placement office also assists in the administration of the program, while academic staff involved in co-operative education concentrate on placement of students, visits and the evaluation of co-operative work. This "mixed" system seems to enjoy the advantages of both the centralised and the decentralised co-ordination systems.

### 2.7.3 THE FUNCTIONS OF THE CO-ORDINATOR

According to Tromp (1984, p.4 - 14) the function of the co-ordinator is the actualisation of the total objective of co-operative education. The following functions may be identified:

- The planning of the practical experience at the work station. This experience must be directly related to the training course and must be structured in such a manner that it would facilitate the transition from educational institution to work.
- Selection of a work station. A work station must provide the student with the type of experience which will assist in his development; it must provide good supervision and opportunities for application.
- The placement of students. Placement is done by means of interviews. The co-ordinator must know exactly what the job entails in order to place a specific type of student in a specific type of work situation in such a manner that it will contribute to the actualisation of the student's objectives.
- The drafting of training agreements and training plans. The training agreement is a written document which sets out the responsibilities of the employer, the educational institu-

tion and the student. The training plan is a plan of successive activities of experience and study. Training plans must be drawn up in conjunction with the employer after the student has been placed.

- The visiting of students at their work stations is an essential component of the successful co-operative education program. The object of these visits is to evaluate the student in the work situation; to judge the student's progress in conjunction with the employer; to solve problems which may have developed, and to ensure that the practical experience remains relevant.
  
- The co-ordinator must ensure that the in-service training remains aimed at specific skills as well as survival skills such as communication skills, attitudes, co-operation, tidiness, employer-employee relations and the ability to carry out instructions.
  
- The evaluation of students' progress at work as well as in the class room is one of the most important functions of the co-ordinator. Evaluation must take place regularly and systematically and in co-operation with the employer. Evaluation forms must be supplied to the employer and must reveal the following information about the student:  
reliability, co-operation, personal appearance, discretion, confidence, initiative, speed, accuracy and learning ability.

- The maintenance of advisory committees is an excellent method of promoting communication between the educational institution and employers. Advisory committees have no policy making powers but are nevertheless a good method of bringing about improvements in the training process.
- Public relations work is important for the maintenance of the goodwill of the public as well as to constantly keep the public informed of the objectives, policy and procedures of co-operative education. A well planned program of liaison and information is important for the maintenance of a co-operative program.
- Evaluation of the program. This must take place regularly in order to improve the program continuously.
- Follow up studies must be made after students have finished their studies. This is done to determine students' success in professional life and to establish which problems they experience.
- The student's practical task, which must be completed during his in-service training, must be supervised. The co-ordinator must guide the student in this task.
- From time to time seminars may be arranged at which students may share their experiences, problems, projects etc. Thereby students may learn from one another. This also provides an

opportunity for the educational institution to receive feedback from practice.

- Finally, it is the co-ordinator's duty to prepare students for placement before they are sent out. Students must know exactly what will be expected of them during their period of practical work.

## 2.8 ACADEMIC CREDIT FOR CO-OPERATIVE WORK

Whether academic credit should be given for co-operative work is an open question. In an investigation into co-operative education in the USA in 1975/76 (Du Plessis 1983, p.72) it was found that 81 % of universities and colleges gave academic credit for co-operative work. In England a similar investigation was conducted during 1975. From the results of this investigation Meiring (1980, p.69) derives that the evaluation of students' practical work during in-service training is an absolute necessity.

Giving credit for co-operative work serves a number of purposes. Some of the more important ones mentioned by Du Plessis (1983, p.72) are the following:

- It involves academic staff in in-service training - academic staff who help with the identification of learning objectives and the evaluation of learning.

- It helps students to concentrate on what must be learnt and requires them to become active learners.
- It emphasises that co-operative education is a learning program and not merely a practical experience program.
- Employers will be more conscientious when credit is given for work experience because they become involved in the evaluation process.
- It increases student participation in the program.

If it is accepted that academic credit must be given for co-operative work, a further question arises viz. how much weight must be allocated to it?

The answer to this question varies from institution to institution and from department to department at the same institution. It is, however, common to all departments which give academic credit for co-operative work that evaluation of the work must at least answer the question whether the student has "sucessfully completed" the in-service training period (Meiring 1980, p.69). Others, however, go further and award marks to practical work which count towards the award of the degree of diploma or membership of a professional body. There is general consensus that in-service training which occupies a considerable part of the total course time, is an activity which warrants proper evaluation.

The evaluation of in-service training, like any evaluation, is not easy. The fact that evaluation is difficult in the academic sphere did not lead to its abandonment. Similarly, evaluation of in-service training cannot be ignored. Problems must be faced and solutions must be found for them.

A problem that is mentioned in connection with the evaluation of in-service training is the question of subjectivity.

Subjectivity is, however, a common problem with evaluation in general. Although subjectivity cannot be entirely eliminated, one can move closer to objectivity by establishing certain criteria for judgement. In this manner one can move away from personal opinion. Criteria are developed through discussion and experience and are more comprehensive than those which the individual can think of in a short period of time. Examples of such criteria for the evaluation of in-service training are the following: What degree of interest does the student show in the work? How successful did the student adapt to the work situation? What degree of initiative, originality etc, does the student display? How well does he communicate? etc.

Another common problem in evaluation is that of quantifying. Even a decision on what is acceptable, is quantitative. Decisions of this kind may be facilitated by using, for example, a five point scale and allocating a mark to each criterium.

Often it is also stated that it is unsatisfactory to accept the

opinion of non-academic people. Their opinion, however, is very important and cannot be ignored because they (the employers) are the users of the end product (the qualified student) of education. The employer's opinion can, however, be moderated by a visiting lecturer. Other problems stated by Meiring (1980, p.69) which may be overcome by moderation are those that the execution of work is influenced by the nature and circumstances of the work station and the problem of the uniformity of evaluation.

The methods of evaluation of in-service training which will be used, are determined by the objectives of the particular co-operative training system. The following methods are generally used:

- Extra-mural course work, viz. academic work which the student does during his in-service period.
- A written in-service report by the student.
- An oral in-service report by the student.
- A report by the employer or supervisor in charge of the student.
- A report by the visiting lecturer.

Usually a combination of the above methods is used by a depart-

ment. Meiring (1980, p.80) recommends the following weights when all methods are used simultaneously:

Extra-mural course work	10 %
Written report	30 %
Oral report	10 %
Employer's report	30 %
Visiting lecturer's report	20 %

## 2.9 PROBLEMS IN CONNECTION WITH CO-OPERATIVE EDUCATION

As with any innovation, co-operative education does not only have advantages but also disadvantages and problem areas. Some forms of co-operative education have more problems than other forms. In general the following problem areas must receive attention:

- Commerce and industry are often reluctant to give their support to co-operative education.
- It is well known, and also specifically stated by Wilson & Lyons (1961, p.149), that co-operative education requires greater financing and more supporting staff than non-co-operative education.
- The availability of enough suitable work stations at all times, particularly during an economic recession when job opportunities are scarce, is often a limiting factor.

- Problems relating to the placement of students. These include the applicability of the work; long distances to and from work stations; the limitation the work places on the student's participation in extra-mural activities and the lack of continuity of study and work in the sandwich system.
- Students are often inclined to over-emphasize the financial reward of the work station. They are often reluctant to accept jobs with low (or no) remuneration, although such jobs may have considerable educational and training value. Sometimes students are inclined to view their employment purely as a method of gaining financial support. In such cases they often fail to see the relationship between their work and their total training.
- Lecturers are sometimes unwilling to give their co-operation. They would, for example, in the class room ignore the fact that students do practical work by not relating their lectures to such practical work.
- Employers sometimes feel discontented if students do not return to their firms after qualifying.
- Students are often not employed in such a way that the best use is made of their abilities and skills - they are often not given the most applicable jobs. Sometimes students are used for mere routine jobs without any challenge (Meiring 1980, p.88).

- Problems may also occur because the work at a co-operative educational institution differs from the work at a traditional institution. Contract hours are more, advice to students requires more time and greater emphasis is placed on the practical aspects of subjects in contrast to the theoretical aspects. These things may lead to academic staff finding the image and atmosphere unacceptable for the realisation of their study and research ideals. Meiring (1980, p.89) maintains that the recruitment, retention and professional development of academic staff become more problematic in a co-operative institution.
  
- Traditionally the co-operative course system developed through the diligence and enthusiasm of the individual staff members of educational institutions. These are the lecturers who, amidst their normal teaching and research commitments, still found enough time to search for work stations for their students. When such staff members leave the institution, problems may occur because their contacts may often be lost to the institution (Wilson & Lyons 1961, p.152).

Although these problems may appear to be formidable, they are not insurmountable. Some problems are more relevant to certain forms of co-operative education, which again emphasises the importance of the right choice of attendance pattern. Thereby problems may be limited to a minimum. Authors such as Wilson & Lyons (1961, p.153) offer the following solutions to the above

mentioned problems:

- The public must be properly informed on the philosophy, nature and objectives of co-operative education. Guidance teachers and employers in particular must be better informed to improve the image of co-operative education and to highlight its educational value.
- Commerce and industry must commit themselves to long term support of co-operative education so that the program will not fluctuate with the national economy. Industry must see itself as a partner of the educational institution, with the common objectives of the development of managerial talent, better training for the student and better utilisation of graduates and diplomats.
- There must be closer liaison between industry and the educational institution. Continuous communication is necessary to ensure that specific problems are resolved before they get out of hand, or even before they occur. More co-ordinators will have to be appointed to bring about this liaison.
- It is sometimes felt that only the best students should be elected for the co-operative program and that such students must continuously satisfy high standards in order to be allowed to stay on the program.

- It is also felt that the work periods must be arranged in such a manner that the student will find time to continue with the tasks of the educational institution - tasks such as preparatory reading.
  
- More counselling of students should be done by employers. Employers should inform students of their progress on the job as well as their potential in the particular firm.

## CHAPTER 3

### THE NATIONAL DIPLOMA IN COST ACCOUNTING AS OFFERED BY SOUTH AFRICAN TECHNIKONS

#### 3.1 PROCEDURE FOR THE APPROVAL OF COURSES AT TECHNIKONS

The curricula and syllabi of all the National Diplomas offered by South African technikons are uniform i.e. all technikons offer exactly the same courses as approved by the Department of Education and Culture (previously the Department of National Education). These National Diploma courses are designed by Sub-committees of the Committee of Technikon Principals (previously known as the Association of Technikons). In the case of Cost Accounting the work has been done, and revisions are continuously made, by a sub-committee called the Commerce Committee. As its name indicates, this committee is responsible for the design and updating of a large range of commercial courses. Directors of the Schools of Management, Accounting and Secretarial Studies at all the technikons, under the leadership of vice-rectors and rectors with relevant interests and training, usually form the Commerce Committee.

Although the Commerce Committee officially meet no more than once a year, its operations continue during the whole year. New courses, as well as course improvements are continuously

initiated by the members of the Commerce Committee. Once all technikons agree on the contents of a course, it is submitted by the Committee of Technikons Principals, via the Committee of University and Technikon Principals, to the Department of Education and Culture. If the new course, or course change, is approved, it becomes official and all technikons then adapt their offerings accordingly.

At present the Department of National Education is responsible for the issue of national qualifications to students. External examinations are conducted by the Department for all subjects above the second level. Internal examining rights up to the second level have been granted to all the well-established technikons. It is expected that these internal examining rights will in the near future be extended to higher subject levels. At that stage of autonomy the technikons will begin to issue their own diplomas and higher qualifications.

At this point in time the technikons are compelled to regard the various courses as given. All technikons must operate within the given framework of the prescribed curricula and syllabi. An individual technikon can only change an existing curriculum or syllabus by convincing the other technikons of its opinion and by getting the Department to officially approve the change.

In the manner as described above the various National Diploma Courses, including the National Diploma in Cost Accounting, were established.

### 3.2 THE CURRICULUM, VARIOUS AMENDMENTS THERETO AND THE REASONS THEREFORE

The National Diploma in Cost Accounting has been offered at South African Technikons since 1966. The admission qualification is a National Senior Certificate or equivalent qualification. The initial curriculum was as follows:

#### First Year

Financial Accounting I  
Industrial Accounting I  
Economics I  
Afrikaans or English

#### Second Year

Financial Accounting II  
Industrial Accounting II  
Business Economics I  
Afrikaans or English (the subject not taken in the first year)

#### Third Year

Financial Accounting III  
Industrial Accounting III  
Industrial Legislation  
Statistical Methods

It is remarkable that both Afrikaans and English (one on the first language level and one on the second language level) initially were compulsory subjects in this course.

By 1973 the curriculum was changed to the following:

First Year

Financial Accounting I  
Industrial Accounting I  
Office Practices and Procedures  
Statistical Methods

Second Year

Financial Accounting II  
Industrial Accounting II  
Business Economics I  
Economics I

Third Year

Financial Accounting III  
Industrial Accounting III  
Industrial Legislation  
Principles of Electronic Data Processing

At this stage the two languages were replaced by the subjects Office Practices and Procedures and Principles of Electronic Data Processing. It was felt at the time that the languages occupied too much space in the curriculum. Simultaneously it was also believed that the course should not consist of more than twelve subjects as this applied to most of the other national diplomas in the commercial field. In addition there were also problems in the offering of the course to unilingual persons, who could not reach diploma level in the second

language. As a consolation to those who believed that the languages deserved a place in the course, the following was added to the curriculum:

Additional subjects which may be taken in any year of study:  
Afrikaans A or B and/or English A or B.

The movement of subjects from one year of study to another is irrelevant as it was accepted that the various Technikons could offer the subjects in any order. Obviously this concession did not apply to Financial Accounting I, II and III and Industrial Accounting I, II and III. It should also be noted that since the beginning of the course the subjects Industrial Legislation included a half course in Mercantile Law. The change to Business Economics was a mere change of name.

During 1981 the course was again changed and currently it appears as follows:

First Year

Financial Accounting I  
Industrial Accounting I  
Mercantile Law I  
Statistical Methods

Second Year

Financial Accounting II  
Industrial Accounting II  
Company Law  
Business Economics I

Third Year

Financial Accounting III

Industrial Accounting III

Economics I

Principles of Electronic Data Processing or Labour Law

At this stage the languages disappeared as additional subjects because virtually no students had offered them. The transition from Industrial Legislation to Labour Law (which also took place in many other technikon courses) made it necessary to bring Mercantile Law in as a separate subject. The importance of Company Law was also recognised and, because there was still resistance against the increase of the number of subjects in the course, Principles of Electronic Data Processing and Labour Law had to become optional subjects. Furthermore, the subject Office Practices and Procedures, which did not have much substance, also had to be left out of the curriculum.

