To my wife and mother
Sajeeda & Sarah
(the cornerstones of my life)

AN INVESTIGATION INTO THE SOCIO-ECONOMIC IMPORTANCE OF TECHNICAL EDUCATION FOR SOUTH AFRICAN INDIANS

"S. I." "S. n" 1986.

by

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Submitted in part fulfilment of the requirements for the degree of

MASTER OF EDUCATION

in the Department of Applied Didactics in the Faculty of Education at the University of Durban-Westville

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NOVEMBER 1986

ACKNOWLEDGEMENTS

I am indebted to the following persons for their assistance:

My supervisor, Dr. S. Strauss for his untiring efforts, patient supervision and his constant encouragement;

The Executive Director of the Department of Education and Culture (House of Delegates), for granting me permission to conduct this research in the secondary schools under his control;

The Principals, Guidance Counsellors and Industrial Arts teachers of the selected schools for accommodating me and helping me to choose the sample; the Industrial Arts teachers and the pupils at these schools for the manner in which they responded to this investigation;

Mr. P.N. Moodley (Principal of Rose Heights Primary School) and Mr. H.S. Singh (English teacher - Montarena Secondary) for improving the language of the text;

Lastly, my wife, who assisted in analysing the questionnaires, proof-reading the typing and for her constant moral support.

A.G. RAMJAN

NOVEMBER 1986

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CHAPTER 1

1. PROBLEM SETTING ; PURPOSE AND METHOD OF RESEARCH

1.1 PROBLEM SETTING

The progress and prosperity of a country and its various regions lie in the continual improvement of the quality of its inhabitants. Without a sufficient number of diligent, knowledgeable and skilled people who are motivated to apply their talents responsibly in national and regional contexts, natural resources cannot be fully exploited. The standard of living of society will neither improve nor can it be maintained in the long term. Moreover, it will be impossible to improve the quality of life of everybody and all will not be able to share in the progress; a privileged minority will also not be able to maintain stability and order.

To achieve rapid and purposeful development, all the available manpower must be consolidated into an efficient and qualified labour force with different skills. To ensure the existence of such a labour force and to ensure that its needs are constantly catered for, training and education must be effective and must relate to all the developments in the field of manpower.

When one looks at the projected population figures for the Republic of South Africa for the year 2000, (1)

Blacks	:	25,6 million
Whites	:	5,8 million
Coloureds	:	3,6 million
Asians	:	1,1 million

and the present growth and productivity rates as against the manpower that is available, one cannot but believe that we are heading for a crisis unless steps are taken to alleviate the present situation. Presently the country is in the throes of a recession. Although South Africa has an abundant and ready supply of cheap Black labour, unemployment and the low economic growth rate is reaching near crisis proportion. There is little or no employment for the masses. In the past, cheap and "uneducated" labour was regarded as an asset to the country. Today it is viewed as a threat to the progress and prosperity of the country. The masses need training in elementary technology so that they could be meaningfully employed and thereby support themselves. In this way, the impending crisis could be averted.

It is generally accepted that we are living in a technological age and our lives are influenced to a large extent by science and technology. The school curriculum will have to undergo changes from academically orientated courses to technical and vocational ones. This will help South Africa's manpower shortfall since the country is not producing sufficient apprentices. Figures revealed in the South African Parliament in 1973 (Table 1) on the registration of apprenticeship are disquieting.(2)

POP. GROUP	NO. OF REG. APPRENTICE	NO. EXPRESSED AS % OF POPULATION OF EACH GROUP
Blacks	656	0,003
Whites	9878	0,24
Coloureds	1455	0,06
Indians	507	0,07

TABLE 1

The above figures when compared to Table 2 point to an inadequacy in the country's technically skilled work force which is vitally important for a sound economy.

The question that must be asked: "Has the position changed from 1973 to 1986?" Unfortunately it has not altered much. In fact, the numbers have fallen for Whites, Coloureds and Indians as the 1985 figures in Table 2 show.(3)

POP. GROUP	NO. OF REG. APPRENTICE	NO. EXPRESSED AS % OF POPULATION OF EACH GROUP
Blacks	666	0,003
Whites	9246	0,18
Coloureds	1148	0,03
Indians	513	0,05

TABLE 2

While a rising generation of Whites might be seeking employment in areas of higher technical qualification, it is important that they should be assisted, otherwise the entire economy would be based on an under-productive, semi-skilled workforce which would create an unstable foundation.

The Government, the Trade Unions and the employers of skilled labour should get together urgently to find a formula to facilitate the training of Black artisans. Their absence as a support system to the labour market has disturbing socio-political as well as economic implications. Large numbers of Blacks have no formal education for the working world - hence they cannot be employed. This results in tension between the race groups. The unrest in the Black townships and the state of emergency are the possible results of the high rate of unemployment prevalent there.(4)

The present growth rate of the South African population (especially amongst the Blacks) and the fact that more

pupils are now being exposed to secondary education means that more job opportunities must be created. It is also necessary to develop skills so that the South African labour force would not be found "lagging" behind the other industrialised countries of the world. Technical education must therefore take its rightful place in the school curriculum. Education in virtually every nation of the world is undergoing rapid and dramatic change. In the past decade, countries have implemented policies and legislation designed to reconceptualise the content of curricula and to expand or to change the focus of the guidance mechanisms available to children and youth. According to L.C. Deighton[5] the reasons for re-shaping education and guidance to meet specific national needs and goals vary. However, common to all these movements are:-

(a) growing linkages between education and work;

(b) the need to create labour forces that are functionally capable and efficient;

(c) concern for the rising numbers of unemployed youth;

(d) shifts in the proportion of women leaving home and entering the work force; and

(e) alarm that large numbers of pupils are not mastering the school to work transition because they lack the attitudes, skills and personal goals that constitute employability; to assist these pupils, schools must provide career education.

Next to man's capacity to think and talk, his hands have undoubtedly contributed to his superiority. Notwith-

standing the increasing mechanisation in modern times, manual skills are essential in everyday life. As a result of greater stress being placed on the academic side of our education, manual skills receive less attention by pupils at home with the result that the practical side of things, except for specialisation in certain trades, has generally played a less important role in preparation for living. To remedy this inadequacy, it has become imperative for the school, in its educational endeavour, to pay more attention to the development of technical skills.(6)

1.1.1 MANPOWER REQUIREMENTS AND TEACHER SHORTAGES

South Africa's technical manpower needs are overwhelming. At the present rate of training, only 33 752 skilled workers and technicians are being prepared annually for a labour market which can absorb an annual intake of 48 914 personnel.(7)

With such a demand, qualified teachers of technical subjects are becoming a priority. However, the problem is multiplied by the fact that insufficient pupils are opting for technical subjects. What may be a new era in the training of teachers in the technical fields, including Technical Drawing, was launched at the beginning of 1985.(8) According to technikon authorities, this would allow prospective teachers to enter the real world of technician training by following a large part of their course in the company of students who will emerge

as fully qualified technicians in fields of Electrical Engineering, Electronics, Mechanical Engineering and Technical Drawing. This development stems from a growing awareness stimulated by the de Lange Report[9] of the absence of facilities and programmes for the training of suitably qualified teachers who could confidently face the challenge of providing "technological literacy" where it is most desperately needed - in the schools.

However, in the realm of "technical" teacher training, both the labour market and the curricula of the schools have changed faster than has the provision for suitable teacher-education programmes. In this respect, colleges of education, technikons and universities do offer a variety of courses for the training of teachers of technical subjects.

1.1.2 TECHNICAL COURSES AT INDIAN SCHOOLS

Indian pupils' first encounter with technical education is Handicrafts and Basic Techniques at the primary school. At the secondary level, they pursue Industrial Arts. At the technikon, they can select from a range of technical courses, a direction of study, for the purpose of a vocation. At the university they can study engineering.

In Industrial Arts, the main component of technical education in the ordinary secondary school, the pupil becomes acquainted with Technical Drawing, Woodworking and Metalworking through which he is given the opportunity to determine his sphere of interest with the object of furthering his studies in any one of these directions or related directions, even to the university level or for the purpose of making better use of his leisure hours. The knowledge and experience acquired through Industrial Arts can awaken interest in the study of such subjects as Architecture, Engineering, Wood Technology and Metallurgy.

Objectives as laid down by the then Department of Indian Affairs, Division of Education (now Department of Education and Culture - House of Delegates)[10] for the technical direction of study are:-

a) in a wider sense, to create opportunities for the joy of creation and the satisfaction in one's own work through combining individual design and neatness, accuracy and systematic procedure to achieve success;

b) to encourage the pupil to give tangible expression to his thoughts in the form of a practical subject which he can appreciate as functional;

c) to enable the pupil to discover his technical and creative responsibilities and to use them for the development of his personality and dormant talents;

d) to instil values such as:
independence, dedication, thoroughness, neatness and accuracy and an ability to adapt himself to changing circumstances;

e) to acquaint them with some of the methods, processes and products of industry and in so doing, give them a better conception of a more complete way of living; and

f) to give them an opportunity to work with other pupils.

In this atmosphere, the pupil discovers his own personality and learns to work with other pupils under normal and abnormal conditions.

These objectives are achieved by working on wood, metals, alloys and synthetic materials, using suitable hand and machine tools and by the correct

techniques. The scope of the work allows the pupil to become acquainted with different kinds of wood, metals, alloys and suitable synthetic materials, working processes and techniques. The purposeful experimenting and shaping of wood, metals and suitable synthetic materials enable the pupils to acquire knowledge of the possibilities and limitations of the different media. An awareness is cultivated for the importance of orderliness, neatness, accuracy, care and maintenance of tools and equipment.

1.1.3 THE FUTURE OF THE INDIAN MATRICULANT

From observation and teaching experience, the researcher was able to gauge that technical education was not popular since fewer pupils were opting to follow the technical direction of studies. Most secondary schools for Indians have modern centres for the teaching of technical courses such as Industrial Arts. However, these centres were being under-utilised. Pupils still prefer to follow academic subjects.

What of their future?

As thousands of Indian pupils celebrated their success in the Senior Certificate examination at the end of 1985, the Chairman of the Ministers'

Council, in the House of Delegates, the Honourable A. Rajbansi,(11) expressed concern about their future. He stated that while every effort was being made to create more job opportunities, his advice to matriculants was that they should embark on careers in the technical field. He stated further, that, from a qualitative point of view, this was the best result in the history of Indian education, with 1197 subject distinctions and a record number of A aggregates.

> "Generally the results reflect an overall improvement in the quality of passes. For the first time after several years, there were three candidates who obtained all six A^{s}," he stated.

The matric results for 1985 as compared to 1984 in Table 3 show the improved position.

	1985	1984
1. Total number of candidates	11 071	10 449
2. Total number of passes	9 473	6 273
3. Total number of failures	1 598	1 034
4. Total attempting matric exemption	5 728	4 614
5. Total number of exemption passes	3 577	3 076

TABLE 3

1.2 VIEW POINTS ON TECHNICAL EDUCATION

1.2.1 De Lange Committee[12]

The main limitation to further development in South Africa is a shortage of skilled manpower at nearly all levels and in all fields, as well as an over-supply of poorly skilled people who cannot find suitable employment. The result is that shortages increase the salaries of skilled manpower, induce rapid turnover and reduce productivity which makes South Africa less competitive in world markets. The present system of education is to a large extent responsible for this situation. It is dominated by an academic value system which is more concerned with knowing than with doing. Universities have expanded rapidly and in an unbalanced way, leading to an oversupply of graduates in some fields and an under-supply in other fields. Differentiation between academic, technical and vocational fields at secondary level is ineffective and many students at secondary and tertiary level are in academic streams for which they have little aptitude. This results in bottlenecks in the educational system, high drop out rates, lowering of standards, general inefficiency, and an output not in line with the needs of the country. The training of skilled workers is still geared to the apprenticeship system of the industrial revolution which is rapidly

becoming obsolete owing to the advancement of knowledge. The apprenticeship system is also ineffective in communities where racial discrimination is practised. The large bureaucracies which control education exert divided control over technical-vocational education at secondary level to the detriment of healthy development. Competition between bureaucracies in education makes it extremely difficult to establish an effective system of education.

1.2.2 A university Professor's point of view (13)

According to W.L. Rautenbach, (professor of Physics-University of Stellenbosch), the shortage of skilled manpower at practically all levels is probably the main factor limiting the rate of economic growth and development in Southern Africa. There appears to be a new era in the labour field initiated by the publication of the Riekert and Wiehahn Reports which recommended improved labour mobility and the elimination of racial restrictions of work opportunities. This implies that the output of the educational and training system will be the main factor affecting the rate at which skilled people can enter the economy in future. The question is whether the educational system can meet these requirements. Vocational education has had a low status among Whites in the past. Although the status appears to be enhanced by the advent of the technikon,

the shortage of teachers and lecturers in vocational fields makes expansion difficult. This is further complicated by the divided control of technical and vocational education between the Department of National Education and the provinces. Another complicating factor is that there exists considerable doubt about the efficacy of the curriculum of the present technical high school, since it appears to be an academic-vocational compromise. The need for vocational education is being strongly felt in Black education. Centralised technical institutes are being established to enable pupils from numerous schools to be brought together to obtain experience in vocational subjects. The number of technical colleges are being increased but their effectiveness is severely reduced by a lack of qualified teachers.

The general conclusion is that the present academically orientated systems of education, despite their rapid growth, are not designed for the needs of a developing country. At present the situation has reached a very critical stage. If vocational education does not become a rapidly growing part of education very soon, the growth of low-quality general academic education and skills will be completely out of line with the developmental requirements of Southern Africa. This will lead to severe socio-economic problems which may make further development impossible. It is therefore important

to develop effective, efficient and balanced systems of education in Southern Africa and to implement the essential changes as soon as possible.

1.2.3 A former technikon principal's point of view - A. Solomon.(14)

According to Dr. Solomon, a past principal of the M.L. Sultan Technikon, technical education by its very nature has to be practically orientated; since it requires the use of tools, machines and materials, its approach is therefore realistic; for this reason, it tends to be regarded by those unfamiliar with science and technology as undesirable, non educational, lacking in culture development, devoid of intellectual value and materialistic. This also provokes the uninformed to proclaim in a cynical way that technical education means training for the delinquent the lazy and the retarded. He further states that South Africa is endowed with natural resources which are the envy of many countries in the world. In his view, it is the trained mind as well as the skilled hand that is needed to meet the ever increasing demands of commerce and industry for trained personnel. One way of achieving this is through technical education. With increased technical training, the country's production potential will increase, so increasing the overall growth in the economy which in turn will improve the well-being of all population groups. Experts in the

field of education and training are therefore turning to the various technical institutions more than ever before, to provide this much needed training. The dangers of maintaining a static pattern and system of education have been realised. All countries have done a great deal of self-examination and re-thinking about the weaknesses of concentrating all education on the classical and academic traditions. The changes in educational philosophy which technological development has compelled have been so rapid and of such magnitude that they have been beyond the grasp of many educationists and teachers.

1.2.4 A technikon principal's point of view

The principal of the Natal Technikon, Professor A.L. du Preez,(15) states that the supply of skilled labour in South Africa was on the verge of collapse. He blamed the "fatal shortfall" of skilled labour in the country on the "educational snobbishness" which makes people prefer universities to technikons as places of higher learning.

> "The blame lies with us. For generations, South Africa's economy has carried the heavy burden of educational snobbishness. Technical and vocational training were just not the 'in-thing'."

This distortion is largely the result of a university-biased secondary school system. In South Africa only 18% of White high school pupils take commercial

and technical courses, while the figure for Taiwan is 70%. Universities have beautiful buildings, large sports fields and theatres, while the old technical colleges had "museum-like buildings" with no recreational or cultural facilties.

> "You went to classes and fled as soon as possible. No campus life; no alma-mater feeling. There was nothing to stimulate a sense of pride."

He stated that successful industrial developing countries had to place a high priority on technological and vocational training.

1.2.5 A second technikon principal's point of view

According to A. Ramsamy,[16] principal of the M.L. Sultan Technikon, the Indian community has always had a great predilection for university education. At one time this may have been easy to understand because of the very limited opportunities available. All roads led to a university. Irrespective of the inherent talents, abilities and limitations of the student, so long as the minimum entrance requirement was met, the obvious and perhaps the only choice was the university. The university was the "open sesame" to success and that was where the key to everything in life was to be found.

The technikon has evolved from the original trade schools and technical colleges to introduce a new kind of education - an education relevant to the

times and to the nation's needs where students would be educated in the application of knowledge acquired commensurate with their abilities and talents. Having evolved from the trade schools and technical colleges, the technikon is still looked upon as an institution offering an inferior education in comparison with that offered at a university. Nothing could be further from the truth.

Technikons have come to stay and have a very important role in the training of the desperately required manpower needs of our country. According to the National Manpower Commission's Report "technikon training must increase 400% if a growth rate of 4,5% is to be achieved. Only 2000 technicians are being trained annually against a required 9500." The task of the technikon is to train these technicians and technologists if our economy is to achieve the desired growth rate. The Indian community has to realise that tertiary education at a technikon is not inferior but different and that a technikon is not in competition with a university but complementary.

1.2.6 A Deputy Director of Education's point of view

According to H.J.A. Moore,(17) deputy director of the Transvaal Education Department, the child is born into the world and would in later years be called to meaningful service. He is expected to surrender himself to becoming dedicated and industrious, pro-

portionate to his talents and gifts. He possesses specific drives and abilities which he can employ to learn about this world as a whole. This is a reality which includes not only religious and moral norms but also embraces cultural norms. It is through these cultural systems as manifested in the lives of his parents and teachers, that the child now learns to live in an adult way and is enabled, eventually, to hold a particular philosophy and view of the world. Both the educator in particular and the adult in general are responsible for making known to the child this reality, which is ordered, systematized and established by mankind, and for leading him along this path.

Today technology is an integral part of our lifestyle. New Yorkers were helpless when the city's power-supply, a man-made commodity, failed. It is thus a pre-requisite for one to understand technology in order that one may live with, and beneficially apply it. Technology enables man to live comfortably. The technical field of study needs pupils with potential to be trained to fulfil manpower requirements. It is necessary for all industrialized countries to train engineers, technicians and artisans from their own resources. Technical education enables the pupil to discover the general principles applicable to machines and equipment through practical experience. This experience provides a firm basis upon which abstract concepts of the applied sciences

and mathematics can be founded.

The advantages of technical courses for the pupil are:-

a) development of obvious skills;

b) mastery of science and an insight into technical development;

c) satisfaction of his yearning to give concrete expression to his creative instincts; and

d) success based on completed projects acts as therapy, in particular for the young who feel inferior and useless.

The technical field of study offers the pupil the opportunity to realize that he too is capable of creating something himself and giving it form, thus making a worthy and useful contribution to society.

1.2.7 An industrialist's point of view

According to Peter Morum[18], managing director of Firestone, S.A., a new direction of education in South Africa, with emphasis on vocational and technical training, is necessary to get the country's crippled economy back on a sound footing. He added that the White sector was simply incapable of supplying the necessary technically skilled personnel, despite the fact that they had 80% of the new registered apprentice contracts in the country.

1.2.8 A professional engineer's point of view

Douglas Mills,[19] president of the Federation of Societies of Professional Engineers reports that thousands of job vacancies for engineers and artisans still existed despite the economic recession. The demand for technically qualified people is much higher than the supply. School-leavers must seriously think of careers in engineering and technology. By the time their training is complete, the demand for their service would be very high.

1.2.9 The researcher's point of view

The researcher sees the urgent need for a revised curriculum for South African schools. Such a curriculum should duly emphasise the need for technical skills. Educational authorities should take cognisance of the unrest and violence in Black schools. Amongst other grievances, the Black pupil's dissatisfaction for the curriculum should serve as an "eye-opener" to the authorities concerned - greater emphasis should be placed on the relevance of subject matter for the curriculum. The great stress placed on academic learning in the schools makes education irrelevant to large numbers of pupils. It is apparent that South Africa's "neurotic" concern with academic education and university degrees - and the ill-directed snobbery against vocational and technical education is costing the country dearly. A carefully planned national manpower provision programme must

be designed in conjunction with education authorities. More thought should be devoted to the choice of subjects and syllabuses at school level so that students with special aptitudes are identified for higher technological education. School-leavers must seriously think of careers in engineering and technology. By the time their training is complete, the demand for their services is likely to be very high. Economic progress remains one of the keys to a peaceful society. To achieve it, South Africa must be able to compete effectively in this age of knowledge - and this means developing specialist skills by upgrading the education of all the people, but more especially the illiterate Blacks.

1.2.10 Concluding remarks on the views cited above

From the views cited above, the following conclusions can be drawn:-

a) The imbalance between academic and technical directions of study has caused bottlenecks in the educational system. The majority of pupils are in academic streams irrespective of their capabilities. This has had a negative effect on the country's productivity. The end result has been an over-supply of "white-collar" professionals and a serious shortage of skilled technicians, engineers and artisans.

b) The demand for engineers, technicians and artisans has far exceeded supply. Despite soaring unemployment, work opportunities still exist for these workers.

c) The attitude of some people to the technical direction of study is still one of prejudice. They regard technical education to be the reserve of the delinquent, the lazy and the retarded, whereas in fact this direction of study needs students with potential to fulfil the manpower needs of the country.

d) Lastly the technical direction of study at both the primary and secondary level can help satisfy the pupil's creative urge. He will be able to achieve a sense of satisfaction knowing that he has created something.

For these reasons and backed by the views cited above, it is important that consideration be given to the placement of technical courses and emphasis thereof in the school curriculum.

1.3 EXPLANATION OF TERMS

The following terms are explained in order of importance since they have relevance to this investigation.

1.3.1 Career Education

There are different definitions of career education. In general, such definitions agree that career education is a set, preferably a systematic programme of processes, techniques or services designed to assist an individual to understand and to act on opportunities in work, education and leisure and to develop the decision-making skills by which one can create and manage one's career development. Career education can also be defined as an organized programme to assist an individual to assimilate and integrate knowledge, experience and appreciation related to:-

a) self understanding;
b) understanding the work, society and those factors that affect its constant change including worker attitude and discipline;
c) awareness of the part leisure may play in a person's life; and
d) understanding the information and skills necessary to achieve self-fulfillment in work and leisure.(20)

1.3.2 Technical education

The term "technical education" carries the connotation of specific knowledge and understanding of the theory of "know-how". Technical education is also regarded

as education to earn a living in an occupation in which success is dependent largely upon technical information and understanding the laws of science and technology as applied to modern designs, production and service. (21)

1.3.3 A technician

A technician is a person working in occupations requiring a knowledge of technology and related sciences between that of skilled worker and that of an engineer or technologist; occupations at the technician's level may call for inspection and maintenance, detailed development plans, supervision of production work, and detail construction. Collaboration with the engineer is an essential part of the work of a technician. Though the term technical education is at least a hundred years old, the use of the word technician is relatively recent. It is now extended to denote a certain academic and social level between "skilled worker" and "engineer". Although not all industries need such a category, there are but few at present who have not taken some action to utilize a level of training below that of university or full professional qualification, if only because university graduates are scarce and costly to train. Whilst persons with this level of training are in great demand, especially in developing countries, the number being trained is not sufficient to meet the demand. The prestige value of university studies and the increasing financial assistance which governments provide for uni-

versity students have caused the volume of technician training to remain quite inadequate for national needs.(22)

With the realisation that there is so much opportunity for technicians of all races in this country the conservative industries are gradually opening their doors to technicians of all race groups. The Indians have been in the vanguard of this breakthrough into technological careers. Their natural abilities, diligence and willingness to learn have been recognised.

A technician needs three types of training:

a) theoretical training;

b) laboratory training; and

c) practical in-service training.

The technikon supplies the theoretical and laboratory training. The employer provides the practical experience. The course consists of alternate sessions of theoretical training provided by the technikon and practical "on the job" sessions, provided by firms. This type of "sandwich" course works well as the quality of training is high when the theoretical knowledge is reinforced by practical experience in the working environment.(23)

1.3.4 An artisan

The artisan or craftsman or journeyman is a person skilled in the practical processes attached to a particular trade. He is the man who does the job.(24)

1.3.5 An apprentice

An apprentice is a young worker who is indentured by an employer who undertakes to teach him a certain trade and to pay him a certain fixed wage while he is undergoing training. The schedule of training is prescribed for each trade by the Department of Manpower and must be followed by the employer. If the employer does not have the proper training facilities he will not be granted the right to employ apprentices. The Apprenticeship Act of 1944, as amended, prescribes all the conditions under which apprenticeship training may be undertaken. The main provisions of the Act which affect the employer are:

a) The employer undertakes to train the apprentice in all aspects of the particular trade so that after the prescribed period of four years, the apprentice will be able to undergo a trademan's competency test with a good chance of success.

b) The employer also undertakes to pay the apprentice the prescribed rates of pay

and to allow the apprentice to attend classes at a technikon in order to learn the theoretical knowledge required for his trade.

c) The apprentice undertakes to work for the employer and to pass the National Technical Certificate Part II examination which is the minimum educational requirement for artisans.(25)

1.3.6 The apprenticeship system

An apprenticeship is a period of training during which the skills of a trade are learnt. When an apprentice has completed his or her apprenticeship and has passed a trade test, he or she is called an artisan.

In this country, more than 300 trades are called "designated trades". This means that they have been named by the Minister of Manpower as trades in which apprentices may be trained and that he has allocated these trades to specific industries such as bricklayers in the building industry or an upholsterer in the furniture trade.(26)

1.3.7 Technikon

A technikon is a tertiary institution, parallel to, but different from a university, and which

offers an alternative path to the acquisition of tertiary qualifications. Universities offer degree courses which prepare candidates over a broad base to a high theoretical level. Candidates usually decide what employment they wish to take up after they have completed their degrees.

Technikons offer diploma courses which prepare candidates at a lower theoretical level but with greater practical exposure. They prepare candidates for employment in specific fields in the profession. In a number of cases a diploma cannot be obtained until the candidates have completed appropriate in-service training. Because of the in-service training component of the diploma, co-operation between the technikon and employers is essential and committees exist to ensure that employer organizations are consulted when courses and syllabi are developed and reviewed.(27)

1.3.8 Academic education

The South African system for the provision of education has always been aimed at the preparation of pupils for university study, with the emphasis on general preparatory education up to standard 10 level, regardless of whether or not the pupils will continue their academic training after standard 10. A large part of the White population consequently enters the world of work without any occupational

qualifications, skills or appropriate value systems. In the case of the other population groups, the percentage of pupils not continuing with tertiary education is much larger. Many of them leave school without having obtained any academic or other qualifications, skill or useful value system. A characteristic of the academic value system is that the abstract world of ideas is often rated higher than the concrete world, which inter-alia entails that the mastery of technology is based on scientific understanding since science forms the basis of modern technological development. As a result, manual labour and skills are regarded as inferior. The effect of this academic value system can be seen in the neglect of vocational training traditionally associated with manual labour.(28)

1.4 PURPOSE OF RESEARCH

During the late 1970's, the researcher himself a teacher of technical subjects for over 11 years at that time, found that the Industrial Arts course offered then was not popular with Indian pupils. Schools had modern workshop facilities with qualified teachers; yet pupils were not being attracted in sufficient numbers and hence the technical subjects had a limited following.

A preliminary investigation by the researcher at that stage showed that parental attitude had much to do with the technical subjects unpopularity. The Indian parent wanted his son to go to school to concentrate on "bookish education" and not "waste" his time knocking around with "hammers, chisels and saws", in workshops. University was the place where he was to aim for and a "white collar job" was to be his vocation in later life. In short, the parent had a prejudice against technical subjects which he considered to be inferior to academic subjects.

With that as a starting point, the researcher decided to investigate:-

a) the socio-economic importance of techical education for South African Indians;

b) the attitude of parents and pupils towards technical education;

c) the choice of subjects and courses, in respect of pupil's attitude, aspiration and motivation in relation to later vocation and career, and

d) parental influence on pupil's choice in respect of (c) above.

1.5 LOCALE OF RESEARCH

The research was primarily conducted in Durban where a number of selected secondary schools were chosen. Pupils in standard 7 and standard 10 and Industrial Arts teachers were interviewed at the following secondary schools:-

1. Chatsworth	2. Crossmoor
	3. Montarena
4. Southlands	5. Westcliff
6. Wingen Heights	7. Woodhurst
8. Witteklip	9. Merebank
10. Sea Cow Lake	11. Orient Islamic
12. Avoca	13. Earlington
14. Greenbury	15. Phoenix
16. Lenaria	17. Stanmore
18. Rydalpark	19. Reservoir Hills

By way of comparison, secondary schools away from Durban, as well as secondary schools in the Transvaal and Cape Province were considered. Since these schools were not easily accessible, questionnaires were sent out. The following secondary schools were canvassed through questionnaires:-

NATAL	1. Buffelsdale	2. Esther Payne Smith
	3. Isipingo	4. Port Shepstone
	5. Raisethorpe	6. Stanger
	7. Umkomaas	8. Umzinto
	9. Verulam	10. Lincoln Heights
	11. Windsor	

TRANSVAAL	1. Klerksdorp	2. Laudium	3. Lenasia
	4. Liverpool	5. Taxila	6. Valencia

CAPE PROVINCE	1. East London	2. Rylands	3. Woolhope

1.6 RESEARCH METHODS

The interview was used extensively as a method of research.

Interviews were conducted with:

a) parents of pupils presently in secondary schools;

b) pupils presently in secondary schools;

c) planners of technical education in the House of Delegates. (The Planning Section requested the copy of the interview schedule and provided the answers since many sub-sections of the different planning sections were involved);

d) teachers of technical subjects in the House of Delegates;

e) business organizations/industries; and

f) laymen.

Questionnaires were used to gather information from secondary school pupils, parents and teachers in the Transvaal, Natal and Cape Province.

Information thus obtained was collated and studied; comparisons were made, leading to conclusions and recommendations.

1.7 OUTLINE OF REMAINING CHAPTERS

CHAPTER TWO Technical Education in South Africa (Excluding technical education for Indians)

In this chapter, the researcher examined the position of technical education from its earliest development to the present time in respect of South African Whites, Blacks and Coloureds. The inclusion of such a chapter serves as a basis for comparison - to see how the different race groups in South Africa have coped and progressed in the field of technical education.

CHAPTER THREE The historical development of technical education for South African Indians.

In this chapter, the researcher traced the development of technical education for Indians from about 1927 with the signing of the Cape Town Agreement, the establishment of the M.L. Sultan Technical College (1956), the role

of the Department of Indian Affairs, the initiation of Indian Technical Colleges, Technical High Schools to present day Industrial Arts as offered in the ordinary secondary school.

CHAPTER FOUR Analysis of Questionnaires and Interviews

Keeping the purpose of the research in mind, the researcher interviewed -

the Planning Section of the Education Department, House of Delegates;

Standard 7 and 10 pupils and their Industrial Arts teachers at selected secondary schools for Indians in Natal;

Parents of standard 7 and 10 pupils in Phoenix, Chatsworth and Merebank areas;

Subject advisers of Industrial Arts (House of Delegates);

Industrialists from the Mobeni, Pinetown and Phoenix areas.

Information was also obtained from Questionnaires sent to standard 7 and 10 pupils and their Industrial Arts teachers in the Transvaal and the Cape and also to parents there. (The Orange Free State was excluded as no Indians reside there).

CHAPTER FIVE

Having analysed the questionnaires and interviews, the researcher was able to arrive at certain conclusions in

respect of the socio-economic importance of technical education for South African Indians; and the attitude of parents and pupils towards technical education. On the basis of his findings, the researcher made certain recommendations in respect of technical education.

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CHAPTER 2

2. TECHNICAL EDUCATION IN SOUTH AFRICA (EXCEPT FOR INDIANS)

In this chapter, the researcher examined the development of technical education for Whites, Blacks and Coloureds from the earliest time to present day. The inclusion of such a chapter serves the important purpose of comparing how the different race groups have progressed with technical education.

2.1 TECHNICAL EDUCATION FOR WHITES

2.1.1 Introductory comments

Since 1652 when Jan van Riebeck founded a refreshment station at the Cape to the last quarter of the nineteenth century, the people of South Africa were predominantly a pastoral and agricultural community. Education under church control was not systematised. The colonists owned large tracts of land and even with primitive methods of farming they could manage to live in comfort. Their simple wants were easily satisfied.

Until the discovery of diamonds and the development of the mines from 1871, South Africa could lay little claim to be regarded as an industrial country; the only workshops in existence being those attached to the Cape Government Railways. And for years after the opening of the diamond fields, mining

operations were carried on in a somewhat primitive fashion, with practically no need for advanced scientific or technical training. Such engineers as were required were brought from overseas, and South African parents had not seriously considered professions in engineering and mining for their sons. The discovery of gold, however, and the rapid development of the Witwatersrand, combined with the overcrowding of the legal, medical, surveying and other professions, served to focus attention on engineering, mining and related technical careers.(1

The South African economy changed from agriculture to industry and mining. Mining in turn stimulated the development of industry, especially from the 1920's. But it was during and after World War II that South Africa's industries started to expand at an accelerated pace, continuing into the 1980's.

Today, South Africa, as a developing country, is faced with a major dilemma. A sustained high rate of economic growth is an essential pre-requisite to give employment and higher standards of living to South Africa's rapidly increasing workforce; at the same time, a principal constraint on South Africa's economic growth is the critical shortage of skilled manpower. It is considered to be the task of the South African education system to resolve this dilemma by transforming the character of its workforce to match the need for technical skills. Education must equip people for life.

2.1.2 Early beginnings (1890's)

The earliest efforts in connection with technical education were designed to provide for the needs of the railways and the mines. As early as 1884, the Natal Government Railways started conducting classes for its apprentices in the Railway Institute at Durban. Part-time classes for apprentices were also started at the Salt River workshops of the Government Railways at Cape Town in 1890.

The Orange Free State began to give serious consideration to industrial education in 1898. In that year an industrial school was established at Bloemfontein. Admission to this school, however, was confined to the children of very poor parents.(2)

2.1.3 Technical Education under the control of the Central Government.

2.1.3.1 Conference on Technical, Industrial and Commercial Education, 1911.

An important Conference on Technical, Industrial and Commercial Education (3) was held in Pretoria from 8 - 10 November 1911 under the presidency of the Honourable F.S. Malan, Minister of Education. His remarks at the Conference aptly describe the fragmented control of technical education in South Africa at the time:-

> "I find that industrial and technical education has been divided between the Union Government on the one hand and the Provincial Administrations on the other and that at the present time there are nine different departments concerned in its administration. Five Union departments and four Provincial Administrations 'have a finger in it'."

Recommendations made at this Conference were inter alia:

(a) Industrial and trade schools should be referred to as vocational schools;

(b) That for the fullest advantage to accrue from the establishment of schools, it was essential that every young boy, prior to working at a modern form of skilled trade, should have received suitable preparation for that adult occupation in a vocational school;

(c) That vocational schools should be directly under the control of the Union Government; and

(d) That all courses of technical instruction should be in accordance with set syllabi thereby establishing reasonable uniformity throughout the Union.

Unfortunately very little was done to implement the recommendations which were made by the Conference. The Conference was nevertheless important as it was an indication of the desire on the

part of the Government to develop vocational education in the light of South Africa's envisaged industrial growth.

One could see that the 1911 Conference wanted "to get away from the purely bookish side of the education system" by introducing manual training into ordinary primary and secondary schools and the establishment of trade schools which could take the place of the apprenticeship system. The Minister of Education at the 1911 Conference stated:

> "In South Africa we have the idea of making ordinary school education more practical, but in addition, there are two special reasons for demanding it in South Africa. With a certain class of people manual labour is regarded as derogatory to the dignity of the White man. The idea in the past has been too much in the way of an opinion that labour is for the Black man and that the White man is to look on. If that continues we shall be gradually training the Native to do skilled as well as unskilled work and the White man will suffer. We have comparatively few industries in South Africa, and if we did not train our people to take their share in the initiation and development of industries, we shall not succeed in making of South Africa what we ought to make of it. I therefore think that the desire to have more industrial and technical education introduced into our educational system in South Africa is very well founded."

2.1.3.2 Establishment of Technical Colleges and their subsequent development.

South Africa's experience of industrial technology was limited up to the end of the nineteenth

century. However, her industries were developed considerably during the boom period which followed the First World War. During that period, the cost of many overseas products became prohibitive. Some goods, which had hitherto been freely imported, were no longer available. As a result of this, many of the industries already established in South Africa became considerably developed and new industries were started. South Africa could not rely exclusively on gold and diamonds due to price fluctuations and it was essential that she should build other industries as well. Hence, the openings in industries other than agriculture increased considerably and a definite need arose for institutions which would undertake to train people for this new field.(4)

Two Government Acts which profoundly influenced technical education during this period were:

(a) the Apprenticeship Act of 1922 which provided for the regulation of apprenticeship involving compulsory attendance of technical classes; and

(b) the Higher Education Act of 1923 which made "provision for the recognition of certain institutions as places of higher education; for the control, administration and regulation of such institutions and

> also for the recognition of certain courses of instruction as being included in higher education." (5)

An important development for technical education was the establishment of technical colleges from 1922. The first technical colleges developed out of the old technical institutes which were in most instances established by the various railways which operated in South Africa at the turn of the century (Refer to 2.1.2). Examples of such technical colleges were the Cape Technical College, the Witwatersrand Technical College and the Natal Technical College. These technical colleges made a valuable contribution to the training of technicians, artisans and other skilled workers who were required for the country's developing industries. However, the development of technical education in the Orange Free State was slow due to the fact that this province was primarily agricultural with minimal industrial growth.

Subsequently additional technical colleges were established in South Africa's major cities and towns.

By 1981, South Africa had seventy-two technical colleges and technical institutes. The functions and aims of the technical colleges and technical institutes are the same. It makes no difference

to the student, parent or employer whether a student attends a technical college or technical institute, as the same courses and examinations are offered by the institutions and all certificates are issued by the Department of National Education. The differences are mainly of an administrative nature:

> Technical institutes are subsidised by the Department of National Education on the basis of the difference between income and expenditure. On the other hand, technical colleges pay their income to the State and their expenditure is paid by the State. Institutes have their own banking accounts, while colleges do not. Institutes are more autonomous than colleges in that they can purchase buildings and equipment more speedily. Colleges are required to purchase according to State regulations.(6)

The following are some of the fields of study covered by the technical colleges;

> art (fine art; commercial art); home science; physical education; adult education; mining; pharmacy; optics; leather; printing; teacher training; music; speech-training and dramatic art; hairdressing and photography.

Some technical colleges became colleges for advanced technical education in 1968 in terms of the Colleges for Advanced Technical Education Act No. 40 of 1967. Technikons, in turn, evolved from the colleges for advanced technical education. A technikon is a tertiary teaching institution with no restriction or ceiling on its educational levels. Technikons provide full-time as well as part-time post-secondary training in pharmacy, secretarial practice, art and music, engineering, mining and building construction. From 1983 to 1984 the number of full-time equivalent (FTE) students who could be taken into consideration in accordance with the subsidy formula, in calculating the amount of subsidy payable to the technikons, increased by 19% to 25 589. In the National Education Department's estimates of expenditure, provision has been made for an amount of R108 312 000 for subsidies to the technikons during 1984 in respect of total current expenditure. This represents an increase of 18% on the amount budgeted for 1983-1984.