The possible weaknesses of this Accounting qualification are the lack of Taxation and Auditing. By offering these two subjects the students' job opportunities could be enhanced.

### 3.3 SYLLABI OF THE SUBJECTS INDUSTRIAL ACCOUNTING I, II AND III

The syllabi of the subjects Industrial Accounting I, II and III are all preceded by the following statement:

"The value of theory is by no means under-estimated, but in the

examination the practical application of the syllabi will be stressed."

The detailed syllabi of Industrial Accounting I, II and III appear in appendix 2. The following is only a summary to indicate the main features of the syllabi:

- The objectives of Industrial Accounting; the significance of the cost price as policy information concerning the selling price, efficiency and decisions.
- The rudiments of the theory of costs, cost price and value, and the application thereof.
- Costs and cost price.
- The analysis of cost elements: materials, labour, manufacturing overheads. Accounting entries.
- Costing techniques for determining unit costs: job costs and manufacturing accounting.
- Cost statements for goods manufactured and sold.
- Income statements and balance sheets.
- Relation between and the integration of Financial Accounting and Industrial Accounting - reconciliation of final statements.

- Elementary planning and control techniques using the critical path method, P.E.R.T. and linear programming.
- The importance of the industrial accountant's profession, practising the profession and the ethics that have to be upheld.

### Industrial Accounting II

- Manufacturing overheads: allocation, departmentation and accounting entries.
- Costing techniques to determine unit costs: contract costs and process costs including joint products and by-products.
- Introduction to budgetary control.
- Direct costs. Comparison between direct costs and absorption costs.
- Inflation problems.
- The replacement value theory.

Industrial Accounting III

- Advanced process costs.
- Budgetary control and profit planning.
- Standard costs; variance analysis; accounting entries.
- Decisions on capital expenditure.
- Cash flow.
- Planning and control of profits by means of direct cost methods.
- Break-even analysis.
- Profit planning by comparative cost analysis.
- Marketing and distribution costs.
- Preparation of reports for management decisions.

The object of this research is also to investigate the current curriculum in Cost Accounting and the syllabi of Industrial Accounting in order to make suggestions which may lead to the improvement of the course.

### 3.4 THE NATIONAL HIGHER DIPLOMA IN COST ACCOUNTING

Shortly after the change of the name College for Advanced Technical Education to Technikon in 1979, a number of higher qualifications have been established in the commercial sciences. One of the first higher qualifications was the National Higher Diploma in Cost Accounting which follows after the completion of the National Diploma.

Initially the curriculum was as follows:

Industrial Accounting IV  
Advanced Accounting IV  
Personnel Management and Training  
Administrative Automation  
Production Management  
Marketing Management

It was soon realised that the course was too wide and since 1983 Personnel Management and Marketing Management were omitted. Administrative Automation was changed to Management Information Systems.

### 3.5 SYLLABUS OF THE SUBJECT INDUSTRIAL ACCOUNTING IV

The syllabus consists of 3 question papers of three hours each.

Paper 1

## Cost information

## 1. Integrated statements

## 2. Logistics

The logistical chain

The importance

Determination of the need

Development of the need

Distribution

Stockpiling

Codification

## 3. Advanced Process Costing

Standard Costs and Process costs

Normal and abnormal waste

Units Costs

4. Cost Accounting for Services and functions including maintenance, power generation and distribution, road transport, welfare, marketing, administration and research. Problems of allocating these costs to products and the consumer.

Paper 2

## Cost Accounting control

Standards and control

Comparison of standards with actual results - variance analysis in detail

Budgets and budgetary control

Profit planning and control

Supplementary budgets and inter-relationships

Reporting for management control

Long and short term budgets

Case studies.

Paper 3

Capital Budgets and Investment

Techniques in decision making on capital investments

Classification of investment possibilities

Discounted cash flow

Buy or lease

Capital budgets and inflation

Case studies.

In this research it is also intended to investigate the curriculum and syllabi of the Higher Diploma in Cost Accounting. It is confidently hoped that certain improvements could be suggested.

## CHAPTER 4

### CO-OPERATIVE EDUCATION AS APPLIED IN THE NATIONAL DIPLOMA IN COST ACCOUNTING AT THE CAPE TECHNIKON.

#### 4.1 MOTIVATION FOR THE INTRODUCTION OF A CO-OPERATIVE EDUCATION SYSTEM.

It was indicated in the previous chapter that the contents of the courses offered by the Technikons, is determined, or at least finally approved, by the Department of National Education. The Technikons' autonomy has, therefore, not yet reached the stage where they have full authority over curricula and syllabi.

In so far as the methods of offering courses are concerned, the technikons, however, virtually have a free hand. The only limiting factor in this case is the question of finance, which affects all tertiary institutions. There exists very specific practical components (in-service training) in the requirements for the award of Diplomas to engineering and other technicians. In the humanities, however, and particularly in the commercial sciences, no such requirements exist. It, therefore, becomes a matter for the individual technikons to consider ways and means of ensuring that the emphasis in their courses is placed on the practical application of knowledge.

The acceptance or non-acceptance of a co-operative education system, and furthermore, the choice of a particular form of co-operative education in the commercial sciences, and therefore in Cost Accounting, is a matter on which each technikon must take its own decision.

In chapter 1 it was indicated that the technikons' education philosophy stresses the application of knowledge rather than the academic-philosophic value thereof. Vocational education must be aimed at practice; it must be aimed at a specific career and particular skills.

At the beginning of this decade, and even earlier, it was more and more felt that the technikons' commercial training was too theoretical. Consequently, it was argued that the technikons, in so far as the commercial courses were concerned, to a large extent missed the aim of their existence, namely the application of knowledge in the practical situation.

Students' lack of maturity; their lack of insight in the professional world for which they were supposed to be trained; their lack of ability to apply; their inability to secure top class positions and their inability to do justice to such jobs, brought heads of departments and lecturers to the reality of the necessity of co-operative education. It was highly undesirable to continue, in the name of vocational education, to train students without an ability to apply their acquired knowledge in practice.

It became abundantly clear that students had to be brought into contact with practice; that they would have to obtain a certain amount of practical experience before they could be regarded as properly trained. The problem, however, was to decide on the particular form that this experience should take. In other words, a decision had to be made between the various types of co-operative education.

#### 4.2 REASONS FOR THE INTRODUCTION OF A PARALLEL SYSTEM OF CO-OPERATIVE EDUCATION

The various types of co-operative education, in other words the various attendance patterns were set out in detail in chapter 2. According to this exposition a choice had firstly to be made between the alternating system or sandwich system and the parallel system of co-operative education.

After careful consideration it was decided to give preference to the parallel system because the experience in the training of engineering and other technicians revealed the following disadvantages of the alternating or sandwich system:

- Academic work must be dealt with at a very fast rate in the sandwich system. In this system the students attend classes for only four months whereafter examinations are conducted. Not much opportunity exists for the fixation of knowledge nor for the acquisition of an appreciation and love for a particular subject and consequently the whole person is not educated.

- In the process of alternating work and study according to the sandwich system (six months in, six months out) the student population is of necessity divided into two. In fact this division of the student population is one of the objectives of the sandwich system. (Meiring 1980, p.43) However, because of this division there is a lack of continuity in student activities such as the Students Representative Council, sport and the various student associations.
- The sandwich system often forces students to change their place of residence; to regularly have to move in and out of technikon residences. This continuous movement in and out disrupts the student as well as the technikon administration.
- Students are forced by the system to adapt in quick succession to the working community and the academic community.
- The lack of an alma mater feeling among sandwich course students is a real shortcoming in comparison to conventional students as well as parallel co-op students (Du Plessis 1983, p.61).
- Finally, with the given curriculum of the National Diploma in Cost Accounting, the introduction of a sandwich system would of necessity have lead to an increase of the course length if the same academic content had to be retained. An

extension to say four or five years would have made the Cost Accounting Diploma less acceptable and attractive in comparison with other commercial qualifications of three years' duration.

The disadvantages and problems of the sandwich system as set out above, are all resolved by the application of a parallel system. This takes place as follows:

Academic work is dealt with at a much more even rate as it is evenly spread over a whole year; the student population is not divided into two with the concomittant lack of continuity; no disruption is caused by the students' continuous change of place of residence; successive adjustment to work and study becomes unnecessary; students remain attached to the educational institution and they therefore develop a strong alma mater feeling, and finally because of the integration of theory and practice, there is usually no extension of the course length necessary when a parallel system is applied.

The advantages of co-operative education as discussed in chapter 2 apply equally to the alternative and parallel systems. In addition to these advantages, the following additional advantages apply in particular to the parallel system:

- A major advantage of the parallel system is the continuous integration and simultaneous development of theory and practice. Thereby both the students and the lecturers are kept on the alert for opportunities to apply knowledge.

The parallel system has the inherent advantage that students' practical experiences may be used as case studies in the class room. In this manner students' experiences are shared among one another as well as the academic staff.

- On employment students who have completed their studies are often given credit for a year's study as well as a year's experience although both occurred in the same year. The student is therefore, given double recognition for his efforts.
- In view of the fact that the student remains in contact with his lecturers, he receives regular guidance with his project work.
- Responsible lecturers (co-ordinators) are continuously in contact with practice because they have to monitor their students' progress. This contact with practice is extremely valuable for lecturers because it prevents them from stagnation in a closed academic environment. This advantage sometimes also applies to the alternating system.

It was, therefore, clear from the outset that the parallel system would be more advantageous for the training of Cost Accountants than the alternating system.

It was indicated earlier that there exists several variations of the parallel form of co-operative education. Fundamentally the parallel system consists of a division between work and study of

a relatively short period such as a week or even a month. This takes place in such a way that a number of days are spent in practice, followed by a number of days on campus. Examples are one day in practice followed by four days in class or two days in practice followed by three days in class or five days in practice followed by five days in class, etc. Alternatively the student's day may be divided in such a manner that he spends a part in class and a part with the employer. Meiring (1980, p.43) refers to such a system as a "half-time arrangement." Dividing the day between work and study, however, has some disadvantages which are listed below:

- The student's day is filled entirely with either work or class attendance and because employment usually occupies at least three quarters of the student's time, the student regards himself primarily as an employee. The employer is also inclined to over-emphasize the employment aspect and consequently the student's studies suffer.
- Filling the student's time entirely with either work or class attendance deprives him of opportunities for library work and private study. The latter will have to take place after hours which in turn deprives the student of opportunities to develop in the fields of sport, culture and social activities.
- A further problem which is experienced when the student's day is divided between work and class attendance is that work stations must then be found in close proximity to the

campus - otherwise too much time will be spent travelling between the campus and the work station. It will be too time consuming for the student to have to travel on a daily basis from his place of residence to the educational institution, then from there to his work station and then from the work station back to his place of residence. It will, therefore, be necessary to find work stations near the campus for all students involved in the co-operative training course. This will hardly be possible under normal circumstances. It will be impossible in times of economic recession when jobs are hard to secure.

The above disadvantages of the "half-time arrangement" may in turn be avoided by placing students in practice for a certain number of full days at a time. Furthermore, the advantages of the parallel system, as discussed above, will also be retained. In addition it has the advantage that time can be found for students to visit their classmates' work places on academic days. A student who may, for example, be placed at a asbestos manufacturer will get the opportunity to look at the costing system of for instance a clothing factory etc. The students' experience is thereby broadened. Placement for a number of full days at a time also has the advantage that work stations may be secured in the countryside, which may be within reach of some students. Thereby the advantages of co-operative education to the employer may be shared by employers situated considerable distances away from a technikon.

By weighing up against one another the various co-operative

education systems as above, it was endeavoured to secure maximum advantages and minimum disadvantages for Cost Accounting students.

#### 4.3 DESCRIPTION OF THE SYSTEM

The system of practical work currently applied in the training of Cost Accountants by the School of Accounting of the Cape Technikon, may be described as a parallel system of co-operative education. Theory and practice are continuously integrated and developed in the system. It was started in 1982 by placing third year students for one day per week. During 1985, the amount of practical work was extended to two days per week. During 1987, as a direct result of this research, the amount of practical work was increased to 50% when students were placed on a week-in-week-out system alternating weekly periods of academic study with similar periods of practical work. In addition, a continuous period of one month between the second and third years of study was also introduced. Furthermore, many students increase their experience by voluntarily working during technikon vacations in the third year.

Currently only third year students are being placed. First and second year students are regarded as not yet suitable for placement. In the first instance it is felt that they have not yet acquired enough theoretical knowledge to fill a position successfully. Secondly, there exists the real danger that students may discontinue their studies as a result of a too early placement. This danger is minimal in the third year

because by that time a student is committed to the completion of his studies. In the third instance it is noticeable that where co-operative education was introduced in the humanities of technikons in the eighties, such as in Marketing, Public Relations and Food Service Management etc., invariably only third year students were placed. This points towards a general acceptance of this principle.

Practical work usually ends at the end of September each year. This is regarded as important to enable students to prepare themselves properly for their final examinations.

Amongst others, it is the objective of this research to establish whether the practical work component of the Cost Accounting course could be improved or not.

#### 4.4 CHANGES IN THE STRUCTURE OF THE CURRICULUM TO MAKE THE IMPLEMENTATION OF THE SYSTEM POSSIBLE

It was indicated in chapter three that the curriculum of the National Diploma was laid down as follows by the Department of National Education at the time of the introduction of practical work in 1982 to date:

##### First year

Financial Accounting I

Industrial Accounting I

Mercantile Law I

Statistical Methods

Second Year

Financial Accounting II  
Industrial Accounting II  
Company Law  
Business Economics I

Third Year

Financial Accounting III  
Industrial Accounting III  
Economics I  
Principles of Electronic Data Processing OR Labour Law

In order to make it possible to devote one day per week during the third year to practical work, it was necessary to reduce the number of subjects in the third year. It was decided to offer five subjects in the first year, four subjects in the second year and three subjects in the third year. It was also established that Statistical Methods was a stumbling block for many students in the first year. (It must be remembered that a large proportion of students do not offer Mathematics as a Senior Certificate subject.) Consequently Statistics was moved to the second year and Economics I as well as Business Economics I were moved to the first year. Although it could be argued that first year students are not mature enough to cope with Mercantile Law, but because Company Law should preferably follow upon Mercantile Law, the latter was retained in the first year and Company Law in the second year.