The student enrolment at the technikons for Whites for 1982 as compared to 1983 is shown in Table 5.(7)

TECHNIKON	1982	1983
1. Cape Technikon	5583	5433
2. Technikon Natal	5256	4614
3. Technikon OFS	*	777
4. Port Elizabeth Technikon	2117	2440
5. Technikon Pretoria	8716	8825
6. Technikon RSA ++	*	*
7. Technikon Witwatersrand	7279	5202
8. Vaal Triangle Technikon	3196	3269

TABLE 5

* figures not available

++ correspondence technikon

Technical Colleges and technikons are presently operating the following systems of training.(8)

(a) Co-operative education: Co-operative education is based on the co-operation between the employer and the education institutions with a view to training students for specific careers. Co-operative education is a training system which attempts to integrate classroom and laboratory instruction with practical in-service training in industry. Co-ordination of theories and concepts with the practical application thereof in industry is achieved by the alternating or integration of periods of technical colleges/technikon-training with practical in-service training in industry. The

one compliments and supplements the other, thus effecting better and more efficient training.

Co-operative education is based on the job requirements or job specifications of specific vocations. To effectively train a person for a particular career or vocation requires not only theoretical knowledge but also practical application thereof; in addition, it requires professional development as well as integration and identification with the organizational structure and nature of an enterprise.

(b) Career-orientated training: Career-orientated training consists of systematic training of students in order that they may follow specific careers. Career-orientated training is effected in the following ways:

(i) Course content: Technical college and technikon courses contain the theory and knowledge required in specific vocations. Emphasis is placed on the application of theoretical knowledge.

(ii) In-service training: In-service training is part of the requirements for a qualification and is thus an integral part of the course. This in-service training is planned according to job description and career requirements.

(iii) Laboratory training: Laboratory sessions for students contribute to a thorough grounding in theory and principles, as well as practical techniques.

(iv) Mutual co-operation between technical colleges/technikons and employers: Employers in industry are able to make a direct input towards the compilation of courses and syllabuses, through the medium of advisory and subject committee, where employers' representatives can advise the technikon of requirements in industrial practice. In-service training programmes are also compiled by employers in co-operation with the technikons concerned.

(c) Short intensive courses: The technical colleges/technikons also offer short and intensive courses in collaboration with organized commerce and in-industry. This also includes re-training.

In conclusion, both the technical colleges and technikons have played a vital role in the training of technicians, artisans and skilled workers to satisfy the manpower needs of South Africa. However, a large proportion of South African students still prefer the University over these institutions. In countries such as Japan, Korea and Taiwan, enrolment at technical colleges is constantly on the increase and South Africans can take their cue from these

fast developing industrial giants if she wishes to be economically and industrially independent.

2.1.3.3 Technical education at secondary school level.

In addition to the technical colleges and technikons, secondary schools also contribute to the development of technical education. Control over education in South Africa became divided between the central education department (Union Department of Education) on the one hand and the four provincial education departments (Cape Education Department, Natal Education Department, Transvaal Education Department and Orange Free State Education Department) on the other with the creation of the Union of South Africa in 1910. As a result of this division, control over technical education at secondary school level was also divided between the Central Government and the provincial governments. This division hampered the sound development of technical education which was essential for South Africa's industrial growth, especially from the 1920's.

The then Minister of Education, therefore, appointed a Commission of Inquiry into South Africa's education system (Hofmeyr Commission). The Commission's Report which was published in 1923, (Hofmeyr Report) had a far reaching effect on technical education at secondary school level. The Hofmeyr Commission recommended that all education, with the exception of the agricultural colleges and

the universities, should be placed under the immediate control of the provinces, and that a Union Council of Education be established to co-ordinate education. At a meeting of the Union Government representatives and the provincial administrators, in 1924, it was decided, however, to transfer all vocational education from the provinces to the central government. This transfer commenced in 1925. As from 1 April 1925, all vocational education (19 State and 23 State-aided institutions) were transferred from the control of the provinces to the Union Education Department. The reason for the transfer was that the provinces were not in a financial position to administer an expensive form of education such as vocational education, which should be controlled on a national basis.(9)

Technical education, being vocational, was also affected by this transfer. Vocational education, however, made good progress from 1925. The Vocational and Special Schools Act (No. 29 of 1928)(10) made provision for the establishment of vocational schools in rural areas where there were no technical colleges. Nine vocational schools were established by 1939.

Another important Commission of Inquiry into South Africa's education system was the Commission on Technical and Vocational Education (De Villier's Commission). This Commission reported (in 1948)

that there were problem areas in the implementation of vocational education. Vocational education was given too early to pupils who lacked a sound foundation of general education. There was little or no correlation between training and the occupational demands of the country. The Commission recommended that pupils should not receive specialised vocational education at too early an age. The Commission also recommended a separate junior high school which would not provide organized vocational training in specialised groups. This was intended as three-year post-primary general differentiated education in order to secure effective placing of pupils in different types of courses. There would be academic and vocational senior high schools. Practical Art, Workshop Practice, Woodworking and Domestic Science would be introduced into the junior high schools.(11)

The year 1955 marked yet another important event for technical education at school level. The Vocational Education Act (No. 70 of 1955) provided "for the establishment, maintenance, management and control of a vocational school and part-time classes; for the transfer of the maintenance, management and control of certain declared institutions and State-aided vocation schools to the Government in the Department of Education, Arts and Science".(12)

A vigorous policy began to emerge which resulted in the establishment of more technical schools. An important change was again brought about in 1968. In that year, Technical and Vocational Education was again transferred, this time from the Department of Education, Arts and Science to the provinces. This was done to facilitate the National Education Policy Act, No. 39 of 1967 in terms of which the provincial education departments were granted control of all full-time education up to matric level. Tertiary technical education, however, remained controlled by the Central Government in terms of the Colleges for Adv. Tech. Educ. Act, 1967 (No. 40 of 1967) which made provision "for the establishment of colleges for advanced technical education, for their control, administration and regulation and for matters incidental thereto". (13)

The Central Education Department (Union Department of Education; Education, Arts and Science and Department of Higher Education) had thus made a valuable contribution between 1910 and 1968 to further technical education at school level through the establishment and development of technical schools in South Africa's cities and towns. From 1968 the provincial education departments carried on with the work

on technical education which was initiated and developed by the Central Government.

2.1.4 Technical education under the control of the Provincial Education Departments

As mentioned earlier, the colonial education departments which existed at the time of the Union of South Africa (1910), were retained as provincial education departments. These were the Cape, Natal, Transvaal and Orange Free State Education Departments respectively.

Initially, technical education to a limited extent was also provided for by these education departments. But the transfer of control over vocational education to the Central Education Department which was started in 1925 and completed in 1955, made the involvement of the provincial education departments with technical education almost non-existent. It was only again from 1968, when control over full-time education up to matric was transferred to the provincial education departments, that these departments became fully involved with technical education. (Refer to 2.1.3.3)

Technical education under the control of the provincial education departments will, therefore, be discussed from 1968 only.

2.1.4.1 Transvaal Education Department

On 1 April 1968, technical schools were transferred to provincial control in accordance with the National Education Policy Act No. 39 of 1967 and the Education Services Act No. 41 of 1967. At that stage there were twenty technical schools in the Transvaal. This number has since grown to 23 secondary schools exclusively offering the technical field of study and 27 secondary schools to which the technical field of study has been allocated for future implementation. Although a practical technical subject may be taken at the standard grade only, the subject set provides for the pupil to take the official languages, Technical Drawing, Physical Science and Mathematics on the higher grade if so desired. The need has arisen for a specific, applied, scientific subject, Technica, in three particular fields: civil, mechanical and electrical. The aims of this subject are to provide an introduction to the language of technology, scientific means of observation, measurement, experimentation and deductive reasoning. In 1982, the Transvaal Education Department (Technical) had 9000 pupils in the senior secondary phase. Their direction of specialisation was as follows: (14)

Building Construction	400
Electrician Work	2700
Electronics	600
Woodworking	800
Motor Mechanics	2200
Fitting and Turning	1400
Welding and Metal Working	900

2.1.4.2 Cape Education Department

Young men and women who have trained at technical colleges and technikons have little problems in finding employment, even in the present economic climate. The De Lange Report also warns that it is not too far fetched to expect that the country can well be faced with unemployment among those with a purely "academic" background. Unemployment can result just as easily from forms of education for which there is little demand as it can from lack of education. The difficulties inherent in technical education should not be underestimated. Apart from the past resistance to this form of education, it is also expensive. This is not only because of the cost of facilities and equipment, but because teachers have to be drawn from the private sector. There is a critical shortage of professionally qualified teachers in this field. In spite of the difficulties encountered, the Cape Education Department is committed to the

expansion of technical education. The present policy of the Department is to add a technical field of study to new or existing secondary schools at strategic places, rather than building separate technical high schools.

The enrolment of pupils pursuing technical directions of study for the fourth quarter of 1984 is shown in Table 7.

STD.6	STD.7	STD.8	STD.9	STD.10	TOTAL
1350	1442	1321	1128	913	6154

(15)

There are 10 technical high schools under the control of the Cape Education Department. The subjects Technica Electrical, Technica Mechanical and Technica Civil are already offered by the Cape Education Department and the first Senior Certificate examinations in these subjects will be written at the end of 1988. The subject Technica Electronic is not offered.(16)

2.1.4.3 Natal Education Department

Technical subjects at secondary school level are taught in four broadly identifiable types of schools.

(a) Special Schools: Subjects vary and are taught to pupils of low intellectual ability. Subjects include woodworking, panel beating, bricklaying, sign writing, automatic spray

painting, metalworking, welding theory and practice. Elementary theory lessons form part of these curricula.

(b) Technical High School: All pupils take English, Afrikaans, mathematics, physical science, technical drawing and select one subject from the group: motor mechanics, electronics, electrician's work, woodworking and fitting and turning to complete standards 8 - 10. In standards 6 and 7, pupils rotate in semesters through the workshops to "explore" the various technical subjects.

(c) Comprehensive High Schools: All boys schools and co-educational schools may offer technical drawing along with mathematics as a matriculation exemption subject. Woodworking and metalworking on standard or lower grade may be offered in one of the departmentally specified subject package options.

(d) Comprehensive High Schools with a Technical bias: At these schools, some pupils may opt to take courses as outlined in (b) or (c) above. Other pupils are free to follow the "traditional" high school subjects.

(e) Technica (Mechanical, Electrical, Electronic, Civil) was introduced in 1986. This allows some of the technical subjects to be offered

on the higher and standard grades. These subjects have a theoretical bias and would be based on applied mathematics and physics as main components and would be aimed at the pupil who intends to proceed to a technikon or university. It is also envisaged that all Technica courses will have technical drawing as a compulsory ancillary subject.(17)

2.1.4.4 Orange Free State Education Department

Very little has been written on technical education at the secondary level. However, a lecture delivered by Professor Dr. J.H. Jooste, Deputy Director of Education on 1 - 3 November 1972, has reference to developments there. An extract from his speech is quoted :

> "One group of pupils, who under the old dispensation with its divided administration were somewhat neglected, are the pupils who were unable to proceed to, or further than, standard 8 and who were unable to make the most of the ordinary courses. The differentiated system of education makes provision for these pupils. These pupils have a choice of five lines of study: technical, commercial, agricultural, home economics and general." (18)

The following statistics for 1985 give some idea of the number of pupils and their related technical direction of studies.(19)

1.	Woodworking (standard 6 - 10)	4623
2.	Metalworking (standard 8 - 9)	211
3.	Technical Drawing (standard 6-10)	7559
4.	Technica (Electrical) (standard 8-10)	209
5.	Technica (Mechanical) (standard 8)	32

2.1.5 CONCLUDING REMARKS

A projection made in 1961[20] for South Africa's manpower needs in 1980 showed a requirement of some 600 000 White skilled and semi-skilled artisans compared with 375 000 for 1960. However, the number of Whites for example enrolled for technical courses at technical colleges decreased instead of increased. In 1962, they formed only 17% of those training for future employment.

The Minister of National Education also referred to this decrease in 1970 when he stated:

> "... not realising the fine status and excellent possibilities for advancement that technical education affords, many a student who would benefit by enrolling at a college for advanced technical education, goes to university instead, only to find later that he is not suited to this kind of education. In the end he has to abandon his studies, usually too embittered and crushed and too old, as he thinks, to take a technical course at a college for advanced technical education." (21)

E.G. Malherbe (22) in 1977 attributed this decrease broadly to two reasons:-

(a) better incentives offered by commerce compared to industry; and

(b) prejudice against technical colleges in favour of university education.

In this way, according to Malherbe, the high rate of failures among first year students at universities was on the increase. Today young people miss their true vocation in life, and the technical colleges and technikons are weakened and prevented from properly fulfilling their function. Industry, commerce, the private sector and the public sector are deprived of the technically-trained people who are so urgently needed.

2.2 TECHNICAL EDUCATION FOR SOUTH AFRICAN BLACKS

2.2.1 Introductory remarks

It was the Christian missionaries who first brought formal education to the Blacks of South Africa. Their original purpose was to provide elementary schooling as an ancillary to evangelization, but in doing so, they began the process of sharing with Blacks not only their knowledge of God but also the benefits of more

highly developed civilizations. The dedicated work of the early missionaries serving in remote rural areas, began to equip Black tribesmen to play a worthy part, side by side, with members of other races, in the development of the country they shared; and numerous Black men and women who were trained in the mission schools fully demonstrated their ability to do so. Had financial resources made possible a far more rapid extension of Black education, the history of South Africa's economic and political development might have been a very different one.(23)

2.2.2 Endeavours up to the Eiselen Commission Report (1951)

With the appointment of Sir George Grey as governor of the Cape in 1854, a new era was introduced in so far as Black education was concerned. He regarded education as a prime factor in the peaceful subjugation of the Blacks, and was instrumental in persuading the British Government to apportion funds for the purpose of subsidising "missionary institutions that could undertake to train Black youth in industrial occupations."(24)

To this appeal, the missionary societies readily responded and during the next few years, relatively large sums of money were paid out, and

considerable development in Black education took place. During the period January 1855 to December 1862, a total amount of some £49 000 was expended on Black education, whereas the government expenditure at that time on the education of the Whites was at the rate of little more than £ 10 000 per annum. However, lack of supervision and expert guidance hampered educational progress for the Blacks.(25) In 1936 there were 12 centres in the Cape Province and 5 in Natal where specialised trade instructions were given to a total of 543 Black youths. At that time no such training was given in the Transvaal and Orange Free State. In 1946, however, the Transvaal had 10 such centres with 623 pupils. This brought the total for the whole country to 2015 Black pupils receiving some form of vocational training. The commission on Technical and Vocational Training in its report (1948) attributed this lack of progress in industrial training to "the limited sphere in which the trained Native worker can find an outlet for the practical application of his skill."(26)

In 1949, 94 students were enrolled at Zwelitsha in the Cape, training as building artisans. The Johannesburg Municipality was operating a Vocational Training Centre at Orlando with 147 students (33 builders, 52 carpenters, 39 tailors, 23 pre-vocational students). The Transvaal Educa-

tion Department, in 1949, had an industrial school at Vlakfontein with 241 pupils (33 of them girls) training in cabinet making, carpentry, bricklaying, tailoring, general mechanics, agriculture, boot and shoe making or domestic science. The Department also administered a training school at Middelburg for handwork teachers at which 62 were enrolled. Beside these, there were the following State-aided institutions.

DEPARTMENT	INDUSTRIAL SCHOOL	INDUSTRIAL DEPARTMENT	ENROLMENT
Union Education	10	--	612
Cape	18	6	835
Orange Free State	-	3	88
Transvaal	4	7	520
Natal	8	-	454
	40	16	2509

The 2509 pupils included 1224 girls.

The following courses were offered to the boys.(27)

Woodworking	20 institutions
Building	10 "
Tailoring	9 "
Cabinet Making	5 "
Shoemaking and Saddlery	4 "
Blacksmithing	3 "
Tanning and leatherwork	2 "
Agriculture and Horticulture	1 institution
Motor Mechanics	1 "
Printing	1 "
Bookkeeping	1 "

Courses for girls included domestic science, spinning and weaving.

Largely because of the lack of suitable occupational outlets, technical, vocational and industrial education for Blacks was not highly developed by 1949. The Commission on Technical and Vocational Education [28] recommended that wherever adequate employment opportunities existed, facilities for the training of Blacks should be provided, preferably in the form of polytechnic institutions.

The Government appointed a Commission of Inquiry into Native Education in 1949 (Eiselen Commission). The Report of the Commission on Native Education, (1951)[29] found that there were more applicants than could be accepted at the various institutions. This indicated that the Blacks, and particularly the parents, who had to pay their children's fees considered the time and money spent in acquiring training justified. For many reasons, industrial education had not proved to be as attractive to Blacks as academic education. In many of the institutions, there was an unfortunate feeling among the pupils that those taking industrial courses were inferior in status to those in secondary schools. One of the principal causes of this feeling of inferiority was that there was no uniform system of certification, some of the courses were not inspected at all, and consequent-

ly the school certificate was regarded as invalid.

2.2.3 Eiselen Commission of Inquiry into Native Education (1949 - 1951)

Following the report of the Eiselen Commission of Inquiry into Native Education, education for Blacks was put under control of the Central Government with the acceptance of the Bantu Education Act (Act No. 47) in 1953.(30) The Commission, in its recommendation, emphasised the need for uniform certificates, syllabi and duration of courses as well as the need for proper inspection. Since the implementation of the Bantu Education Act, the education of the Blacks has increasingly been geared to their personal, social and economic needs and has consistently contributed to the raising of the social and economic standards of the Black communities.

As a result of this report, the Government created a separate education department for Blacks (Department of Bantu Education which developed into the present Department of Education and Training) and a systematic effort has been made since then to improve technical education for Blacks. However, progress has been slow as evidenced by the following statistics: In 1955, there were 2239 pupils receiving vocational education out of over one million at school, while in 1970 the figure was 3652 out of a school population of almost three million.(31)

2.2.4 Subsequent Developments

Since the 1970's, growing attention has been focused on technical education because there is now general acceptance both by the government and the private sector that:

(a) homeland development, particularly in the social and economic fields, is dependant upon the maximal realisation of human potential both in terms of general educational background and in the training of manpower and leadership at all levels;

(b) rapid economic growth along with perennial shortages of trained White manpower in greater South Africa, has led to a position in which it is imperative for the Blacks to play an increasingly important role in providing the skills necessary in commerce and industry. Achievements in the field of technical education have up to now been somewhat limited, not so much in the courses offered, but in numbers.