The curriculum was, therefore, adjusted to read as follows:

First year

Financial Accounting I  
Industrial Accounting I  
Business Economics I  
Economics I  
Mercantile Law I

Second year

Financial Accounting II  
Industrial Accounting II  
Statistical Methods  
Company Law

Third year

Financial Accounting III  
Industrial Accounting III  
Principles of Electronic Data Processing  
Practical work (one day per week)

By 1984 it became clear that it would be feasible to extend the amount of practical work done by students and consequently it was decided to introduce an additional one day of practical work in the third year. This was done from 1985 and in order not to overload the third year of study, Principles of EDP was moved to the second year. Another good reason for moving EDP to the second year was the fact that by the time (end of second year)

students had to be placed, they had not yet been exposed to computerised systems and this reduced their employment possibilities.

Since 1985, therefore, five subjects have been offered in the first year, five in the second and only two in the final year. Third year students spent two days per week (Tuesdays and Wednesdays) in practice and three days per week (Mondays, Thursday and Fridays) in the class room, concentrating on their two major subjects only. This curriculum was also most suitable when, in 1987, the attendance pattern was changed to week-in-week-out.

Since 1986 Principles of EDP was moved to the first year and Business Economics 1 to the second year. This was done to enable students to do a general computer course in the first year, followed by Accounting-related computer systems in the second year and thereby even further increasing the students' employment potential. This became very necessary in order to secure an ample supply of work stations for third year students. The following curriculum is, therefore, offered since 1986:

First year

Financial Accounting I

Industrial Accounting I

Principles of EDP

Economics I

Mercantile Law I

Second year

Financial Accounting II  
Industrial Accounting II  
Statistical Methods  
Company Law  
Business Economics I

Third year

Financial Accounting III  
Industrial Accounting III  
Practical work (50% of students' time)

4.5 FIRMS PARTICIPATING IN THE SYSTEM

A complete list of all the firms that have so far participated in the system of practical work for third year Cost Accounting students, appear in Appendix 1. Details are also given about each individual company's main activities, annual turnover and number of employees. All these firms have major manufacturing departments and Cost Accounting systems. Their turnovers vary between R1,25 m and R240 m per annum and they employ between 40 and 6 500 people. Third year Cost Accounting students have been successfully placed at all these firms.

By making use of questionnaires and structured interviews the opinions of these employers were obtained regarding the possible improvement of the system of practical work; improvements which may benefit all three parties involved viz. the student, the employer and the technikon.

#### 4.6 THE CO-OPERATIVE EDUCATION SYSTEM APPLIED TO THE NATIONAL HIGHER DIPLOMA IN COST ACCOUNTING

The co-operative Education System applied to full-time students in the Higher Diploma in Cost Accounting is a natural consequence of the system followed with diploma students.

The Higher Diploma has for the first time been offered on a full-time basis in 1984 at the Cape Technikon. The course, however, was started on a part-time basis over two years in 1983. Since 1984 full-time higher diploma students attend lectures for two days per week and work in practice for the remaining three days of the week. During 1987 the week-in-week-out system was applied to higher diploma students as well.

The object of this research includes the refinement and possible improvement of the system of practical work applied to this higher diploma.

## CHAPTER 5

### THE METHODOLOGY OF RESEARCH INTO THE COST ACCOUNTING TRAINING PROGRAM OF THE CAPE TECHNIKON.

#### 5.1 INTRODUCTION

The particular nature of the parallel system of co-operative education as currently applied in the training of Cost Accountants at the Cape Technikon was described in chapter 4. Although unique in South Africa, the system is not without limitations. The introduction of the system in itself already pointed towards a number of possible improvements.

The aim of this research is to evaluate the above mentioned co-operative education system and to make recommendations for the improvement of the system. In particular the aim is to provide information on the following aspects of the system:

- The nature of the practical work that students are subjected to
- The value of such practical work
- The amount of practical work that should be included in the program
- The most suitable attendance pattern
- The granting of academic credit for practical work done as well as the evaluation of such work

- Remuneration for practical work
- The subjects that should be included in the Diploma as well as the Higher Diploma in Cost Accounting
- The contents of the various syllabi in Cost Accounting.
- The changes in students' attitudes brought about by their exposure to the real world.

## 5.2 THE SAMPLE

There are three parties involved in any co-operative education program viz. the employer, the student, and the educational institution. In order to separate current students from ex-students, and employers of current students from employers of ex-students, the sample consisted of the following five parties:

- Employers participating in the co-operative training system by appointing third year students in their firms, and supervising their progress.
- Employers of ex-Cost Accounting students on a full-time basis.
- Ex-Cost Accounting students who were trained through the co-operative system.
- Cost Accounting students while they were engaged in the co-operative training system.
- Lecturers acting as co-ordinators and teaching co-operative Cost Accounting students.

In view of the fact that the co-operative system was introduced in Cost Accounting in 1982, a reasonable number of employers, students and lecturers were involved in the system to provide a sound research base. Questionnaires were sent to all persons involved since 1982. The exact number that responded in each category is given in 5.3 below.

### 5.3 THE INSTRUMENTS

In order to obtain relevant information from the five groups of parties involved, two different sets of questionnaires were used viz. open ended questionnaires and Likert-style questionnaires, both translated into the two official languages (English and Afrikaans)

#### 5.3.1 THE OPEN ENDED QUESTIONNAIRES

The English version of the open ended questionnaires used, appear in appendix 3. Table 1 below indicates the five different open ended questionnaires used, the relevant party to whom each questionnaire was sent, the aspects of co-operative education covered by each questionnaire and the number of respondents to each questionnaire.

TABLE 1

Questionnaire Number	Party to whom sent	Aspects of Co-operative Education covered by the questions	Number of Respondents
3.1	Employers participating in the co-operative training system	<ol style="list-style-type: none"> <li>1. The nature of practical work</li> <li>2. The value of practical work</li> <li>3. The amount of practical work</li> <li>4. The attendance pattern</li> <li>5. Academic credit for practical work</li> <li>6. Remuneration for practical work</li> <li>7. The curriculum</li> <li>8. The Cost Accounting syllabi</li> </ol>	27
3.2	Employers of ex-Cost Accounting students on a full-time basis	<ol style="list-style-type: none"> <li>1. The value of practical work</li> <li>2. The amount of practical work</li> <li>3. The attendance pattern</li> <li>4. The curriculum</li> <li>5. The Cost Accounting syllabi</li> </ol>	12 in addition to the 27 employers in 3.1 above

TABLE 1 (Continued)

Questionnaire Number	Party to whom sent	Aspects of Co-operative Education covered by the questions	Number of Respondents
3.3	Ex-Cost Accounting students	<ol style="list-style-type: none"> <li>1. The nature of practical work</li> <li>2. The value of practical work</li> <li>3. The amount of practical work</li> <li>4. The attendance pattern</li> <li>5. Academic credit for practical work</li> <li>6. Remuneration for practical work</li> <li>7. The curriculum</li> <li>8. The Cost Accounting syllabi</li> </ol>	29
3.4	Cost Accounting students while engaged in co-operative education	<ol style="list-style-type: none"> <li>1. The nature of practical work</li> <li>2. The amount of practical work</li> <li>3. The attendance pattern</li> <li>4. Academic credit for practical work</li> <li>5. Remuneration for practical work</li> </ol>	54

TABLE 1 (Continued)

Question-naire Number	Party to whom sent	Aspects of Co-operative Education covered by the questions	Number of Respondents
3.5	Lecturers acting as co-ordinators and/or teaching third year students	<ol style="list-style-type: none"> <li>1. The value of practical work</li> <li>2. The amount of practical work</li> <li>3. The attendance pattern</li> <li>4. Academic credit for practical work</li> <li>5. Remuneration for practical work</li> <li>6. The curriculum</li> <li>7. The Cost Accounting syllabi</li> </ol>	11

It can be seen from the above table, as well as appendix 3, that while identical questions were used for the five groups of respondents, some questions were limited to those parties who could be expected to have a well considered opinion derived from their involvement in the co-operative education system.

### 5.3.2 THE LIKERT QUESTIONNAIRES

In order to evaluate the change in Cost Accounting students' attitudes brought about by their exposure to the world of work, the same students' attitudes were assessed before they were placed i.e. towards the end of their second year of study and then again during their third year i.e. after they had been exposed to practical work for a considerable period of time. A questionnaire was developed using the Likert technique. On a 5 point Likert scale the respondents were requested to respond to 32 questions by means of the following five-category system: Very, more than average, average, less than average and not at all. In addition the category "not in a position to judge" was included for use whenever necessary. Five points were allocated to the response "very", 4 points to "more than average", 3 points to "average", 2 points to "less than average", 1 point to "never" and nil points to "not in a position to judge."

The 32 questions on students' attitudes mainly covered the following areas: Questions relating to the course; questions relating to the work situation; questions relating to the student's interpersonal relationships and, finally, questions relating to the student's personality.

Two separate questionnaires were designed. One for students to complete in respect of their own attitudes and one for lecturers to complete in respect of their assessment of individual student's attitudes.

By comparing students' responses to the same questionnaire, as well as their lecturers' responses to the similar questionnaire before and after exposure to practical work, it was hoped to find a significant and favourable change in students' attitudes brought about by practical work experience. This finding, it is hoped, would then serve as support for the assumed improvements in students' attitudes brought about by co-operative education.

The English versions of these two questionnaires used in the study of students' attitudes, are found in appendix 4.

#### 5.4 THE TIME SCALE

##### 5.4.1 THE OPEN ENDED QUESTIONNAIRES

The five open ended questionnaires were completed by all parties involved in the system of co-operative education in Cost Accounting since the inception of the system in 1982 to 1986. During this time the attendance pattern developed from one day of practical work per week during the third year of study to two days of practical work per week.

##### 5.4.2 THE LIKERT QUESTIONNAIRES

The two Likert questionnaires were completed by second year students of 1985 and their lecturers respectively and again by the same students (now in their third year) and their lecturers in 1986. In addition the second year students of 1986 and their

lecturers completed the questionnaires and again completed them in 1987 when the same students were in their third year of study.

The following table illustrates the time scale.

TABLE 2: THE TIME SCALE

1985	1986	1987
Likert questionnaires completed by 21 2nd year students and by their 5 lecturers in respect of each student (6 x 21 = 121 responses)	Likert questionnaires completed by 21 3rd year students and by their 2 lecturers in respect of each student (3 x 21 = 63 responses)	
	Likert questionnaires completed by 39 2nd year students and by their 5 lecturers in respect of each student (6 x 39 = 234 responses)	Likert questionnaires completed by 39 3rd year students and by their 2 lecturers in respect of each student (3 x 39 = 117 responses)

This time scale made it possible to compare students' as well as their lecturers' responses before and after the students' exposure to co-operative education.

During 1985 and 1986 third year students worked for two days per week. During 1987 weekly periods of practical work were alternated with similar periods of class attendance.

## 5.5 THE METHOD OF ANALYSIS

### 5.5.1 THE OPEN ENDED QUESTIONNAIRES

The results of the open ended questionnaires were analyzed by simply expressing the number of respondents that had the same response as a percentage of the total number of respondents.

### 5.5.2 THE LIKERT QUESTIONNAIRES

#### 5.5.2.1 THE STUDENTS' QUESTIONNAIRE

In respect of each one of the 32 questions the difference was found between the 'before' and the 'after' scores of each student. A two tailed repeated measures t-test was applied to these differences in scores in order to establish any statistically significant changes in attitudes of students resulting from co-operative education.

#### 5.5.2.2 THE LECTURERS' QUESTIONNAIRE

The lecturers' questionnaires were treated in a manner similar to the students' questionnaires. In their case, however, several lecturers responded in respect of the same student, which made it necessary to find means of before scores and means of after scores. Thereafter differences in mean scores were found and a t-test applied as above.

## CHAPTER 6

### THE RESULTS OF THE RESEARCH

#### 6.1 INTRODUCTION

The results of the research will be detailed in two major sections viz. the results from the open ended questionnaires and the results from the Likert questionnaires.

#### 6.2 RESULTS FROM THE OPEN ENDED QUESTIONNAIRES

##### 6.2.1 THE NATURE OF THE PRACTICAL WORK THAT STUDENTS DO

The nature of the practical work that students do, is derived from the responses of participating employers, ex-students and current students. The following table indicates the various tasks that students usually perform, as well as the percentage of work stations in which the task is usually performed:

TABLE 3

TASKS IN ORDER OF DIFFICULTY	%
1. The collection of cost information	72
2. The classification of cost information	53
3. The allocation of costs	55
4. The writing up of journals and ledger accounts	31
5. The calculation of actual costs	55
6. The comparison of actual costs with standard costs and the calculation of variances	49
7. The drafting of performance reports and the identification of problem areas	26
8. The investigation of problems and reporting of results to management	40
9. The drafting of cost of production statements, monthly statements and annual statements	27
10. The setting of standards	16

The above tasks are performed by students at firms which report that they use one or more of the following cost systems: job costs, process costs, contract costs, standard costs, absorption costs and marginal costs.

Other tasks being performed by Cost Accounting students are as follows:

General statistical tasks and calculations

General clerical and routine administration tasks

The administration and control of stock

Financial Accounting tasks such as cash book, the reconcilliation of debtors, creditors and cash

Computer work using inter alia Lotus 1-2-3

Purchases and sales

Tax calculations (including general sales tax)

Fixed asset register

Wages administration

Table 3, above, indicates that the simpler tasks are performed in the majority of work stations while the more complicated tasks are performed in the minority of work stations. It is, however, interesting to note that relatively complicated tasks such as numbers 5, 6 and 8 are performed in 55 %, 49 % and 40 % respectively of all work stations.

#### 6.2.2 THE VALUE OF PRACTICAL WORK

The advantages of co-operative education in general, as well as the advantages of the parallel system of co-operative education have been discussed in detail in chapters 2 and 4 respectively. In this section the particular value of the system of co-operative education as applied in the training of Cost Accountants at

the Cape Technikon, is specifically dealt with. It is assumed that all the advantages applicable to co-operative education in general, apply to "practical work" in Cost Accounting as well.

#### 6.2.2.1 PARTICIPATING EMPLOYERS

Participating employers generally report favourably on the quality of work performed by students. Some report that the fact that they employed a student has led to a realisation of training needs in their own ranks. The training institution is, therefore, able to serve the business community by making known the very specific kind of application of knowledge. The following commentaries received from participating employers further illustrate the value of practical work:

- Practical training is an absolute necessity
- The placement of students has great value
- Practical work is a good recruiting medium for aspiring cost accountants
- Students that have had practical work experience are better equipped than traditionally trained full-time students

#### 6.2.2.2 EMPLOYERS OF EX-STUDENTS

Employers who employed ex-students on a full-time basis, report that they are satisfied with students' training before employment. 75 % of them are of the opinion that the students whom they have employed, had a satisfactory practical training

so that they could be productive immediately after being employed on a full-time basis. This satisfies the most important requirement of successful vocational education, namely the training of productive workers. In addition, the majority of these employers report that the ex-students whom they have employed, have fared very well in their firms in comparison with other employees with similar (non-co-operative) three year qualifications. The other employers indicated that they could not answer the question because they had no other employee in their firm with whom to compare the ex-student.

#### 6.2.2.3 EX-COST ACCOUNTING STUDENTS

Ex-Cost Accounting students who have been in employment for some time, report without exception (100 %) that the practical work that they perform in their third year of study, has helped them to adapt to professional life and that it facilitates their transition from the academic world to the professional world. Those ex-Cost Accounting students who are currently engaged in military training and are, therefore, not employed yet, are all (100 %) of the opinion that practical work will in future help them to adapt to professional life when they are employed in an Accounting position.

The following are some of the comments received from ex-students:

- Practical work has helped me to become ready for action in

the business world.

- Practical work gave me a better understanding of what a proper work day means.
- Practical work gave me the necessary background to be successful in the business world.
- Practical work showed me the vast difference between a student and a working person.
- Practical work gave me a better understanding of the theory.
- Practical work gave me more confidence when I started with full-time employment.
- Practical work gave me a better sense of responsibility. It taught me how to handle pressure, how to work with people and to learn through my mistakes.
- Practical work gave me a good understanding of responsibility and delegation.
- The practical work which I performed during my third year has been taken into account in the determination of my starting salary in my full-time job.

It is interesting to note that approximately 50 % of those students who have already commenced their careers (i.e. either females or males who have completed their military service or students not currently registered for the Higher Diploma on a full-time basis) were employed on a full-time basis by those firms where they did their practical work during the third year. Those who did not stay at their respective work stations indicated that they had to move to other firms because no suitable posts were available in the original firms. Qualified

students report that they find it easy to secure permanent employment at very attractive starting salaries. Increases in salary of up to 60 % in the first year of employment also appear to be normal. It would, therefore, appear that co-operative education plays a vital role in the employment of qualified students.

The positions held by qualified students are amongst others the following: bookkeeper, cost clerk, assistant cost accountant, cost accountant, cost controller, budget accountant, senior departmental cost accountant, financial accountant and partner in an own business. Typical job descriptions are the following: control of short term contracts, cost accounting of a specific product, maintenance of a cost accounting system, variance analysis, reporting to management, control of an operating department, controlling of the relationship between hours worked and production output, cost control, budgetary control, purchasing, cost of production reports, stock control, valuation of finished goods and general financial accounting work.

#### 6.2.2.4 LECTURERS

The following commentaries about the value of practical work were received from individual lecturers acting either as co-ordinators or teaching third year Cost Accounting students:

- There is a very marked improvement in the attitude of students towards their studies after they have been in a

practical work situation.

- After starting with practical work, students are better able to make a positive contribution in the class room.
- The relationship between theoretical knowledge and the practical application thereof in the work situation helps to improve the student's motivation and attitude towards his studies.
- The fact that students see and experience the application of knowledge in practice improves their insight and application to their studies.
- Practical work causes students to grow rapidly in maturity.
- The obligation to perform in the practical application at the work station compels the student to master knowledge more quickly in order to do the work properly.

### 6.2.3 THE AMOUNT OF PRACTICAL WORK THAT SHOULD BE INCLUDED IN THE COURSE

#### 6.2.3.1 ONE DAY PER WEEK DURING THE THIRD YEAR

The current system of the co-operative education in Cost Accounting has been started with one day of practical work per week in the third year of study. Table 4 below indicates the high percentage of respondents that regard one day per week in the third year as insufficient.

TABLE 4  
RESPONDENTS REGARDING ONE DAY PER WEEK AS INSUFFICIENT

RESPONDENTS	%
Participating employers	77
Employers of ex-students	86
Ex-students	90
Current students	82
Lecturers	100

87 % of all respondents are in favour of an increase in the practical experience component of the course. Although one day per week in the third year was a reasonable amount of practical work to include in the initial stages of the project, it became very clear that the practical work component should be increased.

#### 6.2.3.2 THE EXTENSION OF PRACTICAL WORK

##### 6.2.3.2.1 EXTENSION TO THE FIRST YEAR OF STUDY

An increase in the amount of practical work can in the first instance be effected by an extension to the first and second years of study. Only 3 % of all respondents recommended that first year students should be involved in practical work. The

consensus is that first year students are not mature enough and lack the necessary skills for placement in a professional situation.

#### 6.2.3.2.2 EXTENSION TO THE SECOND YEAR OF STUDY

Table 5 below indicates the percentages of respondents in favour of the extension of practical work to second year of study.

TABLE 5  
RESPONDENTS SUPPORTING EXTENTION TO THE SECOND YEAR

RESPONDENTS	%
Participating employers	35
Ex-students	34
Current students	30
Lecturers	30

The majority of respondents, therefore, were not in favour of the inclusion of second year students in practical training. It is interesting to note that not one of the lecturers acting as co-ordinator of co-operative education, is in favour of the placement of second year students. The general feeling among them is that second year students, having only completed one year of study, are not, as far as subject knowledge is concerned, ready for placement.

#### 6.2.3.2.3 EXTENSION BY DEVOTING AN ADDITIONAL DAY PER WEEK TO PRACTICAL WORK IN THE THIRD YEAR

The amount of practical work which is done in the course, may be increased by devoting an additional day per week to practical work in the third year. This has been implemented since 1984. Concurrently with this addition, it was necessary to move a further minor subject from the third year of study to the first two years.

A further aspect of this addition to practical work is the question of continuity. Of those respondents who recommended the increase in practical work, 90 % of participating employers, 100 % of employers of ex-students, 94 % of ex-students, 78 % of current students and 100 % of lecturers are in favour of devoting successive days to practical work. The rationale is obviously that a student must spend enough time continuously at the firm to be able to complete a task of reasonable size. Consequently two successive days in the third year (Tuesdays and Wednesdays) were devoted to practical work from 1984 to 1986.

#### 6.2.3.2.4 EXTENSION BY UTILIZING VACATION PERIODS

The amount of practical work may also be increased by the utilization of vacation periods. Of the respondents who recommended an increase in practical work, 90 % of participating employers, 61 % of ex-students, 56 % of current third year students and 90 % of staff are in favour of using vacations for

practical work, particularly because of the continuity that is involved in spending (say) one month during a vacation in a work station. The ideal time for this, it was found, was the vacation at the end of the second year and before the commencement of the third academic year of study, in other words after the student has successfully completed his first two years of study.

The total amount of practical work included in the Cost Accounting course, therefore, amount to  $30 \times 2 = 60$  days during term time and approximately 20 days during the vacation. Added together it would appear that ideally approximately half of the third year or  $1/6$  of the three year academic period should be devoted to practical application in business.

#### 6.2.4 THE ATTENDANCE PATTERN

The parallel system of co-operative education in Cost Accounting has been in operation since 1982. Table 6 below indicates the very low percentages of respondents in favour of an alternating system such as the thin sandwich system used in the training of engineering and other technicians.

TABLE 6  
RESPONDENTS SUPPORTING THE ALTERNATING SYSTEM

RESPONDENTS	8
Participating employers	7
Ex-students	24
Current students	5
Lecturers	9

The alternating system obviously has certain limitations which make it unsuitable for application in the commercial sciences and more particularly in the training of cost accountants.

During 1986 it became clear that the system of two days per week practical work in the third year could be further improved. By introducing a system of one-week-in-one-week-out in the third year in 1987, a better utilization of facilities, particularly in respect to class rooms, computer laboratories and academic staff, could be obtained. This system of alternating weekly periods of class attendance and practical work does not divorce the student for too long periods from his academic work and, in addition, provides for greater continuity in practical work because the student is at the disposal of the employer for a full week continuously and can therefore be given more substantial tasks to perform.

The choice between the week-in-week-out system and the two days per week system was put to the third year students of 1986. 55 % of these students were in favour of the week-in-week-out system, 4 % were against it and 41 % did not express an opinion. Participating employers generally prefer the system which is shown by the successful placement in 1987 of 42 Cost Accounting students according to the week-in-week-out system. The success of the latter system is also shown by the fact that the School of Accounting applied it successfully, since 1986, in the training of company secretaries, internal auditors and computer programmers. It seems to be a major advantage that the training in similar disciplines, especially where, as in the named courses, some of the major subjects are identical, to use the same co-operative education system. This leads to an optimal utilization of the school's facilities - lecturers, classrooms etc.

Through a process of evolution the practical work system has, therefore, developed from a small beginning with one day per week, and, finally, a system whereby practical work in business and class attendance are alternated on a weekly basis. According to the latter system, students are able to carry out a reasonable amount of work in business without any detrimental effect on their academic progress. In contrast to the thin sandwich system, their major subjects are spread over a full academic year.

6.2.5 ACADEMIC CREDIT FOR PRACTICAL WORK AND THE EVALUATION OF STUDENTS' PRACTICAL WORK

Table 7 below indicates the percentage of respondents in favour of granting academic credit for the practical work of Cost Accounting students.

TABLE 7  
RESPONDENTS SUPPORTING ACADEMIC CREDIT FOR PRACTICAL WORK

RESPONDENTS	%
Participating employers	58
Ex-students	55
Current students	76
Lecturers	73

It is important to note that those respondents who indicated that they were against academic credit for practical work, almost invariably based their opinion on the possibility that students may not receive equal opportunities at the various work stations. This possibility should, however, not be decisive because it is expected from co-ordinators to ensure that students regularly receive proper exposure at the firms where they are employed. Significant differences between the various work stations should, therefore, not exist.

If it is assumed that all students are offered good opportunities in their respective work stations, almost all respondents are in favour of academic credit for practical work.

With reference to the above, lecturers in favour of academic credit for practical work, indicated that a mark for practical work should be included in the year mark for the major subject Industrial Accounting III (Technikons have an examination system wherein the year mark contributes 40 % and the examination mark contributes 60 % towards the final promotion mark.)

#### 6.2.6 REMUNERATION FOR PRACTICAL WORK

In the early stages of this co-operative education project about 75 % of participating employers remunerated students for their work. Gradually, as the project grew and became established in Cost Accounting, but also in Internal Auditing, Company Administration and Computer Programming, more employers started to remunerate their students. Presently all employers remunerate their students and the amount of remuneration forms part of the co-operative education agreement. This amount varies between R20 and R30 per day. All students (100 %) are of the opinion that payment motivates them to work well at the work station. All lecturers (100 %) also regard payment as an integral part of the system.

### 6.2.7 ATTITUDES TO THE CURRICULUM OF THE NATIONAL DIPLOMA

The omission of Communication from the curriculum apparently did not have a significant effect on the communication skills of students. 73 % of participating employers reported that they did not observe a weakness in communication skills among students.

77 % of employers are of the opinion that there is no material weakness in students' theoretical training. Students are well motivated and they display a high level of insight. 100 % of employers indicated that they regard this training as suitable for their prospective employees.

The majority of participating employers (70 %) indicated that their cost accounting systems were computerised. The remaining employers indicated that their systems were about to be computerised. For these reasons, and because students indicated that their third year was too full, the subject Principles of Information Systems was moved to the second year. In 1986 this subject was moved to the first year to enable lecturers in the second year to include computer applications in the subjects Industrial Accounting II and Financial Accounting II. In this manner it is felt that students can be best equipped for their entry into business by the end of their second year of study.

The above changes in the curriculum were all within the powers of the Technikon. The following suggested improvements must,

however, be approved by the Department of National Education and have therefore not yet been introduced:

While a large number of respondents (76 %) did not have any suggestions relating to the improvement of the curriculum, those that offered comments suggested the addition of Auditing and Income Tax to the curriculum. It is also felt that the subject Business Economics has little value in this course and that the relevant elements thereof could be included in Industrial Accounting I, II or III. The introduction of Auditing would certainly enhance an awareness for systems among students. The value of Income Tax is obvious, particularly for those students who will progress to post levels where the tax effects of decisions may not be ignored. These two subjects would no doubt add to the marketability of the course. The number of subjects in the Cost Accounting Diploma would thus have to be increased to 13. This already applies in Diplomas such as Marketing and Company Administration.

All lecturers (100 %) recommended that the name of the course should be changed to the National Diploma in Cost and Management Accounting. This change of name would bring the title of the course in line with its contents and would also increase its marketability.

### 6.2.8 THE SYLLABI OF INDUSTRIAL ACCOUNTING I, II AND III

Consensus exist among all lecturers (100 %) at the Cape Technikon, and those at other Technikons agree that, in line with the change in the name of the course as suggested above, the name of the subject Industrial Accounting should also be changed to Cost and Management Accounting.

Respondents are generally satisfied with the contents of these syllabi. Lecturers suggested a few small changes and additions which will be dealt with in chapter 7. The only other relevant suggestion received was an increase in the amount of computer work and application on the computer. 32 % of all respondents were in favour of this. The other 68 % did not express an opinion in this regard. This is in line with the large percentage (70 %) of participating employers who indicated that their cost accounting systems were computerised.

## 6.3 RESULTS FROM THE LIKERT QUESTIONNAIRES

### 6.3.1 THE STUDENTS' QUESTIONNAIRE

Table 8 below shows the means of the students' own ratings of their attitudes before and after being involved in co-operative education as well as the calculated t-scores. The p-column shows the statistically significant changes in students' attitudes.