C. van Rensburg (in 1975) gives two reasons for this:

(a) it is only since the 1970's that a substantial number of work opportunities in this field have been opened to Black workers,

as industry began to realise the need to make the best possible use of this potential; and

(b) it is only since the 1970's that Blacks themselves have began to seize the opportunities offered by this kind of training.(32)

2.2.5 Technical Centres

In order to enrich the basic technical knowledge of children living in this age, when technology is of the utmost importance, it was decided in 1973 to establish technical centres. These centres were erected in densely populated Black urban residential areas. A centre does not have its own full-time pupils, but acts as an agent for its feeder schools. Pupils of senior primary schools (standard 5) and secondary schools (standard 6-8) attend the centres for about two and a half hours per week, where they are subjected to an orientation programme which introduces them to certain trade directions. In standards 5 and 6, they receive basic instruction in:

Brickwork

Electrical Work

Metalworking

Woodworking and Plasticwork

Half a year is devoted to each. After that (that is, standard 7 and 8), a pupil may choose one of the above named trade directions for further

education. This practical subject takes the place of one of the usual secondary school subjects. Pupils receive tuition in the usual subjects at their own schools and visit the centre for the technical orientation. One centre serves ten or more schools. Originally eight centres at a cost of R2 million were built. The figures below show the enrolment at these centres.(33)

1976 - 13326

1978 - 15899

1979 - 17119

1980 - 19373

2.2.6 Technical High Schools

As a result of the accelerated industrialisation which took place during the war years (1939-1945), organized industry as well as the educational authorities involved, became more aware of the need to have schools where pupils could receive technical orientated education up to matric level. A technical high school is an ordinary school which has a technically orientated curriculum. Pupils here are ordinary secondary school pupils and not apprentices. This type of education enables them to progress further with the filling of technical posts. The technical high school offers the pupil a completely rounded course which starts with standard 6 and ends with matric. Pupils who obtained their matric certificates

at a technical high school are freely admitted to universities or technikons if they wish to continue their studies. It is pointed out that the Matric Exemption Certificate (technical) is in every respect equal to the South African Matric Certificate. This means that a matriculated person from a technical high school is not compelled to take only a B.Sc. course (Engineering) at University. If he so desires, he is free to follow any other course in a scientific direction for example, medical, dentistry, chemical, architecture.(34)

2.2.7 Agricultural High Schools

In the homelands, agricultural high schools were as essential as the technical schools. It was envisaged as early as 1970 that the homelands of Gazankulu, Venda and the Ciskei should have an agricultural school each. These agricultural schools offer a complete secondary education leading to the Senior Certificate. Five of the subjects are the three languages, (the two official languages and a mother tongue), a science and mathematics, while the theoretical and practical aspects of agriculture complete the course. The schools are being equipped with special laboratories, workshops for farm mechanics and the usual farm buildings whilst sufficient land is being allocated so that the practical work will be varied and effective. (35)

2.2.8 Tertiary Technical Education

By 1984 there were 29 technical colleges for Blacks in the Republic of South Africa. These colleges offered training in the various trade fields, for example, motor mechanics, electronics and carpentry, as well as block release courses for apprentices. The Department was planning to erect another 14 technical colleges by April 1987. (36)

The technikons for Blacks place great emphasis on the application of knowledge gained. Although in the presentation of the subjects, the approach is not intensively academic and formal, students nevertheless acquire a sound knowledge of science, technology and the humanities. This knowlege is acquired with a view to its possible application in practice. The training methods at these technikons are also designed to foster this approach. Advanced courses are offered at two technikons, namely, the Mangosutho Technikon in Umlazi, Durban and the Mabopane East Technikon in Pretoria. The hierachy of qualifications which can be obtained at these technikons is listed below:

A one year course leading to a	National Certificate
A two " " " " " "	Higher Certificate
A three " " " " " "	Diploma
A four " " " " " "	Higher Diploma
A five " " " " " "	Diploma in Technology
A six " " " " " "	Laureatus in Technology

The final examinations to be passed are those under the control of the Department of National Education, a professional board or a public institute and are the same for all technikons. (37)

2.2.9 Concluding Remarks

Many Black school-leavers are ill-equipped to handle their jobs, according to Pat Steele, Information Officer at the Career Information Centre in Durban. She stated that education in South Africa tended to ignore the demands of the job. For Blacks with limited and inferior educational opportunities, it was even harder. Blacks worked in clear cut roles of authority where control was often external. (3
However, some Blacks are now holding senior posts in industry and commerce. They have come to realise that upward mobility can be possible with a sound technical education. Due to this, part-time enrolment at technical colleges and technikons for Blacks has seen a steady increase in student numbers.

2.3 TECHNICAL EDUCATION FOR SOUTH AFRICAN COLOUREDS

2.3.1 Early beginnings

Primary education for Coloured people dates back to the advent of Western civilisation at the Cape of Good Hope. In 1658, the first primary school was opened for children of slaves, one of the constituent groups from which the Coloured people

have descended. After 1893 it was official policy to provide parallel education facilities for White and Coloured children in the Cape and in 1911, legislation was passed requiring these two groups to attend separate schools. In the Transvaal, Ordinance 7 of 1903 virtually had the same effect, while in the Orange Free State, parallel schools were established from the very beginning. In Natal, where Coloureds and Whites originally also attended the same schools, the movement towards parallel educational facilities started in 1900 when separate schools for Coloured children were established for the first time. (39)

2.3.2 Developments before April 1962

Except for the classes provided by the Technical College in Cape Town, the St. Joseph's Trade School for Coloureds in Aliwal North, certain part-time classes at Kimberley, and a few other centres, there were no facilities for vocational education for Coloureds before the 1960's. Until then, the Government had displayed hardly any initiative in this direction. This deficiency was commented upon by the Cape Coloured Commission in its Report (1937) and later by the Commission appointed by the Cape Department of Education in its Report (1956) (40) on the education of the Coloureds. The lack of reasonable outlets for skilled and professional employment had a deleterious effect on the standard of their secondary education, which

for many had no relevance. Most of the boys who matriculated went into the teaching profession. Those with no schooling or only a primary education found outlets in factories where mass production and the assembly line did not require artisanship training. In order to absorb the increasing number of Coloured boys who had a secondary education, the Prime Minister in 1945, issued a directive in which all Government departments were requested to widen the scope for Coloured persons in the Public Service so that wherever possible they could serve their own people. In order to ensure that this policy would be acceptable, the Prime Minister had to guarantee that no situation would arise in which Coloureds would be placed in positions of authority over Whites in the Public Service. (41) The situation remained unchanged until 1962 when control of Coloured education was transferred to the Department of Coloured Affairs.

2.3.3 Developments after April 1962

In accordance with the South African Government's policy to establish separate education departments for the different race groups, the responsibility of providing technical classes for Coloured apprentices was gradually transferred to the Department of Coloured Affairs from 1 April 1962 and was completed during 1964. After thorough investigation, the Department decided to establish vocational

schools in order to provide appropriate instruction to Coloured apprentices. It also realised the need for revision of the form of tuition given, and revised courses were introduced leading to the Technical Vocational Certificates 1, 11 and 111, approximately the levels of standards 7, 8 and 9 respectively of the ordinary secondary school. The curricula for these courses consisted of the following subjects for each of which syllabi have been either prepared or taken from the Department of Higher Education.

1. Language (one subject)
2. Mathematics
3. Science
4. Technical Drawing
5. Trade (appropriate to different designated trades)
6. Workshop Practice.

The introduction of workshop practice as part of the course constituted a very important advancement in the whole concept of apprenticeship training. It made provision for what has been found to be an indispensable correlation between the theory of technical subjects and the craftmanship of a trade. Legislation in force requires employers not only to pay the tuition and the examination fees of their apprentices, but also to release them from normal employment duties in order to attend classes. (42)

A further development was the introduction of multi-lateral secondary schools. The introduction of differentiated education facilitated the provision of technical subjects and courses of study at secondary school level. This diversification also referred to as "comprehensive education" was an important milestone in the development of education for Coloured people: technical education was introduced into the ordinary secondary school and was brought within the reach of every Coloured child in the Republic of South Africa. Each secondary school became a multi-lateral school which could extend its activities of study in accordance with demand. Instead of separate schools for academic and commercial courses, there were high schools which offered at least two, or possibly all four courses. Naturally, because of the limitations of staffing, it would not be possible to offer the whole range of courses or subjects but certainly a choice. In the course of a common exploratory year in standard 6, pupils would be able to choose their respective directions of study in accordance with their ability, interests and special talents. Sometimes it may be necessary for them to change schools in order to get the courses they want. If successful, each of the pupils would be able to obtain a Senior Certificate in one of the several directions, academic, technical, commercial, or in some cases, in a more

general course. Standard 6 is the second standard in the junior secondary school phase and seeks to explore the pupil's abilities, aptitudes and interests. In order to do justice to the pupils whose future largely depends on successful adaptation to the technological requirements of the modern world, opportunities must be provided to enable the child to acquire at least a rudimentary knowledge and experience of technology. All pupils in standard 6 take general handwork. This includes tuition in elementary drawing, trade knowledge and practical skills in workshops.(43)

2.3.4 The Peninsula Technikon

In addition to facilities for technical education offered at vocational schools and multi-lateral high schools, facilities for advanced technical training constitute the third direction in which provision of this kind has been available for the benefit of the Coloured people. The Technikon Peninsula, which started as a technical college in 1967, offers courses in almost all specialised occupations (careers) which vary from occupations in the applied engineering, biological, chemical and physical sciences to the applied commercial sciences, humanities and art.

Apart from the Centre for Continuing Education, the Peninsula Technikon has the following schools :-(44)

(a) School of Applied Sciences,

(b) School of Education,

(c) School of Electrical and Mechanical Engineering and Computer Data Processing,

(d) School of Secretarial training Languages and Communication,

(e) School of Business Studies,

(f) School of Civil Engineering and Building, and

(g) School of Health Sciences.

2.3.5 Concluding Remarks

Vocational and technical education for Coloureds was slow initially because:

(a) it was associated with destitution and deliquency; and

(b) from the beginning it was operated under a different administration from that which controlled primary and secondary education until 1964.

The main reason why vocational and technical education for Coloureds did not take its rightful place as a means of advancing the industrial development of the country was the limited fields of apprenticeship and the poor economic condition of the Coloured population. Yet being an adaptable people, they managed without the benefit of an apprenticeship training to pick up skills in bricklaying, carpentry, plastering and painting to make them indispensable to the building trade in the Cape and elsewhere in South Africa. With the influx during the 1920's and 1930's of Poor

Whites from the platteland into the larger urban centres on the one hand, and the influx of Blacks from the homelands in search of work on the other hand, the Coloured worker was caught between two millstones. The result was that even though there was no colour bar at the time (1930's) in the Cape, few White firms would indenture Coloured youths as apprentices when Whites were present. Thus the Coloureds were handicapped not only by the scanty facilities for vocational training but also by the prejudice against them from the Whites. In subsequent years, the South African Government's policy on job reservation perpetuated this problem for the Coloureds.

2.4 SUMMARY OF CHAPTER TWO

Technical education for Whites, Blacks and Coloureds made a slow start because of divided control, limited funding and the general thinking that it was to be the reserve of the destitute and delinquent. There was little or no correlation between the training offered at school and occupational demands of the country.

Technical education for the Whites, however, has made good progress. The Whites are fortunate to have eight technikons whereas the Blacks have two and the Coloureds one. However, amongst the Whites, vocational high schools are still under-utilized while the secondary schools remain full. This is due mainly to the parents' lack of knowledge

of the sound training offered at the vocational high school and the relevance of such training.

Technical education for Blacks was beset with administrative problems. They had no uniform system of certification with some courses not being inspected at all. The introduction of technical centres in densely populated urban residential areas and improvement in administration has, however, improved the set up.

The Coloureds have come to realise the significance of technical education and have therefore introduced multilateral secondary schools catering for, inter alia, technical courses.

To summarize, it can be stated that there were three main factors retarding the development of technical education of non-Whites over the Whites. These were:

a) fear of competition from the Whites;

b) colour bar and job reservation; and

c) the confining of technically trained Blacks to distant and unrewarding homelands for employment.

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CHAPTER 3

3. TECHNICAL EDUCATION FOR INDIANS IN SOUTH AFRICA

In this chapter, the researcher traced the development of technical education for Indians from about 1927 when the Cape Town Agreement was signed; the establishment of the M.L. Sultan Technical College (1956); the role of the then Department of Indian Affairs - Division of Education; the initiation of Indian Technical Colleges, Technical High Schools and Industrial Arts in the ordinary secondary school.

3.1 Introductory comments

The origin of education for Indian South Africans relates largely to events in the provinces of Natal and Transvaal, for it is only in these two provinces that their numbers justified the establishment of separate schools. The comparatively few Indian children in the Cape Province were educated with the Coloured community. (However, today there are separate schools for Indians in the Cape Province.) In the Orange Free State, there has never been more than a handful of Indians.

3.2 Early beginnings of Indian education

From 1860 onwards, Indians were brought from India to work in the sugar industry. The Indians differed in religion, language, culture and tradition from the indigenous Blacks or the White settlers. It was clear from

the start that separate educational provision would have to be made for them. The first school for Indians in Natal offering English was opened in 1869. In 1878, Act No. 20 provided for the appointment of the Indian Immigrant School Board whose duty it was to administer funds for the education of Indian children. In 1894, the Immigrant School Board was abolished and the education of Indians placed under the control of the Natal Education Department. Schooling was not free and parents had to pay school fees varying from threepence to two shillings per month.(1)

Progress was extremely slow between 1895 and 1909. Table 8 reflects this. (2)

	NUMBER OF SCHOOLS	ENROLMENT
1895	28	2919
1900	31	3281
1905	31	3149
1909	35	3284

TABLE 8

This slow progress prompted the Government of India to negotiate with the Union Government(after 1910) for better educational facilities. The outcome was the Cape Town agreement of 1927 which provided for the educational and general up-liftment of Indians.(3) Up to this period, the Indians were generally farm labourers and technical education had little relevance to them.

3.3 Technical Education for Indians

3.3.1 Early development

Technical and university education have played an important role in the economic progress of the Indian community. In the beginning, Indian education was beset with numerous problems. With hope engendered by the Cape Town Agreement, (1927) young Indians who were in employment, and those about to be employed, began to seek avenues for further education in order to improve their economic position and thereby raise their standard of living. (4)

In 1929, part-time commercial and technical classes for Indians started in Durban as a result of private Indian initiative. By 1930, some 300 students attended. (5)

In June 1930, an inaugural meeting of the Indian Technical Education Committee was held and it was agreed that technical and commercial classes would be conducted in the Indian Training College, later known as Sastri College. The South African Government made annual grants from 1931 and these were progressively increased over the years. The Durban Corporation began to support the scheme from 1933 and grants from the Carnegie Corporation enabled

the Committee to purchase valuable and essential equipment for conducting classes. The Indian community also made generous contributions towards the early expenses. The demand for the classes increased considerably and the scope of the Indian Technical Institute (which it was officially called from 9 August 1933), was increased. As a result of this demand, classes were opened between 1933 and 1942 at the Depot Road, Clairwood and Mount Edgecombe Schools. During this period of expansion Senior Commerce courses were also inaugurated and the Indian Technical Education Committee explored the possibility of opening classes in catering agriculture and technology, but owing to a lack of accommodation and facilities, the Committee's efforts were not successful.(6)

3.3.2 M.L. Sultan is introduced to the Technical Education Committee

The difficulties experienced by this Committee in administering the evening classes and the desire among a considerable number of Indians employed in various trades, to improve their level of education, were brought to the attention of a leading businessman in Durban, Hajee Malukmohammed Lappa Sultan, by an eminent educationist and close friend, Sirkari Naidoo. Sultan showed interest in a proposition made to him to establish an institution

to provide technical education. He was prepared to provide half the cost of erecting a technical college building provided that the Government could match the other half.(7)

At the suggestion of Sir Shafa'at Ahmed Khan, the High Commissioner for India, the Minister of Education appointed a Committee "to enquire into and report upon facilities at present existing in Natal for university and technical education for Indians and to make recommendations as to the policy which should be followed in the further development of such facilities." (8)

3.3.3 The Hugo Commission of 1942

The opening remark of the Hugo Report (Government Notice No. 1511 dated 31 July 1942) sums up the position of technical education at the time:

> "There are no facilities for full-time technical education for Indians in Natal, neither are there facilities for any kind of technical education within the strict sense of the term "technical", but part-time classes have been held in Durban for many years, and in Pietermaritzburg for a shorter time, to give instruction in general educational subjects, ranging from elementary to more advanced, and also in commercial subjects."

The control has been vested in the Indian Technical Education Committee whose work has been hampered owing to inadequate funds.

On the question of apprenticeship, the Committee reported that there were only 18 registered under the Apprenticeship Act. This small number was due to: (a) the preference of European employers to engage only European apprentices, (b) the reluctance of Indian employers to engage apprentices since they were afraid that they would not be able to carry out the terms of the indenture. Amongst the more important recommendations made by this Committee were:-

i) that technical classes be instituted in Durban for indentured apprentices,

ii) that the generous monetary offer of Mr. M.L. Sultan be accepted,

iii) that the Union Government make a £ for £ basis on Mr. Sultan's donation, and

iv) that the Union Government subsidise the proposed Indian technical college on the same basis as other technical colleges.(9)

3.3.4 Development during the period 1946-1953

January 1946 was the turning point in the history

of technical education for Indians when J.H.Hofmeyr, Minister of Education, accepted the recommendation of the Hugo Commission and declared the M.L. Sultan Technical College to be an approved institution for higher education in terms of the Higher Education Act No. 30 of 1923. This saw the establishment of the first Indian technical college in South Africa with full statutory rights, powers and duties and with an independent college council. The new council of the college met for the first time in September 1946 and it became fully constituted in terms of the Act. During 1948, technical classes for apprentices were introduced and part-time classes generally continued to progress satisfactorily. In 1949, evening classes were established at Tongaat. In September, 1951, the Minister of Education, Arts and Science, J.H. Viljoen, met the College Council. He agreed to the expansion of the college activities and in addition to doubling the Annual General Purposes Grant, the Minister set aside £20 000 for the purposes of subsidising the new buildings. At the time of his death, Hajee Sultan was concerned with technical education for Indians throughout Natal, the Transvaal and the Cape. He expressed the wish that the college, named after him, should pioneer this work and urged the Indian community to give its full support. (10)

3.3.5. Period of increased activity 1953-1956

On 22 June 1953, the Durban City Council presented the College with a six acre site at Curies Fountain valued at £30 000 and gave £11 500 towards the building fund. The Government had already paid out an amount of £50 000 towards the cost of buildings and had made provision for an additional £5 000 towards the cost of furniture and initial equipment. The foundation stone was laid in 1954. By 1955 there were 4619 part-time students.(11)

With substantial donations from Sultan and with contributions received from various sources as well as the subsidy from the State, the main building named M.L. Sultan Technical College, was completed early in 1956. It was officially opened in the same year, when the College personnel numbered 170 inclusive of part-time teachers. The student enrolment was 5000. The assets of the College amounted to £125 000 and the expenditure in that year was £40 000.(12)

3.3.6 Control under the Department of Indian Affairs

On 1 April 1963, the M.L. Sultan Technical College was transferred from the Department of Education, Arts and Science to the Department of Indian Affairs. In 1966, all provincial educational services for

Indians were taken over by the Central Government and placed under the Department of Indian affairs. Act No. 12 of 1968 (the Indians Advanced Technical Education Act of 1968) gave the College the elevated status of a College for Advanced Technical Education as from 1 March 1969.(13)

According to Act No. 40 of 1979, the M.L. Sultan College for Advanced Technical Education was re-named the M.L. Sultan Technikon.(14)

3.3.7. Concluding remarks on the M.L. Sultan Technikon

The Technikon has reached the stage where it can no longer enrol students at will. In the present climate of economic stringency and tight financial control, it has become essential that the Technikon be circumspect in regard to not only the number of students enrolled, but also the quality of students. The student enrolment has increased steadily for the period 1981-1985. Table 9 indicates this growth.

	1981	1982	1983	1984	1985
Full-time	1002	1056	2006	2331	2902
Part-time	1272	1309	1580	1611	1375
TOTAL	2274	2365	3586	3942	4277
% increase	-	4%	52%	10%	8%

TABLE 9

The projected student enrolment for the period 1986 to 1990 is shown in Table 10

	1986	1987	1988	1989	1990
Full-time	3368	3681	4076	4349	4584
Part-time	1548	1723	1886	2093	2203
TOTAL	4916	5404	5962	6442	6787
% increase	2%	10%	10%	8%	5%

TABLE 10

An analysis of the above statistics reveals the following significant facts:

a) the release of additional accommodation in 1982 due to the transfer of secondary education activities to the Indian Education Department resulted in a 52% increase in tertiary enrolment in 1983; and

b) in 1985, a decision was taken to control the pattern of growth and to correct imbalances between student intake and the accommodation available. To achieve this, a 2% increase in projected student intake in 1986 was planned.(15)

The Technikon offers over 200 career-orientated courses on both a full and part-time basis in its nine schools, namely:

1. Applied Sciences
2. Art and Design
3. Building and Civil Engineering
4. Electrical Engineering
5. Health Sciences
6. Hotel and Catering Administration
7. Management, Administration and Computer Science
8. Mechanical Engineering
9. Secretarial Studies, Communication and Languages (16)

The Technikon will have to double its size by 1988 at a cost of R26 million to meet the demands of the ever increasing student population. The new tertiary status of the Technikon (a senior-certificate is a pre-requisite for entry) will afford all participants an opportunity to set goals, to enhance the value of the institution and to enable it to serve the country better.(17)

Technical education is playing a vital role at present when South Africa is geared to an economy with constantly increasing demands for skilled labour in the commercial and industrial sectors. The Indian with his ability to adapt to skills, given the opportunity, will assist in promoting the growth of the industrial complexes which are being initiated in the different parts of the country. Major incursions have already been made in the

professional and technological fields previously exclusive to Whites.[18]

3.3.8 Indian Technical Colleges

Prior to 1982, the Department of Indian Education provided among its range of educational activities, secondary education with a technical bias leading to the Senior Certificate with eligibility for admission to tertiary institutions. The practical and theoretical knowledge gained in technical subjects forming part of the Senior Certificate curriculum, also enhanced the pupil's chances of seeking an apprenticeship towards that trade. Upon Ministerial announcement, the M.L. Sultan Technikon which had operated both as a technikon and a technical college previously, transferred its technical college activity to the Department with effect from 1 April 1982. Hence the establishment of Sastri Technical College which is made up of the Apprentice School, Catering School, School of General Studies, School of Home Economics and School of Physical Education and Speech.

Part-time classes were also established in Newcastle. The demand especially for apprentice training in the various fields of technical endeavour as well as for commercial and cultural enrichment courses

resulted in the establishment of a full-time institution within one year of commencement, thus the establishment of the St. Oswalds Technical College with effect from 1 January 1985. This new Technical College has an annual enrolment of almost 600 students, offering tuition both to full-time and part-time students. Subsequently part-time centres were also established at Pietermaritzburg and Ladysmith where various courses are provided. Due to the lack of technikon education facilities in these areas, tertiary education courses such as the National Diploma in Public Administration, Diploma in Commerce and Technician Training are also provided as a service to the local State Departments and entrepreneurs. The Department is not unmindful of the need to secure employment opportunities for its trainees and therefore maintains close liaison with employers and employer organizations through consultative committees. These committees provide a valuable forum to ensure that training is compatible with the practical application. Plans for the expansion of technical college education include the development of Northdale Technical College in Pietermaritzburg which is scheduled to open in February 1988 with facilities for 750 students.

The Community Learning Centre planned for Newcastle

which will also incorporate technical college activities is expected to be ready in the near future, the land for which has already been secured from the Municipality of Newcastle.

Arrangements are in an advanced stage to commence technical or adult education and cultural enrichment courses in the Transvaal on a part-time basis and here again, depending on demand, a full-time institution would be contemplated.

The average annual enrolment statistics for 1986 at the abovementioned technical colleges were as follows:(19)

SASTRI TECHNICAL COLLEGE	ST. OSWALDS TECH.COLLEGE	LADYSMITH NO. 1 SEC. SCHOOL	PIETERMARITZBURG (H.S. EBRAHIM TRAINING CENTRE)
Apprentice School 1760	Apprentice 508	Technical 10	Technical 114
Catering School 450	Commerical 28	Commercial 74	Teritary 40
Home Economics 230	Cultural 36	Cultural 145	General 215
General Studies 500			
Physical Education/ Speech 1350			

3.3.9 Pre-Vocational School

The Pre-Vocational School in Moorton, Chatsworth (which opened on 1:1:86) has been specially designed

for pupils who have been classified as mildly mentally handicapped. The pupils here are generally over the age of 13 years. They were initially in the Special Education class and after specialised attention were once again transferred to mainstream education. Here they experienced learning difficulties again and were unable to cope and hence a pre-vocational school was built to cater for their needs. Pupils in mainstream education who do not progress academically at all are also admitted to the above school.

The Pre-Vocational School in Moorton has accommodation for 300 pupils and at present the roll is 265, which include 65 girls.

The courses for boys include:

1. Motor Repairs
2. Panel Beating
3. Woodworking
4. Metalworking
5. Carpentry
6. Spray-Painting

The courses for girls include:

1. Hairdressing
2. Typing
3. Office Procedure (filing; switchboard operation; mailing)
4. Beauty Culture

The Pre-Vocational School is becoming increasingly popular and there is a waiting list of some 400 pupils - hence the demand for such schools in the Indian community is great.(20)

3.3.10 Secondary Technical Education

3.3.10.1 Introductory comments

In South Africa, secondary technical education for Indians starts at standard 6 when, in addition to his academic subjects, a pupil also receives basic workshop training. This training consists of workshop practice designed for the basic skills of differentiated trades, such as Woodworking, Metalworking, Welding, Sheet Metalworking, Electrical Work and Bricklaying. Obviously the skills taught are of a very elementary nature, but they tend to show the pupil's ability, aptitude and dexterity, so that when he is promoted to standard 7, he can take the trade subject that suits his capabilities the best. The training at a technical high school can be classified at the most as "pre-apprenticeship training" which only serves to give the pupil some insight into his chosen trade and to prepare him for his apprenticeship. Training is thus only basic with emphasis on correct methods, the importance of neat and accurate work, the satisfaction that a successfully completed job gives and the

appreciation and care of good tools and equipment.(21)

At present the Department of Education and Culture (House of Delegates) has four technical high schools offering secondary technical education. These are the M.H. Joosub Technical High, M.L. Sultan Stanger High, M.L. Sultan Pietermaritzburg High and Clairwood Secondary School.

3.3.10.2 Fallacies pertaining to Secondary Technical Education(22

Since secondary technical education is a new direction of study for the Indian community, certain fallacies exist. These will now be discussed.

a) It is a fallacy to think that technical education is meant for pupils who cannot make the grade. Consider the following: A person buys a motor car for approximately R20 000 and as we are well passed the old "barbed wire and pliers" age, any defect in this complicated product of technological advancement must be dealt with by a specialist. He may be a product of a secondary technical school. For his services, the owner of the car will have to pay about R20,00 an hour for labour. If he is not a specialist, many hours of unnecessary labour may be charged to the client. Further, unless work of such a specialised

nature can be guaranteed, the safety of the client and his family can be jeopardised. The same argument is valid for other trades if one thinks, for example, of the high costs involved in manufacturing electronic equipment and home appliances.

b) It is a fallacy to think that technical education is meant for practical or lower grade pupils only. In certain trades, it is not logical to imagine admitting a practical course pupil. A good example is the radio and television trade where such a high level of abstract concepts are encountered that the practical or lower grade pupil will not be able to manage.

c) It is a fallacy to think that technical education is for pupils with poor school attendance records. With the specialised training in the workshops, it will be appreciated that should a pupil miss out on practical work, it would be totally impossible to ask the pupil to complete the work in his own time.

d) It is a fallacy to think that pupils are involved in practical work in the workshops only. The trade subject is simply one of

the subjects in his course. Pupils in standard 6 and 7 have 7 periods per week in the work-shops and pupils in standard 8, 9 and 10 (ordinary course) have 9 periods per week. In each case, about 3 periods per week of the allocated number of periods, are spent on theory and only the balance on practical work.

e) It is a fallacy to think that technical education is for pupils who are unable to cope with Mathematics and Science. Technology is not stagnant and innovation can only be attained if the technologists have a proper understanding of the sciences applicable to technology as well as the aptitude to apply this knowledge. It is for this reason that Physical Science and Mathematics are made compulsory subjects.

f) Contrary to certain popular conceptions, it is fallacious to believe that different syllabi are used for the technical course of study in Mathematics and Physical Science. Exactly the same syllabi as for the pure science course are used. In this regard, the question can be asked : How are the pupils in the secondary schools selected for the pure science course? The answer to this

question is that it is done on the proven ability in the Sciences and Mathematics. The same criterion should really be applicable to the technical direction of study but due to certain practical implications it cannot be strictly applied. It is maintained, however, that technical education should have its fair share of pupils who are strong in Mathematics and Physical Science.

g) It is a fallacy to think that technical orientated pupils complete an apprenticeship at a secondary school. A large proportion of the pupils do become apprentices. Should they sign apprenticeship contracts they would be sent for further training to the Sastri Technical College, for example.

h) It is a fallacy to think that the technical course of study is a 'glorified' Industrial Arts course. When pupils are taking Industrial Arts and they are weak in Mathematics and Science, a course is selected in standard 8 which excludes these subjects. However, as already stated, these subjects are compulsory and of extreme importance for pupils following the technical course.

i) It is a fallacy to think that these pupils may not proceed to university. Apart from the technical subjects, the other subjects taken from standard 8 are:

English HG or SG
Afrikaans HG or SG
Mathematics HG or SG
Physical Science HG or SG
Technical Drawing HG or SG

From the above it is obvious that pupils may get matriculation exemption and are, for example, very suitable candidates for the B.Sc. (Engineering) degree course. (23)

A brief discussion of the four secondary technical schools follows.

3.3.10.3 M.H. Joosub Technical High

This school, which is situated in Lenasia, is the only technical high school for Indians in the Transvaal. It features 28 classrooms, 9 specialist rooms, 2 drawing rooms and 3 workshops. The last mentioned consists of one Basic Techniques workshop, one Woodworking workshop and one Motor Mechanic workshop, all of which are supplied with the necessary equipment.

3.3.10.4 M.L. Sultan Stanger High

The main building was completed in 1961 and was regarded as the first phase in the building programme, whereas the second phase entailed the building of additional rooms that were eventually used for the tuition of technical subjects. There are 5 workshops viz. woodworking, Electrician's Work, Electronic, Motor Mechanic and Welding and Metalwork. There were 409 students enrolled at this school in 1986.

3.3.10.5 M.L. Sultan Pietermaritzburg High

Designed as a technical high school, the M.L. Sultan Pietermaritzburg High, was built in 1961-1962. In addition to the usual classrooms, there are 3 workshops, one each for Woodworking and Bricklaying, the latter course being discontinued. The remaining workshop currently used for Motor Mechanics and Metalworking (including Welding) is limited in space with some of the equipment being outdated. There is also a shortage of storage space for material.(23)

3.3.10.6 Clairwood Secondary School

Clairwood Secondary School which started in 1980, was the first fully fledged technical orientated secondary institution for Indians. At the beginning

of 1982, the total enrolment was 1866 pupils of which 1200 had enrolled for the technical course of study. The trade component of the course is done in one of 9 well-equipped workshops for :

1. Panel Beating and Spray Painting
2. Woodworking
3. Radio and Television
4. Electrician Work
5. Fitting and Turning
6. Building
7. Welding
8. Plumbing and Sheet Metalworking
9. Motor Mechanics

In 1986, there were 1800 pupils - 1500 of them were pursuing technical direction of study.(24)

3.3.11 Industrial Arts in the Ordinary Secondary School

3.3.11.1 Introductory comments

In times gone by, communities were more or less self-sufficient, but at present we are experiencing new trends which vary from day to day. Motor cars, aeroplanes, space craft, radio, television, steam power and electronic apparatus are the results of physicists, engineers, technicians and tradesmen. The advantages thus created have been grasped by everybody with both hands, but as a result we are no longer capable of helping ourselves because as a rule we stand helpless when the appliances in our homes, the transport vehicles on our roads,

or the machines used on our farms are out of order.(25)

The study of Industrial Arts can help remove some of the discomforts that we would have otherwise experienced. Industrial Arts became a school subject with the introduction of the system of differientated education in 1973. In the few years, since its inception, the subject has grown as a means of creative expression.

The introduction of Industrial Arts may be attributed largely to two reasons :

i) the need for a change in the learning environment for pupils, who although intellectually capable, have shown an aptitude for more practically orientated subjects; and

ii) in the present age of automation, we find ourselves in danger of losing our manual skills.

3.3.11.2 Handwork/Handicrafts/Basic Techniques

From class 1 to standard 1, the pupils study Handwork and from standard 2 to standard 4, they are exposed to Handicrafts. At the standard five level, the pupils study Basic Techniques. This subject opens the door for the development of creativity, providing pupils with the opportunity of modelling useful articles. Basic Techniques also prepares the pupil

for the Industrial Arts course.

3.3.11.3 Industrial Arts

In Industrial Arts, the pupil is exposed to Technical Drawing, Woodworking, Metalworking and in some cases to Motor Mechanics and Electricity. These subjects offer to the pupil the opportunity to discover his sphere of interest and creative talents, to pursue his studies in any of these or related directions, and to make better use of his leisure hours. Industrial Arts is important as it provides work of great interest both to the able and less able pupil. Industrial Arts lessons are sometimes the most valued periods of the school week for the less able pupil.

Industrial Arts as a course offers excellent opportunities for teachers to establish close relationships with pupils and to develop the personalities of those pupils who are in danger of becoming disillusioned with the school because of their inability to cope adequately with the more "academic" subjects. The basic facilities of the Industrial Arts centres comprise a Technical Drawing room and separate Woodworking and Metalworking workshops. The equipment includes drawing tables, a wide variety of hand tools and machines such as circular saws, scroll saws, band saws, power hacksaws, drilling

machines, jointers, wood and metal turning lathes, rolling machines, guillotines, box and pan folding machines and gas and arc welding equipment. A monetary allocation provides adequately for text books, reference books and expendable instructional materials. Industrial Arts centres are managed by qualified teachers.

The subject matter for Industrial Arts may be divided into theory, drawing and practical work.
These 3 aspects are complimentary.

a) Theory. The subject matter for this aspect deals with the following:

1. hand and machine tools;
2. materials; and
3. code of practice.

Theory is usually integrated with practical work. Given a problem, for example, of designing and making a book rack suitable for placing on a table for a given number of books, a pupil must know about the material he requires and how to cut, join and finish the model.

b) Drawing. Drawing is used to communicate precise shape, size, position and proportion. It describes and defines processes which cannot be adequately conveyed verbally. In order to achieve these objectives, pictorial

drawings, orthographic projections, geometrical constructions and applications, freehand sketches and scale drawings are done, using the principles and prescibed conventions. Working drawings facilitate the execution of practical work. The pupil is required to read drawings which help him in setting out and completing models. The pupil is also encouraged to change working drawings in order to incorporate his own designs into the model, provided that the construction of the model is not altered. A pupil can benefit in future endeavours or leisure time hobbies if he is competent at interpreting drawings.

c) Practical Work. The most rewarding aspect of Industrial Arts is not so much the completion of a perfect model as the skills learnt in the process. The pupils look forward to working with wood, metal and plastic and acquiring the necessary skills. Emphasis is placed on guiding the pupils to develop competence and skill and to work systematically and purposefully. Practical work involves more than reading directions and following procedures : opportunities are provided to devise, manipulate and experiment.(26)

3.3.11.4 Technika

The Department of Education and Culture (House of Delegates) has programmed the introduction of the subject Technika at selected secondary schools. This is a new technical subject. On a pilot basis, Technika Electronics is to be introduced at 3 ordinary secondary schools in 1987. In addition, Technika Electrical, and Technika Mechanical are scheduled to be introduced in later years.(27)

3.3.11.5 The Future

The Department of Education and Culture (House of Delegates), has made a very close study of the recommendations of De Lange Committee in respect of technical education and has drawn up a programme to implement some of these recommendations. In this regard, the Department has programmed the establishment of technical secondary schools, technical colleges, and the introduction of additional technically orientated subjects at ordinary secondary schools. (28)

3.3.12 Concluding remarks

The expansion anticipated in the development of commerce and industry in the Republic of South Africa as a whole will require large numbers of highly trained personnel,and with the knowledge

that White labour resources cannot adequately cope with the situation, one need not be an optimist to predict a promising era of change which will see the realisation by the Indian community of their worth and potential. There can be no doubt at present that the other race groups are enjoying many of the privileges and opportunities which at one stage were exclusively reserved for Whites. The number of employment opportunities that have become available to non-White youth in recent years is encouraging and it gives one hope for the future of South Africa. The development of new industries requires new facilities,new technologies and supporting services and at the same time opens up unlimited opportunities to the people of South Africa. This would demand that there should be close liaison between commerce and industry and the various technical institutions so that a more efficacious system of education and training could be established to the mutual benefit of all concerned.(29)

For the Indian pupil, secondary technical education is of utmost importance. The benefits derived from a technical secondary school education are numerous. Some of the advantages are :

a) Other than the languages, subjects taken closely resemble those offered to apprentices

and have a strong link with technician training and the university;

b) a greater prospect of the pupil obtaining an apprenticeship in the trade of his choice owing to the close contact that technical secondary schools have with industry - this is happening presently for example at the Clairwood Secondary School; and

c) a pupil who has been exposed to nine different workshops and has spent some time in one or possibly two of these, is better able to decide where his interests lie, or better still, is more qualified to decide on what he is interested in.

If the youth of tomorrow is called upon to accept the technological challenges of the future, he needs to be properly trained and the prime pre-requisite here would be a good corps of teachers. "The Government had accepted the recommendation that technikons should train teachers for technical subjects", the Honourable A. Rajbansi stated on 8 October, 1986. He said that discussions with the M.L. Sultan Technikon about the training of such teachers had already begun.

"The training of people who will maintain the future is more important than is the case today and people of the highest calibre will be required. The teacher will be called upon to produce young men capable of accepting any challenge that new developments are likely to produce", he stated. (30)

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CHAPTER 4

4. ANALYSIS OF QUESTIONNAIRES AND INTERVIEWS, WITH DISCUSSION

4.1 GENERAL INTRODUCTORY COMMENTS

In this chapter, the researcher investigated:

a) the socio-economic importance of technical education for South African Indians;

b) the attitude of parents and pupils towards technical education;

c) the choice of subjects and courses, in respect of pupils' attitude, aspiration and motivation in relation to later vocation and career; and

d) parental influence on pupil's choice in respect of (c) above.

Information was gathered primarily through interviews and where the respondents could not be reached easily, questionnaires were used.

The main thrust of the research was directed at the pupils in standards 7 and 10 and their parents, whose attitudes were considered to be of great importance to the investigation. This is so because it is the pupil who selects courses of study at school and he is at some point influenced by his parents. They were also selected because:

a) the standard 10 pupil could speak with authority having had the most schooling experience and having selected subjects way back in standard 7 (he could speak with conviction about the choice of subjects/ courses); and

b) the standard 7 pupils would be receiving much advice from their teachers and guidance counsellors since they would be selecting courses of study at the end of that year.

Interviews were conducted with:-

a) Planners of technical education (Department of Education and culture - House of Delegates)*;

b) Standard 10 pupils at selected Indian secondary schools;

c) Standard 7 pupils at selected Indian secondary schools

d) Parents of pupils presently in Indian secondary schools;

e) Subject Advisers for technical subjects in the Department of Education and Culture - House of Delegate

f) Teachers of technical subjects in the Department of Education and Culture - House of Delegates;

g) Industrialists and business organisations in the industrial areas of Pinetown, Mobeni and Phoenix; and

h) Laymen.

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* The researcher was not able to interview the Planners since technical education in the Department of Education and Culture - House of Delegates was the responsibility of various sections. At their request, the researcher forwarded the interview schedule which was duly completed and returned to him. (Refer to appendix I)

4.2 INFORMATION OBTAINED FROM THE PLANNING SECTION OF THE DEPARTMENT OF EDUCATION AND CULTURE IN THE HOUSE OF DELEGATES

(REFER APPENDIX I)

4.2.1 GENERAL:

The Department of Education and Culture (House of Delegates) has 124 secondary schools under its control with an enrolment of 99 981. Of this number, 51 733 are males. 121 of these secondary schools have Industrial Arts centres. (An Industrial Arts centre comprises a Woodworking workshop, a Metalworking workshop and a Technical Drawing room). Three state-aided secondary schools, namely, Orient Islamic, Gandhi Desai and Darnall have no such facilities. The Department does not envisage building Industrial Arts centres at these schools. It is, rather, concentrating it's efforts on the building of secondary technical schools on a regional basis. All 121 secondary schools have Industrial Arts centres which are fully operational.

4.2.2 INDUSTRIAL ARTS STATISTICS IN RESPECT OF STANDARDS 7 AND 10 PUPILS

Table 11 below shows the statistics in respect of standards 7 and 10 male pupils taking Industrial

Arts subjects (namely, Woodworking, Metalworking and Technical Drawing) for the years 1980; 1983 and 1986.

YEAR	*STANDARD 7	STANDARD 10			
	TOTAL	TECHNICAL DRAWING	WOODWORKING	METALWORKING	TOTAL
1980	4148	252	172	33	457
1983	4531	361	96	25	482
1986	5531	889	388	244	1521

TABLE 11

*(The subject breakdown for standard 7 pupils was not available).