TABLE 8  
STUDENTS' RATINGS

Attitudes	Mean before	Mean after	t-Score	p
1. Interest in the course	3,78	3,80	0,17	
2. Enjoyment of the course	3,73	3,78	-0,44	
3. Inspired by the course to make full use of capabilities	3,57	3,68	0,96	
4. Judgement of the value of the course	3,98	3,93	-0,45	
5. Meaningfulness of studies	4,15	4,07	-0,90	
6. Ability to communicate in writing	3,55	3,63	0,82	
7. Ability to communicate verbally	3,63	3,80	2,10	,05
8. Relevance of the course to the work situation	4,05	3,85	-1,66	
9. Motivation to be successful	4,43	4,32	-1,41	
10. Enthusiasm to become a qualified cost accountant	4,38	4,23	-1,35	
11. Awareness of the difference between the life of a student and the life of a working person	4,33	4,47	1,00	
12. Knowledge about the realities of the work environment	3,40	3,78	3,60	,01
13. Positive attitude towards studies	3,73	3,92	1,79	
14. Ability to make a positive contribution in the classroom	3,53	3,57	0,36	
15. Understanding of people	4,10	4,08	-0,15	
16. Qualities of leadership	3,53	3,75	3,20	,01
17. Ability to work in a group	4,03	4,10	0,66	

TABLE 8 (Continued)

Attitudes	Mean before	Mean after	t-Score	p
18. Appreciation of the relationship between theoretical knowledge and its application in practice	3,63	3,83	1,60	
19. Ability to master new knowledge quickly	3,83	3,88	0,60	
20. Maturity	3,82	3,93	1,55	
21. Responsibility	4,08	4,18	1,29	
22. Social adaptability	4,20	4,32	1,26	
23. Self discipline	3,92	3,92	0,00	
24. Punctuality	3,98	3,97	-0,18	
25. Originality	3,70	3,77	0,75	
26. Creativity	3,60	3,50	-0,19	
27. Ability to think independently	4,15	4,15	0,00	
28. Self confidence	3,87	4,10	2,43	,05
29. Dedication to studies	3,60	3,57	-0,39	
30. Ability to persevere	4,05	4,07	0,16	
31. Willingness to share facilities	3,95	4,12	1,46	
32. Encouragement to do independent research	2,93	2,90	-0,29	

The above table indicates significant improvements in students' attitudes at the ,01 level where t is greater than 2,58. These attitudes are: knowledge about the realities of the work environment and qualities of leadership. At the ,05 level significant improvements in students' attitudes are indicated by t-scores greater than 1,96. These include the two attitudes

already mentioned, as well as self confidence and the ability to communicate verbally.

Although not statistically significant it is interesting to note that of the 32 student attitudes included in the survey, 19 showed positive changes, 2 remain unchanged and 11 showed a decline.

The reasons why statistically significant improvements in students' attitudes were not found in more of the attitudes included in the survey, are the following:

- The relatively high before scores in the majority of cases which indicate that there was quite a positive attitude with students prior to their involvement in the practical work experience. Taking this into account (along with the statistical method used) a high t-score, which indicates degree of significance, would be a statistical impossibility in many of the cases.
- The before rating of the students are affected by their stage of progress in the three year course. They are second year students who have not yet experienced the reality of life in the business world and, having passed the first year, they may be inclined to have an inflated view of their own capabilities.

6.3.2 THE LECTURERS' QUESTIONNAIRE

Table 9 below shows the means of lecturers' ratings of students' attitudes before and after being involved in co-operative education, as well as the calculated t-scores. The p-column indicates the statistically significant changes in students' attitudes.

TABLE 9  
STAFF RATINGS

Attitudes	Mean before	Mean after	t-Score	p
1. Interest in the course	3,61	3,59	-0,33	
2. Enjoyment of the course	3,62	3,68	0,82	
3. Inspired by the course to make full use of capabilities	3,51	3,56	0,61	
4. Judgement of the value of the course	3,68	3,63	-0,57	
5. Meaningfulness of studies	3,57	3,70	1,58	
6. Ability to communicate in writing	3,54	3,53	-0,16	
7. Ability to communicate verbally	3,67	3,61	-1,07	
8. Relevance of the course to the work situation	3,59	3,78	2,42	,05
9. Motivation to be successful	3,69	3,80	1,68	
10. Enthusiasm to become a qualified cost accountant	3,62	3,73	1,69	
11. Awareness of the difference between the life of a student and the life of a working person	3,49	3,89	3,29	,01

TABLE 9 (Continued)

Attitudes	Mean before	Mean after	t-Score	p
12. Knowledge about the realities of the work environment	3,38	3,84	4,23	,01
13. Positive attitude towards studies	3,65	3,76	1,30	
14. Ability to make a positive contribution in the class-room	3,50	3,58	0,91	
15. Understanding of people	3,60	3,59	-0,16	
16. Qualities of leadership	3,27	3,46	2,48	,05
17. Ability to work in a group	3,62	3,66	0,55	
18. Appreciation of the relationship between theoretical knowledge and its application in practice	3,38	3,51	2,32	,05
19. Ability to master new knowledge quickly	3,53	3,57	0,39	
20. Maturity	3,57	3,56	-0,15	
21. Responsibility	3,70	3,63	-1,02	
22. Social adaptability	3,61	3,67	0,69	
23. Self discipline	3,62	3,55	-0,98	
24. Punctuality	3,76	3,62	-2,01	,05
25. Originality	3,34	3,41	0,85	
26. Creativity	3,25	3,28	0,46	
27. Ability to think independently	3,55	3,54	-0,09	
28. Self confidence	3,72	3,75	0,48	
29. Dedication to studies	3,60	3,54	-0,81	
30. Ability to persevere	3,70	3,52	-2,77	,01
31. Willingness to share facilities	3,63	3,67	0,52	
32. Encouragement to do independent research	3,12	2,66	-5,10	,01

As in table 8, the above table indicates significant improvements in students' attitudes from the point of view of the staff at the ,01 level where  $t$  is greater than 2,58. These attitudes are: awareness of the difference between the life of a student and the life of a working person and knowledge about the realities of the work environment. At the ,05 level significant improvements in students' attitudes from the staff perspective are indicated by  $t$ -scores greater than 1,96. These include the two attitudes already mentioned, as well as relevance of the course to the work situation, qualities of leadership and the appreciation of the relationship between theoretical knowledge and its application in practice.

Although not statistically significant it is interesting to note that of the 32 student attitudes included in the survey, 19 showed a positive change and 13 showed a negative change. (according to the staff ratings)

Statistically significant declines in student attitudes from the staff perspective are punctuality, ability to persevere and encouragement to do independent research.

The reasons for these declines and the relatively few statistically significant improvements in students' attitudes included in this survey, are the following:

- As in the case of the students' own ratings, the relatively high before scores in the majority of cases which indicate

that there was quite a positive attitude with students prior to their involvement in co-operative education. Taking this into account (along with the statistical method used) a high t-score would be a statistical impossibility in many of the cases.

- The lecturers who assessed the attitudes of the before students were not the same lecturers who assessed the attitudes of the after students. The before students' attitudes were assessed by five second year lecturers while the after students' attitudes were assessed by two (other) third year lecturers. This defect in the research was inevitable as different lecturers teach in the various years of study. Different lecturers are inclined to apply differing criteria in assessing the various student attitudes. In compiling the data it was often discovered that one lecturer would constantly rate a particular student's attitudes very high, while another lecturer would constantly rate the same student's attitudes very low.

## CHAPTER 7

### DISCUSSION OF RESULTS, CONCLUSIONS AND RECOMMENDATIONS

#### 7.1 INTRODUCTION

The debate among South African Technikon students about the feasibility of the introduction of co-operative education in the commercial sciences has now been going for approximately 15 years. The introduction of a pilot system of co-operative education in Cost Accounting at the Cape Technikon in 1982, laid the foundation for major developments in this field. It also provided a research base for co-operative education in the commercial sciences in South Africa.

#### 7.2 CONCLUSIONS

##### 7.2.1 THE NATURE OF PRACTICAL WORK

A fundamental requirement of any co-operative education program is that the experience that the students gain in the work situation must be related to the relevant course of study. Without such relevant practical experience the co-operative training system would not be successful. In addition it must be noted that one of the criteria for co-operative education, as

stated by the South African Association for Co-operative Education, is that the student should not only observe, but actually perform productive work.

The data from the questionnaires revealed that the tasks that students perform vary in degree of difficulty. Some tasks are mere routine tasks and others are fairly complicated. It is clear, however, that they can all contribute to the student's total development and training.

One of the important tasks of the co-operative education coordinator is to ensure that a student's experience during the year is not limited to mere routine tasks, but that more advanced tasks are allocated to him or her gradually during the year of practical work.

#### 7.2.2 THE VALUE OF PRACTICAL WORK

The analysis of literature in chapters one and two reveals that the co-operative education learning mode offers a worthwhile alternative to the conventional on-campus learning mode. It has been found particularly useful in achieving the training objectives in a tertiary vocational educational institution such as a Technikon. It is believed that it can be successfully applied in any environment where the emphasis is on career orientated education and training in the secondary and tertiary education sectors. The data from the questionnaires also support this view.

In Cost Accounting co-operative education was found particularly useful in securing the integration of theory and practice; in providing a limited source of income for students; in promoting the educational institution's training program among employers; in facilitating the student's transition from the life of a student to the life of a professional person; in bringing about a favourable change in students' attitudes towards their studies and finally in securing full-time employment for qualified students.

#### 7.2.3 THE AMOUNT OF PRACTICAL WORK

The data from the open ended questionnaires show that, in order to be worthwhile, practical work should occupy approximately 1/6 of the three year training period. The responses to the questionnaires indicated clearly that the practical work should take place during the student's third year of study only and may include vacation times during the same year. First and second year students are not ready for placement in business.

Any further increase in the amount of practical work would necessitate a reduction of the academic content if it is to remain a three-year course. Alternatively, the course length would have to be increased, which is also unacceptable as was shown previously.

#### 7.2.4 THE ATTENDANCE PATTERN

The data from the open ended questionnaires clearly indicate

that an alternating system such as the thin sandwich system is unsuitable for application in the commercial sciences and more particularly in the training of cost accountants. The respondents clearly preferred a parallel system such as a system of one or two days per week in the third year. The latter system has amongst others the advantage that it allows for the distribution of the academic content of the third year (the major subjects) over a full academic year.

A further refinement to the above system which was preferred by the respondents, is the week-in-week-out system. The latter provides for even more continuity in the work place and has the further advantage of the optimal utilization of the facilities of the educational institution - a major advantage of the alternating system. It would appear that the week-in-week-out system is an ideal compromise between the alternating and parallel systems because it incorporates the advantages of both systems while it eliminates the disadvantages of both as well.

#### 7.2.5 ACADEMIC CREDIT AND THE EVALUATION OF PRACTICAL WORK

The literature discussed in chapter 2 emphasized the importance of academic credit for practical work. The data from the open ended questionnaires support this view. Where practical in service training forms a substantial part of the total training program such as in the Cost Accounting program, it justifies proper evaluation. It may be stated that if something is worth while doing, it is worth while evaluating.

#### 7.2.6 REMUNERATION FOR PRACTICAL WORK

The data from the questionnaires show that remuneration for the practical work of students form an integral part of the co-operative education system. For students to carry out their tasks with responsibility, it is important that they be rewarded financially. It must be noted, however, that the financial reward attached to a work station should not be over-emphasized. The emphasis should remain on the educational benefit derived from the placement of a student.

#### 7.2.7 TYPE OF FIRMS SUITABLE FOR THE PLACEMENT OF STUDENTS

A complete list of firms participating in the co-operative education system used in the training of Cost Accountants appear in appendix 1. These are all small to medium sized firms with substantial manufacturing departments. Their turnovers vary between R1,25m and R240m per annum. The following generalisations apply in respect of their suitability as co-operators:

- The majority of firms have a good cost accounting system. This requirement is obvious. In very exceptional cases students have been given the opportunity to improve poor systems. The value of such experience must not be underestimated and consequently co-ordinators should be very judicious in insisting on a good cost accounting system when placing students.

- The firm should have at least one trained cost accountant who is able to supervise the student's in-service training. This trained staff member should also be willing to discuss from time to time the integration of theory and practice with the student, and to guide his progress.
- The firm must be located within a reasonable distance from the student as well as the co-ordinator. Long journeys would be unnecessarily time-consuming and expensive.
- The firm (employer) must have a positive attitude towards education and training in general and co-operative education and the educational institution in particular.

#### 7.2.8 STUDENTS' ATTITUDES

The literature reviewed indicates clearly that co-operative education has a positive influence on the attitudes of students relating to their studies, their personalities, the work situation and interpersonal relationships.

The data from the open questionnaires which were completed by employers, students and lecturers, strongly support this view. Although the results of the Likert questionnaires did not provide support for positive changes in all attitudes, strong support was provided for favourable changes in the following student attitudes brought about by co-operative education:

- knowledge about the realities of the work environment

- awareness of the difference between the life of a student and the life of a working person
- relevance of the course to the work situation
- appreciation of the relationship between theoretical knowledge and its application in practice
- qualities of leadership
- self confidence
- ability to communicate verbally

The support provided by this research for the view that co-operative education brings about favourable changes in the above mentioned attitudes, in turn provides strong support for the view that co-operative education facilitates the transition of students from the formal education sector to the world of work. Bearing in mind the Technikons' aim of providing career-orientated education, it strongly indicates that co-operative education provides the key to the realisation of the Technikons' main objective.

### 7.3 RECOMMENDATIONS

#### 7.3.1 THE CO-OPERATIVE EDUCATION PROGRAM

The development of the week-in-week-out system of co-operative education in Cost Accounting at the Cape Technikon was an evolutionary process which started with a small beginning and took five years to develop. The system fulfils the numerous requirements of a good co-operative education system. The

system may be even further improved by for example lengthening the weekly periods and using (say) two weekly periods. The week-in-week-out system is, however, strongly recommended for application in Accounting programs and has been successfully used in Cost Accounting, Company Administration, Internal Auditing and Computer Programming.

It is recommended that only third year students be involved in co-operative education. It has been shown that the involvement of first and second year students in co-operative education is not ideal.

As far as the time allocated to practical work in the third year is concerned, further experimentation and research are required. Too little time allocated to practical work is detrimental to the emphasis placed on co-operative education and is harmful to the partnership between employers and the educational institution. Too much time allocated to practical work is, on the other hand, harmful to the student's academic progress and consequently it is recommended that half the time in the third year be spent in employment and half in academic study.

In order to satisfy the requirements of a parallel system of co-operative education, it is recommended that periods in practice and periods in class should follow upon one another in quick succession in order not to divorce the student for too long from his academic studies.

While the initial emphasis in any co-operative education program must, of necessity, be on the enormous task of placing all qualifying (third year) students, the monitoring of students' progress in practice and the valuation of such practical work, form an integral part of the co-operative education program. As is the case with any educational activity, it requires systematic evaluation. In addition it is recommended that the evaluation of students' practical work be incorporated in their total evaluation for the purposes of awarding the qualification.

Two methods of evaluation of students' practical work are recommended. Firstly, a quarterly evaluation should be made by the employer. It is recommended that the employer should be supplied with an evaluation form such as the one which appears in appendix 5. It is suggested that the form is completed during the co-operative education co-ordinator's visit to the work station, and that the latter assists the employer with the completion thereof. This is also the ideal opportunity for the co-ordinator to iron out any problems which may exist at the work station.