Certain important conclusions can be drawn from the statistics in Table 11. These are inter alia:

a) There has been an increase in the number of pupils taking Industrial Arts subjects from 1980 to 1986 both in standards 7 and 10;

b) The largest increase is evident after 1983. In fact the percentage increase from 1980 to 1986 is as follows:-

Standard 7 - 33%

Standard 10 - 232%;

c) There was a relatively low increase from 1980 to 1983, which was as follows:

Standard 7 - 9%

Standard 10 - 5%;

d) Several reasons for the increase have been advanced by teachers of technical subjects who were interviewed. (Refer to 4.6 on page 137 for details); and

e) The growth during the 1980 - 1983 period has been relatively low, 9% for standard 7 and 5% for standard 10. This low growth rate could be attributed to the pupils being unaware of the value of technical subjects for later vocations during that period. Another reason for the low growth rate could be the attitude of pupils towards Industrial Arts. During the period 1980 - 1983, the researcher himself found that Industrial Arts was not popular with the Indian pupils, hence the purpose of the present study. Workshops were under-utilised and few pupils were opting for technical subjects. Pupils preferred the academic subjects to the technical direction of study. During the early 1980's, pupils were gaining access to university more freely than in 1986. However, the present downturn in the country's economy, lack of job opportunities, and the raising of

entrance requirements at tertiary institutions have created a situation in which the pupil is selecting subjects realistically. The pupil selects subjects that are relevant to the times; that can benefit him immediately in the labour market; and that which can help carve out a vocation for him. Industrial Arts lead to many different careers. Hence we notice the steady increase in the number of pupils now taking Industrial Arts.

4.2.3 FEMALE PUPILS AND INDUSTRIAL ARTS

The Department of Education and Culture - House of Delegates has 102 qualified Industrial Arts teachers. 5 of them are femals. The statistics in respect of female pupils studying Industrial Arts in 1986 are as follows:

Woodworking	:	4
Metalworking	:	8
Technical Drawing	:	106

This is only the start. The researcher is of the opinion that in a few years time, the above figures would increase considerably so that females too would enter the labour market competing equally with their male counterpart. Manpower requirements do not discriminate between the sexes and females are gradually coming to realise this; hence their modest start with the technical subjects. There are already a number of Indian females employed presently as telephone technicians, television technicians, laboratory technicians, medical technologists and radiographers, etc.

4.2.4 INDUSTRIAL ARTS MATRIC RESULTS

The matriculation results for the years 1981, 1983 and 1985 for the Industrial Arts subjects have been outstanding. The statistics in Table 12 below substantiate this. (By way of interest, the General Mathematics results have also been tabled).

SUBJECTS/GRADES	1981	1983	1985
1. Woodworking - standard grade	97%	99%	98%
2. Metalworking - standard grade	94%	91%	98%
3. Technical Drawing - higher grade	75%	63%	67%
- standard grade	70%	83%	65%
4. General Mathematics - higher grade	57%	70%	67%
- standard grade	64%	64%	65%

TABLE 12

4.2.5 CONCLUSION

The Planning Section has earmarked the construction of secondary technical schools. The first of these schools is to be built in Phoenix and the building operation is expected to commence in 1987. The building of secondary technical schools in Chatsworth, Stanger and Pietermaritzburg is expected to commence early in 1988.

4.3 INFORMATION FROM STANDARDS 10 AND 7 PUPILS

4.3.1 ANALYSIS OF QUESTIONNAIRES TO PUPILS IN STANDARD 10 IN 17 SELECTED SECONDARY SCHOOLS AND THE FINDINGS

(REFER APPENDIX II)

Secondary technical schools for Indians were not considered in this sample because they catered primarily for the technical direction of studies.

Pupils at these schools had a positive attitude since they were studying technical subjects in depth, hence, it was decided to exclude them from the sample.

From the ordinary secondary school, the researcher wanted to ascertain the subjects that the pupils were studying; what their parents' occupations were and how parents influenced their sons in respect of careers. Another point that the researcher wanted to ascertain was the attitude of the pupils towards Industrial Arts subjects.

With this in mind, 1073 questionnaires addressed to standard 10 male pupils in Natal, Transvaal and Cape Province were sent out. The pupils in the sample were from the following secondary schools :

NATAL: Verulam; Buffelsdale; Stanger; Isipingo; Umkomaas; Umzinto; Port Shepstone; Esther Payne Smith; Lincoln Heights; Windsor and Raisethorpe. CAPE PROVINCE: East London; (Standard 10 pupils from Rylands and Woolhope could not participate). TRANSVAAL: Lenasia; Klerksdorp; Taxila; Valencia and Laudium.

All percentages in the following analysis have been rounded to the nearest whole number.

Of the 1073 questionnaires sent out, 63% (679) were returned. 69% (466) of the sample studied no technical subjects at all. 31% (213) were studying either Woodworking, Metalworking or Technical Drawing. According to the returns no pupils in the Transvaal were studying any technical subjects because they were not offered at the matriculation level. Industrial Arts subjects were most popular with the Natal matric pupils. This popularity could be attributed to the fact that Natal had a good and ready supply of well-qualified Industrial Arts teachers. The teachers were also fortunate to be supervised by a team of subject advisers (situated locally) who were constantly organizing workshops, orientation courses and in-service training. 91% (618) of the parents had received no tertiary education with 11% (72) having matriculated. 18% (121) of the parents had received a level of education below standard 6 and this matched their vocations since 19% (130) of the parents were employed as labourers. This perhaps proves the point that job opportunities and upward mobility depended largely on a sound educational qualification. This point is further supported by the following statistics :- 7% (46) of the parents were professionals (for example, doctors and teachers) and this matched their level of education, either a university degree or a college diploma. Another point worth mentioning about the

parents' occupation was that only 3% (20) of them were working as technicians. This could have affected their sons' choice of subjects and aspirations for vocations; hence the large percentage 69% (466) not studying technical subjects, despite the fact that over 80% of the schools in the sample offered Industrial Arts at the matriculation level. Less than 1% (6) of the parents had tertiary qualifications from a technikon or technical college and since 3% (20) of the parents were employed as technicians, one could perhaps conclude that 2% (12) learnt their trade on-the--job. 2% (11) of the pupils were taking Industrial Arts subjects because of parental influence and 1% (6) because the teacher/counsellor advised them. This could suggest that pupils in this sample (when they were at the standard 7 level) were fairly independant since 22% (152) of the pupils were studying Industrial Arts of their own choice. Teachers and parents had little influence on the pupils' choice in this sample. The concluding and perhaps most striking feature of the sample showed that pupils were aware of the tight economy and their limited prospects of gaining entry to the university after matriculating. Hence 33% (227) of the pupils indicated their desire to proceed to the technikon or technical college after matriculating with 9% (62) opting for a college of education and 29% (195) preferring to study at a

university. Their choice of tertiary institutions tended to match their future career since the largest number, 22% (148) were desirous of working in the technical field. One can thus conclude that although the majority of the pupils did not take Industrial Arts subjects they are fully aware now of the importance of these subjects. This is further borne out by the fact that large numbers were contemplating to pursue technically related vocations.

4.3.2 ANALYSIS OF FINDINGS AFTER INTERVIEWING 60 STANDARD 10 PUPILS AT 19 SECONDARY SCHOOLS IN THE DURBAN AREA

(REFER APPENDIX III)

The researcher wanted to ascertain the careers the matriculants had in mind, their choice between the university and the technikon and their attitude to the technical direction of study.

Pupils were interviewed at secondary schools broadly in three areas in Durban :

a) CHATSWORTH : Southlands; Chatsworth; Montarena; Westcliff; Witteklip; Crossmoor; Wingen Heights; Woodhurst.

b) PHOENIX : Stanmore; Greenbury; Phoenix; Lenaria; Earlington; Rydalpark.

c) OTHER AREAS : Merebank; Sea Cow Lake; Avoca; Orient Islamic; Reservoir Hills.

Pupils interviewed at the above schools were pursuing either the General, Humanities, Natural Science or Commercial direction of study. Pupils following the Natural Science direction were generally aiming to go to the university since they had a strong academic background. Pupils were aware of the difficulty of gaining entry to post-matric institutions, especially the university and hence the researcher found a very positive attitude of these pupils towards the technikon. Considering the tight economy at the present time and the difficulty of finding suitable jobs, 93% (56) of the pupils were looking seriously at joining either the army, navy or police-force. None of the pupils would object to being apprenticed. 90% (54) of the pupils interviewed were apprehensive and uncertain about the future. The political climate coupled with very limited opportunity made the pupils feel insecure. Of the pupils studying Industrial Arts subjects, all said they had no regrets and enjoyed them tremendously. Amongst the reasons advanced were :-

a) they were exciting, challenging and had aesthetic value;

b) they provided immediate satisfaction - the pupils were able to see the progress of their creativity, thereby making these subjects more satisfying than others; and

c) these were subjects relevant to the time.

That the subjects were gaining in popularity can be substantiated by the following statistics : 80% (48) of the pupils who took Industrial Arts subjects would not change them given the opportunity to choose again. 40% (24) agreed with the statement that weaker pupils took Industrial Arts subjects. This indicates that the majority (60%) of pupils are now adopting a more positive attitude to the technical direction of study. 80% (48) of the pupils disagreed with the remark that the university student had greater vocational scope than the student from the technikon. This view could have emanated from the pupils following media reports and the information passed on by the guidance counsellors that professional certification is no guarantee of occupational placement. The pupils were equally divided on the issue of whether teachers looked down upon pupils pursuing Industrial Arts subjects. Here, reference was made to those teachers other than the Industrial Arts teachers. Lastly, all 60 pupils interviewed agreed that the Industrial Arts pupils would be

better off than the non Industrial Arts pupils after matriculating; citing, in the main, the reason that they could be absorbed into the working environment more readily since they had a type of "pre-apprenticeship-work-out" at school.

4.3.3 ANALYSIS OF QUESTIONNAIRES TO PUPILS IN STANDARD 7 IN 20 SELECTED SECONDARY SCHOOLS AND THE FINDINGS

(REFER APPENDIX II)

Basically, the researcher had the same objectives in mind when these pupils were requested to complete questionnaires as was the case with the standard 10 pupils. Refer to 4.3.1. on page 129.

1470 questionnaires addressed to standard 7 male pupils in Natal, Transvaal and Cape Province were despatched. The pupils involved were from the following secondary schools:-

NATAL : Verulam; Buffelsdale; Stanger; Isipingo; Umzinto; Umkomaas; Port Shepstone; Ester Payne Smith; Lincoln Heights; Windsor; Raisethorpe.

CAPE PROVINCE: East London; Rylands; Woolhope.

TRANSVAAL: Lenasia; Liverpool; Klerksdorp; Taxila; Valencia; Laudium.

Of the 1470 questionnaires sent out, 73% (1071) were returned.

7% (76) of the pupils indicated that they were not studying technical subjects at all. Woodworking was the most popular subject with 43% (458) of the pupils, followed by Technical Drawing which had a 40% (424) pupil preference.

29% (308) of the pupils' fathers were employed as labourers. Only 7% (70) of the parents were apprentices or artisans while 6% (66) were professionals. 40% (426) of the parents received a schooling of standard 6 or below and this corresponded to the large number of parents employed as labourers. 8% (83) of the parents who had a degree or diploma were either teachers or doctors. It was interesting to note that only 2% (18) of the parents had a technikon/technical college diploma and this matched their vocations, namely, working in the technical field. A large number of parents, as high as 25% (272), were in the commercial field as salesmen. When asked to respond to the statement who had influenced them to study technical subjects, 53% (567) stated that it was their own choice; 17% (185) said they had no other option with 3% (37) stating that it was their parents' choice. The role of the teacher/-

counsellor was insignificant since only 2% (19) were influenced by them. The main reason they advanced for not wanting to be an artisan was that the work was too demanding coupled with the fact that the artisan did not earn enough money - 17% (185).

11% (120) felt that the scope for promotion for an artisan was limited and 6% (62) regarded his status to be too low. 63% (671) wanted to proceed to university after matriculating as compared to 12% (130) wanting to go to the technikon. This high percentage could be due to the pupils' perception of the university as an institution with beautiful buildings, fully equipped with all facilities while the technikon was looked upon as "museum-like" buildings offering little campus life or an alma-mater. Another factor for so large a number wishing to go to university could be the fact that these pupils were possibly not reading the newspapers critically to know the difficulty in gaining entry to a university, considering the tightening admission requirements and the point system. On the other hand, the standard 10 pupils were realistic and aware of entrance requirements and hence only 29% (195) were desirous of proceeding to the university. Their career choice corresponded to the response of the standard 10 pupils - 30% (321) would be

seeking careers in the technical field with 19% (200) in the science field followed by 14% (148) in the commercial field.

4.3.4 ANALYSIS OF FINDINGS AFTER INTERVIEWING 60 STANDARD 7 PUPILS AT 19 SECONDARY SCHOOLS IN THE DURBAN AREA

(REFER APPENDIX III)

Here again, the researcher wanted to find out the attitude of the pupils to technical education as was the case in the previous interviews with the standard 10 pupils. (Refer 4.3.2. on page 133)

These pupils were from the same schools where the standard 10 pupils were interviewed and the researcher found almost similar views in both groups. All 60 pupils were doing either Technical Drawing, Woodworking or Metalworking depending on the Industrial Arts subject/s offered at the school. These pupils, like their matric colleagues, had a positive attitude towards technical education with 60% (36) preferring the technikon to the university. Unlike their colleagues in matric, these pupils had little knowledge of vocations and related requirements and their choice of careers ranged from policemen, computer programmers, teachers, engineers, draughtsmen, mechanics, to panel beaters and doctors. None of these pupils nor their parents had any objection

to their being apprenticed. The standard 7 pupils were more optimistic about the future in respect of a career, while 90% (54) of the standard 10 pupils were uncertain about the future, only 40% (24) in standard 7 looked to it with uncertainty. Some of the reasons advanced by the 40% of the pupils were:

a) frequent retrenchment of workers;
b) insolvency of businesses and industries; and
c) political tension and the prejudice operating against them from their White colleagues.

All 60 pupils were satisfied with the Industrial Arts subjects they were studying stating that they were different from the academic subjects and that they could help them in their later careers. When asked to choose subjects again, they indicated that they would not change their Industrial Arts course.

4.4 INFORMATION FROM PARENTS

4.4.1 ANALYSIS OF 60 QUESTIONNAIRES TO PARENTS IN THE TRANSVAAL AND CAPE PROVINCE AND THE FINDINGS. (REFER APPENDIX IV)

Here the researcher wanted to determine the level of the parents' education, their vocations and whether they were aware of the subjects offered at

schools especially Industrial Arts courses. The researcher also wanted to find out whether the parents would object to their sons pursuing studies at the technikon. 78% (47) of the parents canvassed spoke English as their home language. 50% (30) of the parents had matriculated with 7% (4) having received no formal education at all. None of the parents had a technikon/technical college diploma. 70% (42) were in full-time employment with 17% (10) being unemployed. 58% (35) had sons in standard seven and 42% (25) had sons in standard ten. The sample was therefore well qualified to know of the subjects offered at school, their son's choice and what aspirations the parents had for them once they matriculated. 5% (3) of the parents were artisans with an equal number serving apprenticeship. It was a pleasing feature to note that 70% (42) of the parents had a full understanding of the courses their sons were following. 80% (48) of the parents had allowed their sons to choose their own directions of study at school. Only 40% (24) of their sons were studying any Industrial Arts subjects. 58% or 35 parents would be happy and at ease if their sons were to follow Industrial Arts at school with only 3% (2) who would be unhappy because they prefer academic over technical subjects. 90% or 54 of the parents indicated that their sons would make their own career choice

while 7% or 4 would decide the career for them. It has been the tradition with the Indian parent to see that his children eventually go to the university after matriculating. This was evident in the parents' choice of university (72% or 43) as their son's preference for tertiary institution with 13% or 8 opting for the technikon.

On the question of whether they would object to their sons following a technical direction of study at a technikon after gaining a matriculation exemption pass, the responses were as follows:-

Yes	17%	(10)
No	72%	(43)
Not sure	11%	(7)

30% or 18 parents wanted their sons to become technicians eventually with 22% (13) preferring the medical field, and 20% (12) were hopeful that their sons would eventually become engineers.

The analysis of the questionnaires adequately brought out the attitude of the Indian parent towards technical education. Although the parents generally preferred university to the technikon, 80% (55) would not object to their sons being apprenticed, hence showing a positive attitude to technical education.

4.4.2 ANALYSIS OF FINDINGS AFTER INTERVIEWING 16 PARENTS IN PHOENIX, CHATSWORTH, MEREBANK AND RESEVOIR HILLS AREAS OF DURBAN

(REFER APPENDIX IV)

Since the same questions were used here as the ones in the questionnaire, the researcher wanted to ascertain the same information as in 4.4.1 on page 140.

All 16 parents, who had sons in standard 10 or in standard 7, expressed concern about their future because of the lack of job opportunities. Parents were looking forward to some financial assistance from their sons once they qualified.

The attitude of these parents towards the technical direction of study was clear - they had no objection to their sons studying Industrial Arts subjects at school and were hopeful that these subjects would help them in at least finding employment. It was interesting to note that parents in the higher income group, living in Reservoir Hills had similar expectations for their sons as those parents of pupils from the lower income group living in Phoenix, Chatsworth or Merebank. There was one distinct difference between the parents who were interviewed and the parents from the Cape Province and Transvaal

(Refer 4.4.1) and that was that 88% (14) of the Natal parents preferred the technikon to the university whereas the corresponding figure for the Transvaal and Cape Province parents was 13%. This could be because of the realistic attitude of the Durban parent to tertiary placement. The student in Durban has to compete with larger numbers than his counterpart in the Transvaal and Cape and parents are therefore aware that to gain entry to the university is difficult. All 16 parents had no objections to their sons serving an apprenticeship and they were hopeful that their sons would fill vacancies in the technical fields or become tradesmen.

4.5 INFORMATION FROM SUBJECT ADVISERS

4.5.1 ANALYSIS OF FINDINGS AFTER INTERVIEWING TWO SUBJECT ADVISERS OF INDUSTRIAL ARTS

(REFER APPENDIX V)

The purpose of the interview was to find out generally the standard of teaching of Industrial Arts subjects in Indian schools, the calibre of pupils pursuing technical subjects, new technical subjects that the Department intended to introduce and what, in their opinion would give the technical subjects wider acceptance and growth.

At present, there are two subject advisers of Industrial Arts subjects assisted by one in an acting capacity in the Department of Education and Culture (House of Delegates) for the Natal schools. The researcher interviewed the two advisers independently. Both were generally satisfied with teachers under their control. Their teachers were equipped to handle the Industrial Arts subjects because of :-

a) sound advice they were disseminating to the teachers;
b) frequent workshops and orientation courses organized; and

c) articles and literature which are easily available on the subjects.

Both agreed that an increased number of pupils were now pursuing Industrial Arts subjects due to:-

a) the popularity of these subjects;
b) a change from academic to technical subjects;
c) a greater awareness by parents and pupils of the importance of technical subjects; and
d) the breaking down of prejudice against technical education.

They indicated that the improved matric results in respect of the technical subjects were due to the pupils' interest and the fact that the newly qualified teachers were better equipped and more familiar with the subject content.

To give the technical subjects momentum, the introduction of Technika (Electronics; Electricity; Civil and Mechanical) in 1987 is receiving their attention.

On the question of whether females should be exposed to the technical subjects, both advisers were in agreement that they should, with one adviser advancing the reason that females had an

important role to play as employees in a fast developing and highly technological world. To offset any shortage of teachers, orientation courses are conducted as an on-going process, and a two-year part time course for in-service teachers intending to specialise as Industrial Arts teachers would commence in 1987.

According to the advisers, the technical direction of study is relevant to the present day since it is not a pre-vocational course; it is a course that can help the pupil to become a balanced, happy individual. It could also help him in later life. Both advisers are confident that the popularity of technical subjects would continue to grow; that greater numbers of brighter pupils would be attracted with the introduction of Technika; and with a well-trained corps of properly qualified technical teachers, prejudice against technical education would gradually disappear and the community would view technical subjects just as any of the other subjects offered.

4.6 INFORMATION FROM INDUSTRIAL ARTS TEACHERS

4.6.1 ANALYSIS OF QUESTIONNAIRES TO 26 INDUSTRIAL ARTS TEACHERS AND THE FINDINGS

(REFER APPENDIX VI)

Here the researcher wanted to find out how the Industrial Arts teacher perceived his pupils, his own attitude to the technical subjects and the role of the parents in selecting direction of studies for their sons.

40 questionnaires addressed to Industrial Arts teachers in Natal, Transvaal and Cape Province were sent out. These teachers were in the same schools as those pupils canvassed in the earlier questionnaires (Refer to 4.3.1 on page 129).

65% (26) of the questionnaires were returned.

81% (21) of the teachers had studied no technical subjects themselves when they were in matric. 23% (6) of the teachers had specialised at a college of education with an equal number qualifying during in-service training, thereby highlighting the importance of such courses. 15% (4) of the teachers were graduates of a technikon. This probably has no direct attitudinal implication of teachers towards the technikon since these institutions have not offered teacher training courses for a number of years now. 50% (13) had elected to become teachers of technical subjects of their

own free will, while 15% (4) were influenced by teachers or parents. 69% (18) of the teachers felt confident and adequately equipped to teach Industrial Arts subjects. 38% (10) of the teachers perceived their charges as following Industrial Arts subjects because it was a means of getting away from the routine and formal bookwork of the class; 27% (7) said that their pupils loved to work with their hands; 23% (6) felt that it would hold them at an advantage in later careers and only one teacher advanced the view that his pupils were following a technical direction of study because they were less academically inclined. This suggests that the Industrial Arts teachers perceive their pupils as being equal to any others in the school. An interesting point that emerged from the analysis of the questionnaires was that 58% (15) of the teachers felt that their colleagues were prejudiced against the technical subject they were teaching.

When asked to respond to whether the guidance counsellor was "advertising" the technical subjects sufficiently prior to pupils choosing their direction of study, 12% (3) said yes, 35% (9) said no, with 53% (14) saying that they were not sure.

42%(11) of the teachers felt that parents were not prejudiced against their sons pursuing Indust-

rial Arts subjects, 27% (7) felt that parents were, and 31% (8) were not sure. On the question of whether the teacher thought that parents played a role in helping pupils choose their direction of study, 31% (8) said yes, the same number said no with 38% (10) saying that they were not sure. Teachers of technical subjects were satisfied teaching Industrial Arts subjects since 73% (19) indicated that, given the opportunity to "re-qualify" they would not change their specialisation direction, 15% (4) would, and 12% (3) were not sure.

4.6.2 ANALYSIS OF FINDINGS AFTER INTERVIEWING 32 INDUSTRIAL ARTS TEACHERS AT 19 SECONDARY SCHOOLS IN THE DURBAN AREA

(REFER APPENDIX VII)

Here the researcher wanted to ascertain the same kind of information as was done in 4.6.1 on page 148.

32 teachers of Industrial Arts were interviewed at 19 secondary schools. The schools were the same as those used in the interview with the pupils in 4.3.2 on page 133.

Of this number, 22% (7) of the teachers had studied either Woodworking, Metalworking or Technical Drawing when they were pupils themselves. It

was unusual to find that only 28% (9) of the teachers were Technical Drawing specialists, 44% (14) Woodworking specialists and 56% (18) Metalworking specialists. This implies that the teaching of Technical Drawing (which by far has the greatest following), is done either by the Woodworking or Metalworking specialist teachers. All the teachers felt that they were adequately equipped and competent to handle their Industrial Arts subjects. From their point of view, the pupils approached Industrial Arts with enthusiasm showing much interest. Amongst the reasons advanced by the teachers for their pupils choosing Industrial Arts subjects were :-

a) they have an urge to create (they are creative);
b) they have the aptitude for these subjects;
c) these subjects have a practical component; and
d) these subjects provide scope for later careers.

From the interviews, it became evident that there was a steady increase in the number of pupils opting to study Industrial Arts subjects. The implication of this will be discussed in the next chapter.

66% (21) of the teachers were in favour of teaching just one component of Industrial Arts,

(either Woodworking, Metalworking or Technical Drawing), the reasons being :-

a) they would be better equipped to handle the component;

b) there would be a higher degree of specialisation and hence the pupils would eventually benefit;

c) they would have more time to prepare in detail; and

d) they would exercise better control of stock and tools.

25% (8) of the teachers were in favour of teaching more than one component because :-

a) they would be more competent since they were in contact with all the sub-components of Industrial Arts; and

b) the components, since they were related, offered to them a smooth follow through making their teaching more meaningful.

These Industrial Arts teachers saw the guidance counsellor as having a positive influence on pupils taking Industrial Arts subjects since the career aspect of these subjects was emphasised. The teachers generally viewed parents as having a positive influence over their sons choosing Industrial Arts subjects. 59% (19) of the teachers were not satisfied with the scope of Industrial

Arts subjects in the presently offered subject sets. They wanted Woodworking and Metalworking to be offered with General Mathematics and Science. In this way, the Industrial Arts teachers would have a fair chance of attracting and teaching bright pupils as well. Teachers also wanted a wider choice of technical subjects than what is being offered. 75% (24) of the teachers said that given the chance to re-qualify, they would opt once again for Industrial Arts specialisation. According to these teachers, the status of Industrial Arts subjects would be enhanced (attracting more pupils as well as brighter pupils) if :

a) more teaching periods were allocated to the Industrial Arts subjects;

b) the teacher was free of a form class, since he had to organize and manage a workshop;

c) the teacher was used only in the teaching of technical subjects and not involved with other subjects;

d) there was greater awareness on the part of the parents about the benefits of technical subjects over academic ones;

e) the monetary allocation for the Industrial Arts subjects is increased so that bigger and more practical projects could be undertaken; and

f) there were demonstrations at schools by the different trades (for example architects; computer

programmers; plumbers; carpenters).

4.7 INFORMATION FROM INDUSTRIALISTS

4.7.1 ANALYSIS OF FINDINGS AFTER INTERVIEWING 3 INDUSTRIALISTS IN THE PHOENIX, PINETOWN AND MOBENI AREAS

(REFER APPENDIX VIII)

The researcher wanted to investigate the role of industries in the planning and provision of technical education in schools and how technicians and others in the technical field on qualifying were fitting into the industries.

The researcher interviewed management personnel from the Baking, Steel and Motor Industries, experiencing much difficulty though in trying to gain interview access since it was generally not company policy to grant interviews to outsiders. Where granted, the researcher found that industries were generally out of touch with the technical training offered at schools, with the result that they were either not prepared to commit themselves or answer questions and if they did, it was rather vaguely done. Because of the economic recession and the resultant retrenchment of workers, these companies were not experiencing a shortage of artisans or apprentices, who are in great supply at the present time. However, it

will be during the next economic upswing that industries will have problems finding trained technicians and other personnel.

Technical staff appointed for the first time fit in smoothly and "on the job" orientation ensures that the new employee is brought in line with others quickly. Staff at the supervisory level are given company time if they wish to upgrade their qualifications. All the industrialists interviewed felt that the education system of the country could be improved. One made a very significant statement when he said that South Africa was still undergoing an industrial revolution, and that our school system and educational outlook were well behind that of the giant industrial countries of the world. These industrialists had no objection to their children pursuing technical subjects at secondary level, advancing the reason that in a tight economy, the individual with formal technical training would be ahead of the student with a purely academic background. According to them, industries were generally not consulted by the Education Departments when technical subjects were being introduced at secondary school level. They felt, furthermore, that they had a meaningful role to play especially at the tertiary level.

Both the university and the technikon had a contribution to make in the development of our manpower needs and the technological advancement of the country as a whole. Industries needed both the practitioner from the technikon as well as the theoretician from the university. Lastly the industrialists were fully aware of the prejudice of students for the technikon, and felt that as the economy tightened, the change in the students' attitude would become evident and that they would be forced to enter the technikon in greater numbers.

4.8 INFORMATION FROM FACTORY EMPLOYEES

4.8.1 ANALYSIS OF FINDINGS AFTER INTERVIEWING A LAYMAN SAMPLE OF 10 INDIVIDUALS IN CHATSWORTH AND DURBAN (REFER APPENDIX IX)

The purpose of this interview was to perceive how the factory employee viewed the country's education; what he regarded as relevant education and what chances the matriculant had on the open labour market.

The researcher interviewed at random, a sample of 10 factory employees in Durban and Chatsworth.

90% (9) had some secondary schooling with 10% (1) having a matric certificate. 80% (8) were working

for a period of 5-12 years, with 40% (4) having been employed elsewhere before joining their present employer. The workers were uncertain about whether they were satisfied with their vocation.

Amongst their grievances were :-

a) hard work for a low salary/wage return; and
b) poor working conditions with hardly any fringe benefits.

They felt that Industrial Arts subjects were important to the pupils, listing the reason that it could help them in later careers or even in self employment.

Not one in the sample had studied any Industrial Arts subjects himself. They expressed concern for the thousands of matriculants who would complete their schooling at the end of 1986. It seems that the sample spoken to were aware of the limited job opportunities available and hence offered the following advice to those entering the labour market :-

a) do not be over-selective;
b) take any job that the applicant can land;
c) be prepared to work very hard and to start at the lowest level; and

d) part-time studies could accelerate upward mobility in the working environment.

4.9 CONCLUDING REMARKS

The following broad conclusions can be drawn:

a) there can be no doubt about the socio-economic importance of technical education for the South African Indians in the 1980's; the pupils as well as their parents are viewing the technical direction of study more positively and prejudice is being broken down;

b) the steady growth of pupils taking Industrial Arts subjects indicates the popularity of these subjects; the pupils see these subjects as relevant;

c) the Department of Education and Culture (House of Delegates) is building technical colleges and secondary technical schools to cater for the increased number of pupils/students for the technical direction of study;

d) the Subject Advisers together with the Planning Section will soon be introducing Technika so that pupils will be offered a wider subject choice; and

e) the pupils' choice of a tertiary institution is changing; more pupils, realising how difficult it is to gain entry at a university, now view the technikon more positively and would like to study there, thereby qualifying for positions in the technical field.

Recommendations based on the findings are discussed in the next chapter.

CHAPTER 5

5. CONCLUSIONS AND RECOMMENDATIONS

Having analysed the questionnaires and interviews, the researcher arrived at certain conclusions in respect of the investigation viz. the socio-economic importance of technical education for South African Indians; and on the basis of his findings, certain recommendations were made.

5.1 CONCLUSIONS AND RECOMMENDATIONS IN RESPECT OF:

5.1.1 Parents and the socio-economic importance of Technical Education

One of the most significant findings of the research was the rather ironic acceptance of technical education by the Indian community for the very reason they had initially rejected it. (Refer 1.4 on page 30). When Industrial Arts subjects were initially introduced into the schools, the economic climate was sound, matriculants were easily gaining access to universities or to fairly well paid jobs and the technikon was generally shunned as an inferior institution. The parents, at that time, wanted their sons to study academic subjects so that they could eventually go to the university, qualify and earn well. Economically, academic subjects ensured job opportunities and the good life. Socially it gave the pupil status. Technical subjects

were generally frowned upon. However, with the current economic downswing, parents are encouraging their sons to take technical subjects for the same reason they encouraged them to follow academic subjects in the earlier years. 80% of the parent sample would not object to their sons being apprenticed. (Refer 4.4.1 on page 142). 88% of the Natal parents interviewed preferred the Technikon to the university. (Refer 4.4.2 on page 144). The researcher also found an appreciable number of Indian female pupils taking Woodworking and Metalworking subjects at secondary level. This indicates a greater enlightenment on the part of the parent and his ready acceptance of the technical subjects. To conclude, the researcher's main findings in respect of Indian parents are summarised:

a) parents attach much importance, both social and economic, to technical education;

b) the parent's past prejudice was fast disappearing - the researcher found a very positive attitude among parents towards technical education.

c) parents are encouraging their sons and even their daughters to pursue technical subjects at school since the subject has career potential.

The researcher recommends that parents continue

to look at subjects, especially Industrial Arts objectively. That since the recession is likely to continue into the 1990's, and since the technical subjects can be perceived as a "type of pre-apprenticeship training", that they continue to encourage even their bright "academic children" to follow the technical direction of study. To date Indian parents have been passive and have accepted "in toto" curriculum designed for the schools. It is the fervent hope and the researcher's strong recommendation that the parents take a more active part in the school's education committee and through this body request for the implementation of further technical subjects like bricklaying, carpentry, motor-mechanics, panel beating and spray painting.

5.1.2 Pupils and Technical Education

The researcher's most important finding in respect of the pupil's was the growing awareness among them for relevant education. At no other time, were pupils so conscious of the subjects they chose and the career potential of subjects as they are now. Pupils spoken to were fully aware of the recession and the almost complete lack of job opportunity. (Refer 4.3.1 on page 132). The researcher found that pupils who had selected to follow the technical direction of study had done so because they had vocations and careers in mind. They were

contemplating to become technicians and artisans and generally had the technikons as their first choice of a tertiary institution. (Refer 4.3.1 on page 132). The researcher also found that students who had not taken Industrial Arts (either because of prejudice or they did not prefer the subject) were now aware of the subjects importanc and relevance. (Refer 4.3.1 on page 132). The main findings can be summarised thus:-

a) pupils have a positive attitude towards technical subjects offered at schools. The prejudice of yester-year was fast disappearing. If asked to choose again, 80% of the sample would not change their Industrial Arts subjects. (Refer 4.3.2 on page 135).

b) from an economic viewpoint, the technical subjects offered hope for employment prospects. The pupil could perhaps become an apprentice and hence be absorbed into the working world.

c) pupils pursuing technical subjects had careers in mind. Many were aspiring to become engineers artisans or technicians.

d) although parents viewed the technical subjects favourably, the researcher found that pupils in many cases were independent and chose Industrial Arts on their own.

The researcher recommends that:

a) pupils continue to select technical subjects;

b) pupils devote greater study time especially during the examination period to technical subjects;

c) pupils get together and form "technical subject" clubs or societies, to foster awareness and exchange ideas, first within their own schools and then gradually moving to schools of the other race groups;

d) lastly, that pupils, having matriculated, should not hesitate to continue with tertiary technical training at the technikon.

5.1.3 The Industrial Arts Curriculum

The researcher found that the presently offered Industrial Arts subjects were well estabalished in Indian schools. He also found that there was a steady increase in the number of pupils selecting Industrial Arts subjects for the important reason that these subjects were relevant and useful to future careers. However the technical curriculum needs to be updated regularly if South Africa wishes to remain competitive in world markets. More differentiation is necessary so that the content and standard of the different courses suit the

interests, aptitudes and abilities of the pupil and the needs of commerce, industry and society. More provision should be made for academic and practical pupils. In this respect, the researcher recommends that the plea of teachers to have Industrial Arts offered with General Mathematics and Science be heeded and implemented. The researcher also recommends that curriculum designers offer a wider choice of subjects to that which is presently offered. Subjects like Radio and Television Construction, Electronics, Electrical Work and Technica Mechanical and Civil would attract more pupils.

Curriculum designers should also work closely with Industries so that subject content could be appropriate and fitting to what the pupil may come up against in the working environment.

Curriculum designers should also work closely with Industrial Arts teachers. Since these teachers are directly involved in the subject matter, they would be in a sound position to proffer advice. Hence it would be advisable if curriculum designers meet the teachers of technical subjects at least once a year.

Lastly the researcher feels that curriculum designers should promote the technical subjects and the technikon through the different media. In this way, prejudice would disappear, there would be greater

awareness and more brighter pupils would want to pursue this line of study.

5.1.4 Teachers of Technical Subjects especially Industrial Arts

The researcher found that teachers of Industrial Arts viewed their subject with much respect and were fully aware of its career potential. (Refer 4.6.2 on page 150). According to these teachers, the subject had socio-economic importance and relevance for the pupil. Because of the career aspect, Industrial Arts teachers stated that there was a steady increase in the number of pupils now choosing their subject. (Refer 4.6.2 on page 151).

However the researcher found that Industrial Arts teachers were not happy with the scope of the technical subjects in the presently offered subject sets. (Refer 4.6.2 on page 152). The teachers were clear on the point that pupils' parents were not prejudiced against their sons pursuing Industrial Arts subjects. (Refer 4.6.2 on page 152)

The researcher recommends that :

a) Planners and curriculum designers pay heed to the request of Industrial Arts teachers and give the technical subjects greater scope in the presently offered subject sets. Woodworking and Metalworking should be offered with General Mathematics and Science. In

this way, the brighter pupils would be attracted to the technical field of study;

b) Industrial Arts teachers were freed of a form class since they had workshops to manage;

c) Industrial Arts teachers have a greater say in the designing of the curriculum and the subject content to be taught;

d) these teachers should be called to teach just one component of Industrial Arts so that they could display a higher degree of specialisation and professionalism in that particular field.

5.1.5 Subject Advisers of Technical Subjects

The researcher found that the subject advisers of the technical subjects in Natal were generally satisfied with the teachers under their control. (Refer 4.5.1 on page 145). According to the advisers, greater number of pupils now take Industrial Arts because of lesser prejudice and a greater awareness by parents and pupils of the importance of these subjects. (Refer 4.5.1 on page 146).

The researcher makes the following recommendations in respect of the subject advisers:

a) they continue with regular orientation courses and in-service training as an on-going process to assist teachers of technical subjects;

b) that they pay heed to the request of Industrial Arts teachers to be allowed to teach just one component of the technical subject so that they could display greater professionalism in the execution of their duty. (Refer 4.6.2 on page 152);

c) they encourage females to pursue the technical subjects - they could achieve this, if on their visits to schools they talk to the female pupils about the relevance of the subject and their future role in a fast developing technological world;

d) that since the popularity of the subject was growing, they introduce Technica, - Civil, Mechanical, Electrical and Electronics at all schools as a matter of urgency. Such subjects are bound to attract the brighter pupils; for the average and weaker pupils, subjects like bricklaying, cabinet making and plumbing could be offered;

e) that the subject advisers pursue vigorously the request of teachers and pupils to get the technical subjects combined with General Mathematics and Science in the presently offered subject sets;

f) that they devise ways and means of improving and raising the standard of the subject at the senior primary level, especially of Basic Techniques - (standard 5).

5.1.6 Planners of Technical Subjects

The information from the Planning Section, reveals that there is presently a great awareness on their part of the importance of technical education. Their building programme ensures that there is adequate provision for workshops (Industrial Arts Centres) at all state secondary schools under their control (Refer 4.2.1 on page 124). They have also ensured the ready supply of well qualified Industrial Arts teachers to teach the subject. The Workshops are fully fitted with machine and hand tools such as circular saws, scroll saws, band saws, power hacksaws, drilling machines, jointers, wood and metal turning lathes, rolling machines, guillotines, box and pan folding machines, gas and arc welding equipment and drawing tables. (Refer 3.3.11.3 on page 111). Besides the 121 ordinary secondary schools which have Industrial Arts Centres (Refer 4.2.1 on page 124) the Planners have four technical high schools under their control (Refer 3.3.10.1 on page 103).

The researcher recommends that:

a) the Planners devote more attention to technical education at the primary school level. Ideally all primary schools should be fitted out with a "mini" workshop with sufficient tools and workbenches. This would act as an incentive for the primary school pupil to follow up and pursue technical education at the secondary level;

b) the Planners update facilities and the range of tools in the Industrial Arts Workshops on a regular basis;

c) the Planners add more subjects to the presently offered Industrial Arts Courses. Subjects like Technica (Civil; Mechanical; Electrical and Electronics); Bricklaying; Carpentry; Cabinet Making and Plumbing are some of the possibilities;

d) the Planners alter the placing of the technical subjects so that Woodworking and Metalworking are offered with General Mathematics and Science;

e) the Planners make provision for the building of more secondary technical schools and Pre-Vocational Schools;

f) finally the Planners should not reduce the budget for technical education despite the economic downturn but they should set aside

more money progressively each year so that technical education which had been neglected in the past, can take its rightful place in the education system.