Secondly, it is recommended that the students participating in the co-operative education program be requested to write a report on their practical work. This report is then evaluated by the lecturer and may deal with one or more of the following topics:

- The history of the firm
- The activities of the firm
- A description of the particular production processes of the firm
- The management structure
- The firms' cost accounting system
- Stock control and evaluation
- Cost centres in the firm
- The allocation of costs
- Cost controls in the firm
- Communication in the firm
- The firms' management information system
- Suggestions for the improvement of the systems of the firm
- Investigations into specific problems within the firm as requested by employers

It is suggested that the year mark of 40 marks be subdivided as follows:

Tests and other class work	28
Technical report on aspect(s) of practical work	6
Employer's evaluation of practical work	<u>6</u>
	<u>40</u>

It is recommended that students be rewarded financially for their practical work. The emphasis should, however, be on the student's learning experiences and not on the financial rewards of a placement.

Cost Accounting students should be placed at firms where sound cost accounting systems exist and, generally speaking, students should be placed at firms where the particular discipline for which they are being prepared, is practised. This is essential for the work station to be a proper learning place.

### 7.3.2 THE CURRICULUM

The following curriculum incorporates the comments received from respondents relating to the name changes and the order in which subjects are offered. The recommended changes would facilitate the offering of the course according to the co-operative education method recommended in 7.3.1 above:

#### THE NATIONAL DIPLOMA IN COST AND MANAGEMENT ACCOUNTING

##### First Year

Financial Accounting I  
Cost and Management Accounting I  
Mercantile Law I  
Economics I  
Principles of Information Systems

##### Second Year

Financial Accounting II  
Cost and Management Accounting II  
Statistical Methods and Financial Calculations  
Company Law  
Auditing

Third Year

Financial Accounting III

Cost and Management Accounting III

Income Tax

Practical work (alternating weeks)

7.3.3 THE SYLLABI

The following recommended syllabi for Cost Accounting incorporate the comments received from respondents relating to the name change (which would more clearly describe the contents of the subject) as well as a few changes of and additions to the contents:

Cost and Management Accounting I

- Introduction
- Material
- Labour
- Manufacturing overheads
- Accounting systems
- Job costing
- Contract costing

Cost and Management Accounting II

- Process costs
- By-products and joint products
- Budgets
- Marginal/Direct costing
- Standard costs
- Pricing decisions

### Cost and Management Accounting III

- Budgets and Budgetary control
- Standard costs
- Capital budgeting
- Marketing costs
- Application of quantitative techniques
- Management decisions

In the above subjects, as well as in Financial Accounting, Auditing and Statistics, particular attention must be given to computer applications. Considering the rate at which computerisation takes place in practice, Accounting tuition cannot any more be offered without application on the computer. The tuition of computer applications is, furthermore, also essential in view of the Technikon's objective of training employees, including cost accountants, who will be productive immediately upon full-time employment.

#### 7.3.4 THE NATIONAL HIGHER DIPLOMA

In order to bring the Higher Diploma in line with the suggested changes in the Diploma, the following changes to the Higher Diploma are recommended:

In accordance with the Diploma the name of the Higher Diploma will have to be changed to the National Higher Diploma in Cost and Management Accounting. In addition the name of the subject Industrial Accounting IV should be changed to Cost and Management Accounting IV.

In section 7.3.2 above it was recommended that Income Tax should be included in the curriculum of the Diploma. In view of the fact that one of the examination papers of Advanced Accounting presently consists of Income Tax, this part must be changed. The other two papers consist of Financial Management and Advanced Analysis and Interpretation of Statements and consequently it is recommended that the following Accounting topics should be included in place of Income Tax:

- Advanced Consolidated Financial Statements such as vertical groups, purchase and sale of shares during the financial year, insolvent subsidiaries, rights issues and capitalization issues by subsidiaries, deferred taxation and consolidated source and application of funds statements.
- Equity accounting and associated companies
- Inflation accounting
- Advanced valuation of businesses
- Statements of township developers
- Revaluations of fixed assets
- Long term contracts
- Leases
- A working knowledge of GAAP

The minor subjects of the Higher Diploma viz. Production Management and Management Introduction Systems should remain unaltered.

It is recommended that the practical work component of the Higher Diploma should be similar to the Diploma i.o.w. a system that alternate weekly periods of class attendance with similar periods of on the job experience.

#### 7.3.5 GENERAL RECOMMENDATIONS

To be successful co-operative education requires commitment from the top management of the educational institution. In addition it requires the enthusiasm and drive of academic staff - people that will be willing to convince others; to forcefully sell the principle of co-operative education to employers and people that are imaginative in the design of attendance patterns.

Co-operative education can be started on an small scale in most disciplines. The academic staff involved in the system must be prepared to learn from mistakes made and even be prepared to be criticized for such mistakes. In the process better co-operative education systems will be developed. South Africa desperately needs workers that can be productively employed from day one in full-time employment. This challenge must be faced and be reacted upon without delay. To meet the needs of our economy we will have to actively improve the training partnerships between commerce and industry on the one hand, and educational institutions on the other hand. Co-operative education provides the key to this ideal.

Co-operative education is economically viable and educationally sound. While the application of the co-operative education principle is flourishing in Accounting and Accounting related disciplines it is recommended that it be extended to include other commercial sciences such as Marketing Management, Personnel Management, Production Management, Purchasing Management, Secretarial Studies and Commercial Art.

APPENDIX 1

FIRMS PARTICIPATING IN THE SYSTEM OF CO-OPERATIVE EDUCATION  
APPLIED TO THIRD YEAR COST ACCOUNTING STUDENTS OF THE CAPE  
TECHNIKON

The following table gives a summary of the various firms which have so far participated in the system of practical work by employing third year students for one day per week (1982, 1983 and 1984) or two days per week (1985 and 1986) or on a week-in-week-out basis (1987):

TABLE 10

Firm	Main function	Approximate Annual turnover	Approximate Number of Employees
1. Everite Ltd	Manufacturer of building materials and associated products	R240 m	6 500
2. Agriplas, a subsidiary of Everite Ltd	Manufacturer of plastic products for use in agriculture and industry	Included in Everite's figure	Included in Everite's figure
3. Langeberg Co-operative Ltd	Canning firm	R80 m	6 500 plus a further 8 000 during peak times
4. Dairybelle Corporation (Pty) Ltd	Processing and packaging of milk, milk by-products and fruit juices	R60 m	1 000
5. National Panasonic Ltd, a subsidiary of Barlows	Manufacturer of electronic products	R50 m	450

TABLE 10 (CONTINUED)

Firm	Main function	Approximate Annual turnover	Approximate Number of Employees
6. Gants Foods (Pty) Ltd	Canning firm	R40 m	750 plus a further 750 during peak times
7. House of Monatic Ltd, member of the Pepkor group	Clothing manufacturer	R40 m	2 000
8. Consani's Engineering	Engineering company	R40 m	1 100
9. Spekenam, subsidiary of Vleis sentraal	Processing and marketing of pork	R30 m	500
10. Swartklip Products Ltd, subsidiary of Armscor	Manufacturer of ammunition	R25 m	900
11. Chamberlains (Pty) Ltd	Manufacturer of household medicine and sweets	R25 m	350
12. Dairy Maid Ice-cream Corporation	Manufacturer and distributor of frozen ice cream, sorbet and frozen confectionery. Manufacturer of deep freezes and glass fibre products.	Not disclosed	350

TABLE 10 (CONTINUED)

Firm	Main function	Approximate Annual turnover	Approximate Number of Employees
13. Van Schoor (Pty) Ltd	Manufacturer of light steel products	R2.5 m	110
14. Van Riebeeck Press	Printing firm	R1,25 m	40
15. KWV	Manufacturer of wine	Not disclosed	Not disclosed
16. Manufacturers Exchange (Pty) Ltd	Wholesale distributor	R4,5 m	50
17. Nasionale Tydskrifte	Printing firm	R50 m +	700
18. Cape and Transvaal Printers	Printing firm	R60 m	1 000
19. Gilbeys Distillers and Vintners (Pty) Ltd	Liquor manufacturer and distributor	R150 m +	950
20. Rex Trueform	Clothing Manufacturing and Marketing	Not disclosed	3 000
21. Safety Transport	Manufacturer of car safety belts	Not disclosed	140

TABLE 10 (CONTINUED)

Firm	Main function	Approximate Annual turnover	Approximate Number of Employees
22. Atlantic Fishing Enterprises	Trawler owners, Operators, Fish Processors, Wholesalers and Exporters	Not disclosed	1 000
23. Metal Box SA	Manufacturer of metal cans	R60 m	350
24. Epic Oil Mills	Manufacturers of edible oils and fats	R60 m	380
25. Lever Columbus	Suppliers of floor cleaning equipment and chemicals	R25 m	220
26. Consol Limited	Manufacturer of glass containers	Not disclosed	600+
27. Pep Clothing Industries	Clothing manufacturers	R25 m	1 500

APPENDIX 2SYLLABI OF THE SUBJECTS INDUSTRIAL ACCOUNTING I, II AND IIIINDUSTRIAL ACCOUNTING I

(One three-hour paper)

The value of theory is by no means underestimated, but in the examination the practical application of the syllabi will be stressed.

1. The objects of industrial accounting; the significance of the cost price as policy information concerning
  - 1.1 the selling price
  - 1.2 efficiency and
  - 1.3 decisions
  
2. The rudiments of the theory of costs, cost price and value, and the application thereof
  - 2.1 Value as basis
  - 2.2 Quantity as basis
  - 2.3 Time as basis
  - 2.4 Before and after-calculation
  
3. Costs and cost price
  - 3.1 Value, expenditure and costs
  - 3.2 Costs and wastage
  - 3.3 The concept of cost price
  - 3.4 The cost of durable means of production that are subject to

wear, the characteristic of the capacity of the means of production, economic proportionality, the problem of quantitative technique, technical and economic wear and tear, the principal depreciation methods, the effect of economic wear and price changes on the depreciation policy

### 3.5 Cost concepts

Cost elements, primary costs, conversion costs; cost of manufactured goods, cost of goods sold; selling costs and administrative costs.

### 3.6 Costs of service and tax

### 3.7 Interest as a cost factor.

## 4. Analysis of cost elements:

### 4.1 Materials

#### 4.1.1 Product specification and production planning.

Determining the inventory requirements in the production process.

#### 4.1.2 Ordering and stock control - the functions of ordering.

Determining the maximum and minimum stock and the reordering level, buffer stock; determining the most economic order quantity.

#### 4.1.3 Buying and manufacturing specification - Materials

specifications, aids for the buying department - ordering and follow-up procedures.

#### 4.1.4 Reception, and specification and quality control -

approval of invoices and preparation of documents - entry of materials received.

- 4.1.5 Classification and coding of raw materials, work-in-process and finished products
- 4.1.6 Storage - functions of storage - perpetual inventory system - stock ledger cards, bin cards and other aids - handling of materials
- 4.1.7 Issuing of material. Procedure for issuing material and recording all items issued. Issuing methods - Fifo, Lifo, weighted average, standard, etc.
- 4.1.8 Material flow through the entire organization, especially with the use of PERT techniques.
- 4.1.9 Costing of materials. Calculation of material costs per unit and per product. Material summaries - ledger cards, etc. - determining the cost of defective materials.
- 4.1.10 Planning of stores - layout of stores - centralization and decentralization. Methods and facilities for stored materials. Work-in-process and finished goods.
- 4.1.11 Stores procedure - complete records of material flow - transfers and returns - handling of scrap - stock-taking - preparation of reports.
- 4.1.12 Accounting entries in respect of materials.
- 4.2 Labour
  - 4.2.1 Timing function
  - 4.2.2 Remuneration - wage determination and various wage systems
  - 4.2.3 Pay-roll procedure
  - 4.2.4 Pay-out procedure
  - 4.2.5 Wage analysis

- 4.2.6 Calculation of direct and indirect labour costs.
- 4.2.7 Accounting entries in respect of labour.
- 4.3 Manufacturing overheads
  - 4.3.1 Classification of manufacturing overheads.
  - 4.3.2 Analysis of overheads into fixed and variable components
  - 4.3.3 Calculating pre-determined overhead rates by using all the different bases.
  - 4.3.4 Methods of applying overheads to production.
  - 4.3.5 Analysing over or under-applied overheads.
  - 4.3.6 Accounting entries in respect of manufacturing overheads
- 5. Costing techniques for determining unit costs.
  - 5.1 Job costs
    - 5.1.1 The nature of the job cost cycle
    - 5.1.2 Documents, methods and procedures for recording material costs, labour costs and manufacturing overheads in a job cost cycle.
  - 5.2 Manufacturing accounting
    - 5.2.1 Three different types of stock in connection with manufacturing.
    - 5.2.2 Calculation of cost of goods manufactured and sold.
    - 5.2.3 Manufacturing accounts and factory ledger.
- 6. Cost statements for goods manufactured and sold.
- 7. Income statements and balance sheets.
- 8. Relation between the integration of financial accounting and

industrial accounting - problems with regard to booking with the aid of subsidiary books and ledger accounts, and the reconciliation of final statements.

9. Planning and control techniques using -

9.1 the critical path method

9.2 P.E.R.T.

9.3 Linear programming

(Only elementary applications of these techniques will be required in the examination).

10. The importance of the industrial accountant's profession, practising as an industrial accountant, and the ethics that have to be upheld.

## INDUSTRIAL ACCOUNTING II

(Two three-hour papers)

The value of theory is by no means underestimated, but in the examination the practical application of the syllabi will be stressed.

1. Revision of the first-year course.
  
2. Manufacturing overheads
  - 2.1 Allocation of overheads
    - 2.1.1 Importance of the concept of causal relationship.
    - 2.1.2 Methods of allocation in practice.
    - 2.1.3 Organization allocation.
    - 2.1.4 Cost centre allocation.
    - 2.1.5 Product allocation.
  - 2.2 Departmentation of overheads
    - 2.2.1 Difference between production and service departments
    - 2.2.2 Primary allocation
    - 2.2.3 Secondary allocation - different methods that may be used as basis for allocation.
  - 2.3 Accounting entries in respect of the allocation and departmentation of overheads.
  - 2.4 Machinery and equipment
    - 2.4.1 Machinery and equipment records
    - 2.4.2 Depreciation of machinery and equipment
    - 2.4.3 Use and efficiency of equipment

3. Costing techniques to determine unit costs
  - 3.1 Contract costing systems
    - 3.1.1 Three cost elements
    - 3.1.2 Machinery and equipment for contracts
    - 3.1.3 Subcontracts
    - 3.1.4 Extra work
    - 3.1.5 Determining the profit on contracts:
      - 3.1.5.1 After the contract has been completed
      - 3.1.5.2 Retentions in respect of completed contracts
      - 3.1.5.3 Uncompleted contracts
    - 3.1.6 Certified work
    - 3.1.7 Entries on balance sheet
  - 3.2 Process costs
    - 3.2.1 Determining effective units
    - 3.2.2 Determining the stage of completion of work-in-process
    - 3.2.3 The effect of lost units on process costs
    - 3.2.4 The average-cost method for work-in-process, opening stock, in the first department only
    - 3.2.5 The FIFO-method for work-in-process, opening stock, in first department only
    - 3.2.6 Accounting entries in respect of the process cost cycle.
  - 3.3 Joint products and by-products
    - 3.3.1 Difference between joint products and by-products
    - 3.3.2 Problems in connection with the costing of joint products and by-products
    - 3.3.3 Handling of by-products
    - 3.3.4 By-product stocks
    - 3.3.5. Allocation of by-product costs

- 3.3.6 Accounting entries in respect of joint products and by-products
- 3.3.7 The handling of normal and abnormal scrap.
  
- 4. Introduction to budgetary control (elementary)
  - 4.1 Budgetary control and profit planning - theoretical treatment of:
    - 4.1.1 Nature of budgets and budgetary control
    - 4.1.2 Budget period
    - 4.1.3 Organization of budgetary control
    - 4.1.4 Budget plan for an undertaking
      - 4.1.4.1 Master budget
      - 4.1.4.2 Detailed subsidiary budgets
    - 4.1.5 The capacity problem
    - 4.1.6 Fixed and variable budgets.
  
- 5. Direct costs (excluding break-even analysis)
  - 5.1 Techniques and application on an intermediate level
  - 5.2 Comparison of fixed and variable costs
  - 5.3 Comparison of direct and absorption costs methods.
  
- 6. Inflation problems
  - 6.1 Control of material and labour costs and manufacturing overheads in inflationary times.
  - 6.2 Inflation and investment decisions.
  - 6.3 Inflation and depreciation.
  
- 7. The replacement value theory outlined.

## INDUSTRIAL ACCOUNTING III

(Three three-hour papers)

The value of theory is by no means underestimated, but in the examination the practical application of the syllabi will be stressed.

1. Revision of first-year and second-year courses.
2. Process costs. Advanced problems where FIFO and the weighted average are used as basis for the valuation of opening stocks.
3. Budgetary control and profit planning.
  - 3.1 Nature of budgets and budgetary control
  - 3.2 Budget period
  - 3.3 Organization of budgetary control
  - 3.4 Budget plan for an undertaking:
    - 3.4.1 Master budget
    - 3.4.2 Detailed subsidiary budgets
  - 3.5 The capacity problem
  - 3.6 Fixed and variable budgets
  - 3.7 Problems in connection with:
    - 3.7.1 Budgeted income statements
    - 3.7.2 Budgeted balance sheets
    - 3.7.3 Capital budgets
    - 3.7.4 Cash budgets
    - 3.7.5 Sales budgets

- 3.7.6 Production budgets
- 3.7.7 Direct materials purchasing budget
- 3.7.8 Manufacturing overheads budgets
- 3.7.9 Stock budgets
- 3.7.10 Cost of sales budget
- 3.8 Analysis of budget variances
  
- 4. Standard costs
  - 4.1 Nature and object of standard costs
  - 4.2 Advantages of standard costs
  - 4.3 Development of standard manufacturing costs
  - 4.4 Responsibility for the introduction of standard manufacturing costs
  - 4.5 Variance analysis
    - 4.5.1 Where a single product is produced and a fixed budget is used
      - 4.5.1.1 Material variances: Price and quantity
      - 4.5.1.2 Labour: rate and efficiency
      - 4.5.1.3 Overheads: efficiency, budget and volume variances
      - 4.5.1.4 Sales variances. Based on profits and turnover.
    - 4.5.2 Minor variances
      - 4.5.2.1 Materials: mix and yield
    - 4.5.3 Where a variable budget is used
      - 4.5.3.1 Overheads - two-way analysis, namely controllable and volume variances
      - 4.5.3.2 Overheads - three-way analysis, namely expenditure, efficiency and idle capacity variances.
  - 4.6 Calculation of activity ratios

- 4.7 Reasons for standard cost variances and the preparation of variance reports to management.
- 4.8 Accounting entries in respect of standard cost transactions.
  
- 5. Decisions on capital expenditure
  - 5.1 Planning and control of capital expenditure
  - 5.2 Responsibility for and evaluation of capital expenditure
  - 5.3 Problems in connection with:
    - 5.3.1 Pay-back period
    - 5.3.2 Average return on investment
    - 5.3.3 Discounted cash flow:
      - 5.3.3.1 Net present value
      - 5.3.3.2 Discounted rate of return
  
- 6. Cash flow
  - 6.1 The basic concept
  - 6.2 Characteristics of the cash flow concept
  - 6.3 Determining the net cash inflow and cash outflow.
  
- 7. Planning and control of profits by means of direct cost methods
  - 7.1 Nature and object of direct costs
  - 7.2 Comparison of direct and absorption costs
  - 7.3 Comparison of direct and absorption costs where standard costs are used
  - 7.4 Accounting procedure where direct costs are used
  - 7.5 Advantages and disadvantages of direct costs
  - 7.6 The effect of different costing methods on the net income

## 8. Break-even analysis

8.1 Calculation of the break-even point in value and in units

8.2 Calculation of:

8.2.1 Marginal costs

8.2.2 Marginal income (contribution)

8.2.3 Marginal income ratio

8.2.4 Margin of safety

8.2.5 Margin of safety ratio

8.3 Construction of the break-even chart or graph

8.4 Effect of a change in the following on the break-even analysis:

8.4.1 Volume

8.4.2 Costs

8.4.3 Selling prices

8.4.4 Sales mix

8.5 Use of break-even analysis for:

8.5.1 Planning of financial requirements

8.5.2 Decisions on prices

8.5.3 Decisions on product mix

8.5.4 Evaluation of certain departments or branches of an undertaking.

## 9. Profit planning by comparative cost analysis

9.1 Types of decisions

9.1.1 Acceptance of additional volume

9.1.2 To proceed with production or close down altogether

9.1.3 Problems in connection with replacement of equipment

9.1.4 To manufacture or purchase components

9.1.5 To sell the product or process it further

## 9.2 Concepts and application of costs to decisions

9.2.1 Differential costs

9.2.2 Traceable costs

9.2.3 Replacement costs

9.2.4 Opportunity costs

9.2.5 Attributable costs

## 10. Marketing and distribution costs

10.1 Object of distribution costs

10.2 Classification of distribution costs

10.3 Analysis of distribution costs

10.4 Analysis of distribution costs in areas

10.5 Other methods of analysing distribution costs.

## 11. Preparation of reports for management decisions on:

11.1 Periodic comparison of material costs, labour costs, and manufacturing overheads in order to save costs and eliminate inefficiency

11.2 Wastage, scrap, defective work, idle time, inefficient workers, inefficient equipment

11.3 Cost of equipment to increase capacity - more shifts, etc.

11.4 Standard cost variances - interpretation and their use for control and policy purposes

11.5 Distribution costs - sales of which products have to be increased - which products contribute most, etc.

APPENDIX 3.1QUESTIONNAIRE COMPLETED BY EMPLOYERS PARTICIPATING IN PRACTICAL WORK (CO-OPERATIVE EDUCATION) IN COST ACCOUNTING

- 1.1 Name and address of firm .....
- .....
- 1.2 Main objective of the firm (eg. manufacturer of plastic products etc.) .....
- 1.3 Annual turnover of the firm .....
- 1.4 Number of employees in firm .....
2. Name of person completing questionnaire .....
- .....
- Telephone number .....
3. Only third-year students are at present doing practical work on Tuesdays and Wednesdays at various firms.
- 3.1 Should practical work be extended to:
- Second year students ? .....
- First year students ? .....
- 3.2 Which of the following tasks would you normally entrust to a student:
- Collection of cost information? .....
- Classification of cost information? .....
- Allocation of costs? .....
- Writing up journals and ledger accounts? .....
- Calculation of actual costs? .....
- Comparison between actual costs and standard costs - calculation of variances? .....

- Drafting performance reports and identifying problem areas? .....
- Investigations into problems and reporting results to management? .....
- Drafting cost of production statements, monthly statements and annual statements? .....
- Setting of standards? .....
- Any other tasks (please describe)? .....
- .....
- .....
- 3.3 Do you regard two days' practical work per week as adequate to supplement the student's theoretical training?  
.....
- 3.4 If not, how would you recommend that practical work be extended?  
By an additional day per week? .....
- By a continuous period during Technikon vacations? .....
- By a system of one week in (the Technikon) and one week out (in practice)? .....
- Any other proposal? .....
- .....
- 3.5 Do you remunerate students for practical work done in your firm? .....
- If yes, how much are they paid per day? .....
- 3.6 Do you think students should be given academic credit for practical work done at firms?  
.....
- 4. Are students doing practical work in your firm lacking in communication skills?  
.....

5. What, in your opinion, are the weaknesses in the theoretical training apparent from the work of students doing practical work in your firm?  
.....  
.....
  
6. Has any change, however small, been effected to your costing system as a result of your co-operation with the Technikon?  
.....  
.....
  
7. Did this co-operation with the Technikon in any way create an awareness of training needs in your own company?  
.....  
If yes, please describe briefly .....  
.....  
.....
  
8. Give a brief description of your company's costing system (refer to eg. job costing, process costs, contract costs, standard costs, absorption and marginal costing) .....  
.....  
.....  
.....  
.....
  
9. Is your costing system computerised? .....  
If yes, wholly or partially? .....  
.....
  
10. Have you any suggestions for the improvement of the National Diploma in Cost Accounting?  
.....  
.....  
.....

11. Were you aware of the training of Cost Accountants at the Technikon before your participation in this joint venture?

.....

Do you regard this training as suitable for your prospective employees?

.....

12. Have you any other relevant comments? .....

.....

.....

.....

APPENDIX 3.2

QUESTIONNAIRE COMPLETED BY EMPLOYERS OF EX-COST ACCOUNTING STUDENTS ON A FULL-TIME BASIS

1. Name and address of employer/firm .....  
.....
2. Name of person completing questionnaire .....  
.....  
Telephone number .....
3. To what post was the ex-student appointed? .....  
.....
4. Are you satisfied with the student's training before he was employed full-time? .....
5. Have you any suggestions towards the improvement of the student's theoretical training?  
.....  
.....
6. Only third-year students are at present doing practical work at various firms (Co-operative Education)
  - 6.1 Would you be able to accommodate such a student in future?  
.....
  - 6.2 Do you regard two days' practical work per week for one year as adequate to supplement the student's theoretical training?  
.....
  - 6.3 Have you any suggestions for the improvement of the present system of practical work?  
.....  
.....  
.....

7. Did the ex-student have adequate practical training to enable him to be productive immediately after commencement of full-time employment in your firm?

.....  
.....

8. How did this student fare in your firm in comparison with other employees with similar three-year qualifications?

.....  
.....  
.....

9. Have you any other relevant comments? .....

.....  
.....  
.....  
.....

APPENDIX 3.3

QUESTIONNAIRE COMPLETED BY EX-COST ACCOUNTING STUDENTS WHO DID PRACTICAL WORK DURING THE PERIOD 1982 - 1986

1. Your name .....  
Address .....  
.....  
Telephone Number .....
2. Name and address of firm where you are employed .....
3. Name and telephone number of your departmental head .....
4. What is your present position? .....
5. Give a short job description of your current post. ....  
.....  
.....
6. What is your current annual salary? .....  
Any other benefits? .....
7. At what salary did you start employment after completing your third year of study?  
.....
8. Did you take up full-time employment at the firm where you did practical work during your third year of study?  
.....  
If yes, why? .....  
.....  
If not, why not? .....  
.....

9. Only third year students are at present doing practical work on Tuesdays and Wednesdays at various firms.
- 9.1 Should practical work be extended to:
- Second year students? .....
- First year students? .....
- 9.2 Do you regard two days' practical work per week as adequate to supplement the student's theoretical training?
- .....
- 9.3 If not, how would you recommend that practical work be extended? Indicate your choice below:
- By one additional day per week? .....
- By a continuous period during Technikon vacations? .....
- By a system of one week in (the Technikon) and one week out (in practice)?
- .....
- Any other proposal? .....
- .....
- 9.4 Do you think students should be given academic credit for practical work done at firms?
- .....
- 9.5 Which of the following tasks were given to you during your third year at the firm where you did practical work?
- Collection of cost information? .....
- Classification of cost information? .....
- Allocation of costs? .....
- Writing up journals and ledger accounts? .....
- Calculation of actual costs? .....
- Comparison between actual costs and standard costs - calculation of variances? .....
- Drafting performance reports and identifying problem areas? .....

Investigations into problems and reporting results to management? .....

Drafting cost of production statements, monthly statements and annual statements? .....

Setting of standards? .....

Any other tasks (please describe)? .....

.....  
.....  
.....

9.6 Has the practical work that you did during your third year of study assisted you in adapting to professional life?

If yes, how? .....

.....  
.....

9.7 Did you receive any remuneration for your practical work during the third year?

.....

If yes, how much per day? .....

If not, were you demotivated as a result? .....

Do you think that remuneration would lead to a more positive attitude towards practical work?

.....

10. Do you have any suggestions towards the improvement of the curriculum of the National Diploma in Cost Accounting?

.....  
.....  
.....

11. Do you have any other relevant comments? .....

.....  
.....

APPENDIX 3.4QUESTIONNAIRE COMPLETED BY COST ACCOUNTING STUDENTS WHILE THEY WERE ENGAGED IN THE SYSTEM OF PRACTICAL WORK (1982 - 1987)

1. Your name .....
2. Name of firm where you are doing your practical work .....  
.....
3. Only third-year students are at present doing practical work on Tuesdays and Wednesdays at various firms:
  - 3.1. Should practical work be extended to:
    - Second-year students? .....
    - First-year students? .....
  - 3.2 Are you being remunerated for the work that you do in the firm? .....  
If yes, how much? .....
  - 3.3 Do you regard two days' practical work per week as adequate to supplement your theoretical training?  
.....
  - 3.4 If not, how would you recommend that practical work be extended? Indicate your choice below:
    - By one additional day per week? .....
    - By a continuous period during Technikon vacations? .....
    - By a system of one week in (the Technikon) and one week out (in practice)?  
.....
    - Any other proposal? .....
  - 3.5 Do you think students should be given academic credit for practical work done at firms?  
.....

3.6 Which of the following tasks are normally given to you at the firm where you do your practical work:

- Collection of cost information? .....
- Classification of cost information? .....
- Allocation of costs? .....
- Writing up journals and ledger accounts? .....
- Calculation of actual costs? .....
- Comparison between actual costs and standard costs - calculation of variances? .....
- Drafting performance reports and identifying problem areas? .....
- Investigations into problems and reporting results to management? .....
- Drafting cost of production statements, monthly statements and annual statements? .....
- Setting of standards? .....
- Any other tasks (please describe)? .....

.....  
.....  
.....

4. Is your third year of study too full? .....

Should Principles of EDP be moved to the first year? .....

5. Do you have you any suggestions for the improvement of the curriculum of the National Diploma in Cost Accounting?

.....  
.....  
.....

6. Do you have any other relevant comments? .....

.....  
.....  
.....  
.....

APPENDIX 3.5

QUESTIONNAIRE COMPLETED BY LECTURERS ACTING AS CO-ORDINATORS  
AND TEACHING THIRD YEAR COST ACCOUNTING STUDENTS (1983 - 1987)

- 1. Name of Lecturer .....
  
- 2. Only third-year students are at present doing practical work on Tuesdays and Wednesdays at various firms:
  - 2.1 Should practical work be extended to:
    - Second-year students? .....
    - First-year students? .....
  - 2.2 Do you regard two days' practical work per week as adequate to supplement the student's theoretical training?  
.....
  - 2.3 If not, how would you recommend that practical work be extended? Indicate your choice below:
    - By one additional day per week? .....
    - By a continuous period during Technikon vacations? .....
    - By a system of one week in (the Technikon) and one week out (in practice)?  
.....
    - Any other proposal? .....
    - .....
    - .....
  - 2.4 Should students be remunerated for the work they do at the various firms?  
.....  
If yes, what would you regard as a reasonable amount per day?  
.....

2.5 Do you think students should be given academic credit for practical work done at firms?

.....

If yes, what from you recommend that such credit should take?

.....  
.....

2.6 Did you notice any improvement in students' attitudes towards their studies after they had been in contact with practice?

.....

Please describe briefly .....

.....  
.....  
.....

3. Do you have any suggestions for the improvement of the curriculum of the National Diploma in Cost Accounting?

.....  
.....

4. Do you have any suggestions for the improvement of the sillabuses of Industrial Accounting I, II, III and IV?

.....  
.....  
.....

5. Do you have any suggestions for the improvement of the training, practical work etc. of National Higher Diploma students?

.....  
.....

6. Do you have any other relevant comments? .....

.....  
.....  
.....

APPENDIX 4.1

QUESTIONNAIRE COMPLETED BY  
SECOND AND THIRD YEAR  
NATIONAL DIPLOMA IN COST ACCOUNTING  
STUDENTS

In order to help us evaluate and improve the Diploma course in Cost Accounting you are requested to complete this questionnaire. The information provided will be treated in the strictest confidence and will have no effect whatsoever on your success in the course.

Thank you for your co-operation.

Student's name .....  
Year of study .....  
Male or Female .....  
Date .....

Indicate your answer with a tick (✓) in the appropriate block.

1. How interesting do you find the course?

- Very interesting
- More interesting than average
- Average
- Less interesting than average
- Very uninteresting

Why? .....  
.....

2. Do you enjoy the course?

- Most enjoyable
- More enjoyable than average
- Average
- Less enjoyable than average
- Not enjoyable at all

Why? .....  
.....

3. Are you inspired by the course to make full use of your capabilities?

- Strongly inspired
- More inspired than average
- Average
- Less inspired than average
- Not inspired at all

4. How valuable do you judge this course in comparison with other tertiary courses?

- Very valuable
- More valuable than average
- Average
- Less valuable than average
- Worthless

Why? .....  
.....

5. How meaningful do you judge your studies to be?

- Very meaningful
- More meaningful than average
- Average
- Less meaningful than average
- Meaningless

Why? .....  
.....

6. How do you rate your ability to communicate in writing?

- Very good
- Above average
- Average
- Below average
- Very poor

7. How do you rate your ability to communicate verbally?

- Very good
- Above average
- Average
- Below average
- Very poor

8. How relevant do you think the course is to the work situation?

- Very relevant
- More relevant than average
- Average
- Less relevant than average
- Irrelevant

Why? .....

.....

9. How motivated are you to be successful?

- Strongly motivated
- More motivated than average
- Average
- Less motivated than average
- Not motivated at all

10. How enthusiastic are you to become a qualified cost accountant?

- Very enthusiastic
- More enthusiastic than average
- Average
- Less enthusiastic than average
- Not enthusiastic at all

11. Are you fully aware of the difference between the life of a student and the life of a working person?

- Fully aware
- More aware than average
- Average
- Less aware than average
- Not aware at all

Which differences do you think are important? .....

.....

.....

12. How do you rate your knowledge about the realities of the work environment?

- Very realistic
- More realistic than average
- Average
- Less realistic than average
- Very unrealistic

13. How positive is your attitude towards your studies?

- Very positive
- More positive than average
- Average
- Less positive than average
- Very negative

14. How do you judge your ability to make a positive contribution in the class room?

- Very good
- Above average
- Average
- Below average
- Very poor

15. How do you rate your understanding of other people?

- Very good
- Above average
- Average
- Below average
- Very poor

16. How do you rate your qualities of leadership?

- Very good
- Above average
- Average
- Below average
- Very poor

17. How do you rate your ability to work in a group?

- Very good
- Above average
- Average
- Below average
- Very poor

18. How clearly do you see the relationship between your theoretical knowledge and its application in practice?

- Very clearly
- More clearly than average
- Average
- Less clearly than average
- Not clearly at all

19. How do you rate your ability to master new knowledge quickly?

- Very good
- Above average
- Average
- Below average
- Very poor

20. Are you a mature person?

- Very mature
- More mature than average
- Average
- Less mature than average
- Very immature

21. Are you a responsible person?

- Very responsible
- More responsible than average
- Average
- Less responsible than average
- Very irresponsible

22. Are you socially adaptable?

- Very adaptable
- More adaptable than average
- Average
- Less adaptable than average
- Not adaptable at all

23. Are you a self disciplined person?

- Very disciplined
- More disciplined than average
- Average
- Less disciplined than average
- Not disciplined at all

24. How punctual are you?

- Very punctual
- More punctual than average
- Average
- Less punctual than average
- Not punctual at all

25. How do you rate your originality?

- Very original
- More original than average
- Average
- Less original than average
- Not original at all

26. How do you judge your creativity?

- Very creative
- More creative than average
- Average
- Less creative than average
- Not creative at all

27. Are you able to think independently?

- Very good
- Above average
- Average
- Below average
- Very poor

28. How do you judge your self confidence?

- Very confident
- More confident than average
- Average
- Less confident than average
- Not confident at all

29. How do you judge your dedication to your studies?

- Very dedicated
- More dedicated than average
- Average
- Less dedicated than average
- Not dedicated at all

30. How do you rate your ability to persevere?

- Very good
- Above average
- Average
- Below average
- Very poor

31. How do you rate your willingness to share facilities?

- Very willing
- More willing than average
- Average
- Less willing than average
- Very unwilling

32. How often are you encouraged to do independent research?

Very often

More often than average

Average

Less often than average

Never

APPENDIX 4.2

QUESTIONNAIRE IN RESPECT OF SECOND AND  
THIRD YEAR NATIONAL DIPLOMA IN  
COST ACCOUNTING STUDENTS

COMPLETED BY LECTURERS

In order to help us evaluate and improve the Diploma course in Cost Accounting you are requested to complete this questionnaire in respect of each student in your class. The information provided will be treated in the strictest confidence.

Thank you for your co-operation.

Questionnaire completed by ..... (lecturer)  
Questionnaire completed i.r.o ..... (student)  
Year of study .....  
Male or female .....  
Date .....

Indicate your answer with a tick (✓) in the appropriate block.

1. How interesting does the student find the course?

- Very interesting
- More interesting than average
- Average
- Less interesting than average
- Very uninteresting
- Not in a position to judge

2. Does the student appear to enjoy the course?

- Most enjoyable
- More enjoyable than average
- Average
- Less enjoyable than average
- Not enjoyable at all
- Not in a position to judge

3. Is the student inspired by the course to make full use of his/her capabilities?

- Strongly inspired
- More inspired than average
- Average
- Less inspired than average
- Not inspired at all
- Not in a position to judge

4. How valuable do you think the student considers this course in comparison with other tertiary courses?

Very valuable

More valuable than average

Average

Less valuable than average

Worthless

Not in a position to judge

5. How meaningful does the student judge his/her studies to be?

Very meaningful

More meaningful than average

Average

Less meaningful than average

Meaningless

Not in a position to judge

6. How do you rate the student's ability to communicate in writing?

Very good

Above average

Average

Below average

Very poor

7. How do you rate the student's ability to communicate verbally?

Very good

Above average

Average

Below average

Very poor

8. How relevant to the work situation does the student find the course?

Very relevant

More relevant than average

Average

Less relevant than average

Not relevant at all

Not in a position to judge

9. To what extent is the student motivated to be successful?

Strongly motivated

More motivated than average

Average

Less motivated than average

Not motivated at all

10. How enthusiastic is this student to become a qualified cost accountant?

Very enthusiastic

More enthusiastic than average

Average

Less enthusiastic than average

Not enthusiastic at all

11. Do you feel that the student is fully aware of the difference between the life of a student and the life of a working person?

Fully aware

More aware than average

Average

Less aware than average

Not aware at all

Not in a position to judge

12. How do you rate the student's knowledge about the realities of the work environment?

Very realistic	<input type="checkbox"/>
More realistic than average	<input type="checkbox"/>
Average	<input type="checkbox"/>
Less realistic than average	<input type="checkbox"/>
Very unrealistic	<input type="checkbox"/>
Not in a position to judge	<input type="checkbox"/>

13. How positive is the student's attitude towards his studies?

Very positive	<input type="checkbox"/>
More positive than average	<input type="checkbox"/>
Average	<input type="checkbox"/>
Less positive than average	<input type="checkbox"/>
Very negative	<input type="checkbox"/>

14. Is the student able to make a positive contribution in the class room?

Very good	<input type="checkbox"/>
Above average	<input type="checkbox"/>
Average	<input type="checkbox"/>
Below average	<input type="checkbox"/>
Very poor	<input type="checkbox"/>

15. How do you rate the student's understanding of other people?

Very good	<input type="checkbox"/>
Above average	<input type="checkbox"/>
Average	<input type="checkbox"/>
Below average	<input type="checkbox"/>
Very poor	<input type="checkbox"/>
Not in a position to judge	<input type="checkbox"/>

16. How do you rate the student's quality of leadership?

- Very good
- Above average
- Average
- Below average
- Very poor

17. How do you rate the student's ability to work in a group?

- Very good
- Above average
- Average
- Below average
- Very poor

18. Does the student appear to see clearly the relationship between his theoretical knowledge and its application in practice?

- Very clearly
- More clearly than average
- Average
- Less clearly than average
- Not clearly at all

19. How do you rate the student's ability to master new knowledge quickly?

- Very good
- Above average
- Average
- Below average
- Very poor

20. How mature is the student?

- Very mature
- More mature than average
- Average
- Less mature than average
- Very immature

21. How responsible is the student?

- Very responsible
- More responsible than average
- Average
- Less responsible than average
- Very irresponsible

22. Is the student socially adaptable?

- Very adaptable
- More adaptable than average
- Average
- Less adaptable than average
- Not adaptable at all
- Not in a position to judge

23. Is the student self disciplined?

- Very disciplined
- More disciplined than average
- Average
- Less disciplined than average
- Not disciplined at all

24. Is the student punctual?

- Very punctual
- More punctual than average
- Average
- Less punctual than average
- Not punctual at all

25. How do you rate the student's originality?

- Very original
- More original than average
- Average
- Less original than average
- Not original than average
- Not in a position to judge

26. Is the student creative?

- Very creative
- More creative than average
- Average
- Less creative than average
- Not creative at all
- Not in a position to judge

27. Is the student able to think independently?

- Very good
- Above average
- Average
- Below average
- Very poor

28. Is the student self confident?

- Very confident
- More confident than average
- Average
- Less confident than average
- Not confident at all

29. How dedicated is the student to his/her studies?

- Very dedicated
- More dedicated than average
- Average
- Less dedicated than average
- Not dedicated at all

30. How do you rate the student's ability to persevere?

- Very good
- Above average
- Average
- Below average
- Very poor
- Not in a position to judge

31. How do you rate the student's willingness to share facilities with other people?

- Very willing
- More willing than average
- Average
- Less willing than average
- Very unwilling
- Not in a position to judge

32. How often is the student encouraged to do independent research?

Very often

More often than average

Average

Less often than average

Never

APPENDIX 5

CAPE TECHNIKON

SCHOOL OF ACCOUNTING

CO-OPERATIVE EDUCATION STUDENT EVALUATION

Name of student .....

Name of company .....

Name of company supervisor .....

Name of Technikon co-ordinator .....

(Please ring (0) the appropriate comment.)

1.	What degree of interest is the student showing in the work?	5	4	3	2	1
2.	How successful is the student in adjusting to the work situation?	5	4	3	2	1
3.	What degree of initiative does the student display?	5	4	3	2	1
4.	What degree of originality does the student display?	5	4	3	2	1
5.	If in a group how does the student perform as a member?	5	4	3	2	1
6.	Does the student show qualities of leadership?	5	4	3	2	1
7.	How do you rate the student's power of communication?					
	Oral	5	4	3	2	1
	Written	5	4	3	2	1
8.	How do you rate the student's technical knowledge?	5	4	3	2	1
9.	How do you rate the student's practical ability?	5	4	3	2	1
10.	What was the student's attendance record?	5	4	3	2	1

TOTAL:

---

KEY

- 5 - Exceptional
- 4 - Above Average
- 3 - Average
- 2 - Below Average
- 1 - Deficient

Type of work the student is involved in:

.....  
.....  
.....  
.....  
.....  
.....

Has the student the kind of qualities you would look for in an employee?

YES NO

If not, where do the deficiencies lie? .....

.....

General Comments: .....

.....

.....

This report has been discussed with the student.

SIGNED: ..... Company officer: .....

SIGNED: ..... Technikon co-ordinator: .....

DATE: .....

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