5.1.7 M.L. Sultan Technikon and Technical Education

The researcher found a distinct appreciation by the Indian community of the M.L. Sultan Technikon. The institution has gained much respect in the eyes of the pupils and the parents. The majority of the pupils have no hesitation in wanting to pursue their tertiary education at M.L. Sultan Technikon (Refer 4.3.1 on page 132). Even the parents had no objection to their sons following a technical direction of study at a technikon. (Refer 4.4.1 on page 142). Although more students were graduating from the M.L. Sultan Technikon (Refer 3.3.7 on page 95). the researcher makes the following recommendations:

a) the campus lay-out should be improved and made more attractive;

b) hostel accommodation should as far as possible be attached to the campus building - at present the hostel accommodation for the M.L. Sultan Technikon is about 6 kilometres away;

c) better recreational facilities are created for staff and students - the M.L. Sultan Tech-

nikon needs, for example, a modern sports complex, swimming pool and an outdoor sports field and finally,

d) more specialised courses should be offered; the approach should be from the concrete to the abstract; the concentric method should be employed so that students who fail may have some benefit from their studies.

5.1.8 The University and Technical Education

Universities have thus far played a minimal role in the advancement of tertiary education. The University of Durban-Westville, for example, should give serious consideration to offering a degree course for Industrial Arts teachers. Industrial Arts teachers feel that their colleagues are prejudiced against the subject they teach. (Refer 4.6.1 on page 149). If they hold a degree, they would certainly command greater respect from their colleagues.

The researcher recommends that the University implement, as a matter of urgency, technical courses leading to a degree in Industrial Arts. The following courses could be offered:

Technical Drawing

Technica - Civil

" - Mechanical

Technica - Electrical

" - Electronics

Advanced Woodworking and

Advanced Metalworking.

The University should work closely with the Technikon thereby supplementing and complimenting each other. There should be cross-crediting between the university and the technikon with maximim application of the exemption system.

5.2 CONCLUSION

The research has shown without doubt that the Indian community view the technical direction of study positively. The fact that technical education is socio-economically important to the Indian community can be borne out by the statistical data the researcher received from the Planning Section (Refer 4.2.2 on page 125) which clearly show that increased number of pupils now study technical subjects.

However, on a national level, there is still need for an awareness campaign to enlighten the people of South Africa about the importance of technical education. One factor that is impeding the recovery of our economy is the intellectual snobbery South Africans have for technical education and the technikon. Statistics show that two out of three young White South Africans are at University

while in countries like Japan, Korea and Taiwan, the world's fastest-growing economies, the reverse is true. We could certainly take our cue from these countries and ensure that the South African youngster is given greater technical exposure.

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SUMMARY

The researcher was primarily concerned with the socio-economic importance of technical education for the South African Indians in the 1980's. His interest was aroused because of the outlook of pupils and parents towards technical education in the 1970's when the system of differentiated education saw the introduction of Industrial Arts in the school curriculum. Indian secondary schools were equipped with modern workshops and supervised by qualified teachers. However, too few pupils elected to study Industrial Arts subjects then. A preliminary investigation by the researcher at that stage revealed that parents were generally not encouraging their sons to pursue technical subjects at all. The general feeling among Indian parents was that Industrial Arts subjects were devoid of intellectual value, that these subjects were inferior and suitable only for the delinquent, the lazy and the retarded - certainly not for their children. The technikon was frowned upon as a tertiary institution. In short, parents and pupils were far too academically orientated and regarded technical education and vocational training as second rate and inferior.

However, several factors gradually brought a change in the attitude of the community towards this type of education. The economic recession, the almost complete lack of job opportunities, and the difficulty of the student securing a place at the university, (tightening entrance requirements) meant that both parents and pupils were re-examining subjects critically. Presently, greater numbers of pupils are selecting Industrial Arts subjects. Even the Indian female pupils are now studying Woodworking and Metalworking. Economically, the technical subjects can pave the way to many careers.

Socially, the pupil who studies technical subjects, has no fear of being looked down upon since the outlook of the community has changed. Parents in the higher income group, for example, those living in Reservoir Hills, had similar expectations for their sons as those parents from the lower income group living in areas such as Phoenix, Chatsworth or Merebank. The status of the technical subjects had been improved in the eyes of the community, due mainly to the tight economic situation.

An accelerated and diversified expansion programme has been embarked upon by the Planning Section of the Department of Education and Culture (House of Delegates) to accommodate the rise in pupil numbers in the technical field. Four technical colleges and a secondary technical school are in operation presently, with more being planned. The Planners are aware that the school system must provide both knowledge and skill components and they have realised that for too long the system over-emphasised the knowledge component because the major purpose of schooling was to direct the pupil towards the university. Very little attention was given towards satisfying the needs of industry and commerce. The pupil, as he develops, must have a basic understanding of the electrical, mechanical

and electronic equipment with which he is surrounded. He should possess the skill to operate such equipment and carry out elementary maintenance. This could be achieved with the introduction of the subject Technika which would be offered in addition to Industrial Arts subjects.

The researcher trusts that the relevant authorities will continue with their expansion programme in respect of technical education and that it will not be subjected to a reduction in the budgetting of funds since the future of many pupils depends on technical education.

APPENDIX I

RESEARCH WITH THE UNIVERSITY OF DURBAN WESTVILLE

QUESTIONS ADDRESSED TO THE PLANNING SECTION OF THE DEPARTMENT OF EDUCATION AND CULTURE (HOUSE OF DELEGATES)

1. How many secondary schools does the Department have under its control?
2. What is the total secondary school population?
3. What is the male secondary school population?
4. Are Industrial Arts centres provided for in every secondary school?
5. If not, how many schools are without Industrial Arts centres?
6. Are there plans to provide these schools with Industrial Arts facilities and how soon will this be accomplished?
7. Are there cases where schools have Industrial Arts centres and these are not being used ? If yes, why is this so?
8. How many female pupils are studying Industrial Arts subjects (Woodworking, Metalworking and Technical Drawing)?
9. Besides Woodworking, Metalworking and Technical Drawing, are there any other technical subject/s being taught at secondary schools? If yes, name it/them.
10. Are there any other type/s of schools offering technical courses administered by the Department? If yes, name it/them.
11. Supply the following statistics for the years 1980/1983/1986 in respect of Standard 7 and Standard 10 male pupils studying Technical Drawing, Woodworking and Metalworking on both grades.

		STANDARD 7				STANDARD 10				
	TOTAL POP.	NO.OF, MALES	NUMBER DOING			TOTAL POP.	NO. OF MALES	NUMBER DOING		
			T.D.	W.	M.			T.D.	W.	M.
1980										
1983										
1986										

APPENDIX I CONTINUED

12. Complete the following table in respect of secondary schools - females studying Technical Drawing, Woodworking and Metalworking for 1983 and 1986 on both grades.

	NUMBER OF FEMALES DOING		
	T.D.	W.	M.
1983			
1986			

13. Supply the Standard 10 results of both grades for 1981/1983/1985 in respect of Indian pupils:

	STANDARD 10 RESULTS - BOTH GRADES									
	WOODWORKING		METALWORKING		TECHNICAL DRAWING		SCIENCE		GENERAL MATHEMATICS	
	E	P	E	P	E	P	E	P	E	P
1981										
1983										
1985										

* E = ENTERED P = PASSED

14. How many qualified Industrial Arts teachers are teaching the technical subjects?

15. How many females are qualified to teach the Industrial Arts subjects?

APPENDIX I CONTINUED

16. Complete the table showing the number of teacher trainees at Springfield College pursuing Industrial Arts specialisation in 1986.

	YEAR OF STUDY	MALE STUDENTS	FEMALE	TOTAL
1st				
2nd				
3rd				
4th				

17. What is a pre-vocational school?
18. How many does the Department have under its control?
19. Are there plans to build more such schools?
20. Broadly what subjects are taught at these schools?
21. Where do these schools draw its pupils from?
22. What criterion is used to select pupils for the pre-vocational school?
23. Which category of pupils does the pre-vocational school cater for:-

    above average / average / below average?
24. Does the Department consult industries before introducing technical courses?
25. My visits to schools indicate that there has been an increase in the number of pupils taking technical subjects. What would you attribute this to?
26. Do you plan to add any further technical subjects to the curriculum? If yes, what do you have planned?
27. Technical Education can be safely regarded as the education of tomorrow. What is the Department doing to ensure its schools are not found lagging behind those of other education departments in the country?
28. Are there any Trade Schools administered by the Department?
29. Are there any Agricultural Colleges/Schools administered by the Department?
30. If the answers are in the affirmative, please elaborate.

APPENDIX II

RESEARCH QUESTIONNAIRE TO MALE PUPILS AT SECONDARY SCHOOLS

SHOW BY MEANS OF A CROSS IN THE APPROPRIATE SQUARE BELOW, WHICH OF THE FOLLOWING APPLY TO YOU

1. I am presently in:-

1.1	Standard Seven	☐
1.2	Standard Ten	☐

2. My father is:-

2.1	Employed as a labourer	☐
2.2	Employed as an apprentice/artisan	☐
2.3	A professional (Example: Doctor/Teacher)	☐
2.4	Self employed (Own business)	☐
2.5	Employed in a field other than the ones listed	☐
2.6	Unemployed	☐
2.7	Retired	☐
2.8	Deceased	☐

3. My father's highest level of education is:-

3.1	Below Standard Six	☐
3.2	Standard Six	☐
3.3	Standard Seven	☐
3.4	Standard Eight	☐
3.5	Standard Nine	☐
3.6	Standard Ten (Matriculation)	☐
3.7	University Degree	☐
3.8	College of Education Diploma	☐
3.9	Technikon/Technical College Diploma	☐
3.10	Any other Institution (Example: Agricultural College)	☐

4. At present my father fills a position in the:-

4.1	Technical field (Example: T.V.Technician)	☐
4.2	Commercial field (Example: Salesman/Accountant)	☐
4.3	Human Sciences field (Example: Doctor/Teacher)	☐
4.4	Physical Science field (Example: Laboratory Technician)	☐
4.5	Fine Arts field (Example: Artist/Painter)	☐
4.6	Home Economics field (Example: Catering)	☐
4.7	Agricultural field (Example: Farming)	☐
4.8	Any other field not listed above	☐
4.9	Not applicable - father deceased	☐

APPENDIX II CONTINUED

5. My school:-

5.1 Offers Technical Education/subjects ☐
5.2 Does not offer Technical Education/subjects ☐

6. I take the majority of my school subjects (half and more) on the:-

6.1 Higher Grade ☐
6.2 Standard Grade ☐

7. My present or planned school field of study is:-

7.1 Technical ☐
7.2 Commercial ☐
7.3 Humanities ☐
7.4 Natural Sciences ☐
7.5 Fine Arts ☐
7.6 Home Economics ☐
7.7 General ☐
7.8 Other field than the ones listed above ☐

* 8. My school offers:-

8.1 Woodworking ☐
8.2 Metalworking ☐
8.3 Technical Drawing ☐
8.4 Electrical Work ☐
8.5 Motor Mechanics ☐
8.6 Panel Beating ☐
8.7 Spray Painting ☐
8.8 Other ☐
8.9 No Technical subjects at all ☐

* 9. I am studying:-

9.1 Woodworking ☐
9.2 Metalworking ☐
9.3 Technical Drawing ☐
9.4 Technical subject(s) other than those listed ☐
9.5 No Technical subject(s) at all ☐

10. My best Technical Subject is:-

10.1 Woodworking ☐
10.2 Metalworking ☐
10.3 Technical Drawing ☐
10.4 Other ☐
10.5 Not applicable because I do not take Technical subjects ☐

* More than one cross is permitted

APPENDIX II CONTINUED

11. What is your opinion about the amount of theory in Technical Subjects?

11.1 Too much
11.2 Just right
11.3 Too little
11.4 Not applicable because I do not take Technical Subjects

12. Do you think that there is a need for theory in Technical Education?

12.1 Yes
12.2 No
12.3 Not sure
12.4 Not applicable because I do not take Technical Subjects

13. I am studying/intend to study Technical Subjects because:-

13.1 My teacher/counsellor advised me
13.2 It is my parent's choice
13.3 My parents took a similar course
13.4 Of my own choice
13.5 I had no other option
13.6 Of reason(s) other than the ones listed above
13.7 Not applicable because I do not take Technical Subjects

14. If you are not going to be an artisan, which would be your main reason?

14.1 The status of an artisan is too low
14.2 Artisans should come from other national groups
14.3 The work of an artisan is too demanding
14.4 An artisan does not earn enough money
14.5 The scope for promotion is limited
14.6 Reason(s),other than the ones stated above

15. After matriculating, I would like to proceed to:-

15.1 University
15.2 College of Education
15.3 Technikon/Technical College
15.4 Any other type of Institution
15.5 Not applicable

16. My future career would possibly be in the:

16.1 Technical field (Example: T.V. Technician)
16.2 Commercial field (Example: Salesman)
16.3 The Science field (Example: Doctor)
16.4 Other

APPENDIX III

INTERVIEW SCHEDULE FOR SECONDARY SCHOOL PUPILS

TO ALL INTERVIEWEES

1. What is your direction of study?
2. Are you happy with it or do your regret it? Why?
3. What prompted you to choose that direction?
4. Who helped you in making this choice?
5. What is your father doing presently?
6. If deceased, what was his last known occupation?
7. What is your mother doing presently?
8. If she is deceased, and if she was employed, what was her last known occupation?
9. What is/was your father's highest level of education?
10. What is/was your mother's highest level of education?
11. Do they have a good knowledge of the subjects offered and direction of studies at your school?
12. Have they met and spoken to the guidance counsellor?
13. Have they spoken to you about your future career?
14. Would they dictate a career to you?
15. What do you plan to do after matriculating?
16. Which tertiary institution do you have in mind?
17. Presently all tertiary institutions are tightening their entrance requirements, resulting in many students being turned down. What are you doing to secure a place?
18. If you had to choose between a university and technikon, which institution would you go for?
19. Why?
20. Would you object to being apprenticed?
21. Would your parents object?
22. Do you feel insecure about the future in respect of a job or career?
23. Why?

APPENDIX III CONTINUED

TO INDUSTRIAL ARTS PUPILS ONLY

1. Which of the Industrial Arts subjects do you take?
2. Do you enjoy it/them?
3. Why?
4. If you had the option to choose again, would you change your subjects? Why?
5. Is there a lot of theory involved in technical subjects?
6. Is there a need for theory in Industrial Arts? Why?
7. Why have you decided to select Industrial Arts subject(s) in your direction of study?

TO NON TECHNICAL PUPILS ONLY

1. Do you agree with the statement that, "weaker pupils take Industrial Arts subject(s)"?
2. Substantiate your answer
3. Do you agree with the statement that the university student has greater vocational scope than the student from the technikon after graduating?
4. Substantiate your answer
5. From your observation, do teachers generally frown (look down/ criticise/belittle) on your colleagues who take/study Industrial Arts?
6. Substantiate your answer
7. If you had the opportunity to choose subjects again, would you include any technical subject?
8. Do you think that the Industrial Arts pupil would be better off than you after matriculating?
9. Substantiate your answer

APPENDIX IV

QUESTIONNAIRE TO PARENTS

SHOW BY MEANS OF A CROSS (X) IN THE APPROPRIATE SQUARE BELOW, WHICH OF THE FOLLOWING VIEWS OR OPINIONS IS APPLICABLE TO YOU

1. My sex is:-

1.1	Male	☐
1.2	Female	☐

2. My home language is:-

2.1	English	☐
2.2	Hindi	☐
2.3	Tamil	☐
2.4	Urdu	☐
2.5	Afrikaans	☐
2.6	Other	☐

3. My highest level of education is:-

3.1	Below Standard Six	☐
3.2	Standard Six to Nine	☐
3.3	Matriculation	☐
3.4	College Diploma	☐
3.5	Technikon/Technical College Diploma	☐
3.6	No formal education at all	☐

4. At present I am:-

4.1	Employed full-time	☐
4.2	Employed part-time	☐
4.3	Unemployed	☐
4.4	Collecting a grant	☐
4.5	Retired	☐

5. I have son/s in:-

5.1	Standard Seven	☐
5.2	Standard Ten	☐

6. I am employed as:-

6.1	A labourer	☐
6.2	An artisan	☐
6.3	An apprentice	☐
6.4	A professional	☐
6.5	Self employed	☐
6.6	Other than the ones listed above	☐

APPENDIX IV CONTINUED

7. I fill a position in the:-

- 7.1 Technical field
- 7.2 Commercial field
- 7.3 Human Sciences field
- 7.4 Physical Science field
- 7.5 Fine Arts field
- 7.6 Home Economics field
- 7.7 Agricultural field
- 7.8 Not one of the above

8. My son/s follow/s courses at school of which I:-

- 8.1 Have a full understanding
- 8.2 Hardly know anything about

9. My son/s choice, in so far as his/their present direction of studies is/are concerned was made by:-

- 9.1 Him/them (by your son himself)
- 9.2 Subject teacher
- 9.3 Guidance teacher
- 9.4 Family and friends
- 9.5 Persons other than the ones listed above

10. Is your son/s studying any Industrial Arts subjects (Industrial Arts subjects presently offered are Woodworking, Metalworking, Technical Drawing):-

- 10.1 Yes
- 10.2 No

11. If your son/s follow Industrial Arts at school, you feel:-

- 11.1 Happy and at ease because it's a good choice
- 11.2 Unhappy since you would have preferred to see him take academic subjects
- 11.3 Not sure
- 11.4 Not applicable

12. Have you made a career choice for your son?:-

- 12.1 Yes
- 12.2 No
- 12.3 My son will decide a career for himself

APPENDIX IV CONTINUED

13. Would you like your son/s on matriculating to proceed to:-

13.1 University
13.2 College of Education
13.3 Technikon
13.4 Any other institution for tertiary education
13.5 Enter the job market (start working)

14. If your son/s was/were to obtain a matriculation exemption, would you object to him pursuing a technical direction of study at a technikon/technical college?:-

14.1 Yes
14.2 No
14.3 Not sure

15. Would you want your son/s eventually to be:-

15.1 A teacher
15.2 In the medical field
15.3 A lawyer
15.4 A telephone technician/T.V. technician
15.5 An engineer / an architect / computer operator
15.6 An apprentice / artisan
15.7 Other than the ones listed above (State what? .....)

16. Would you object to your son being apprenticed after matriculating?:-

16.1 Yes
16.2 No
16.3 Not sure

17. I would not like my son/s to become artisans because:- (one X only)

17.1 The status of an artisan is too low
17.2 Artisans should come from other national groups
17.3 The work of an artisan is too demanding
17.4 An artisan does not earn enough money
17.5 The scope for promotion is limited
17.6 No objection to my son being apprenticed/being an artisan

18. Would you be dependent on your son, financially once he begins working?:-

18.1 Yes
18.2 No
18.3 Partly
18.4 Not sure

APPENDIX V

RESEARCH WITH THE UNIVERSITY OF DURBAN-WESTVILLE

INTERVIEW SCHEDULE FOR INDUSTRIAL ARTS SUBJECT ADVISERS - DEPARTMENT OF EDUCATION AND CULTURE - HOUSE OF DELEGATES

1. In which year did you matriculate?
2. Did you study any technical subject at high school? If yes, state the subject/s. Who influenced you with such a choice?
3. Which tertiary institution/s did you attend after matriculating?
4. Which subject/s did you specialise to teach?
5. For how many years have you been teaching at:-
   a) primary level?
   b) secondary level?
   c) tertiary level?
6. Have you served Industries/Commerce before joining the teaching profession? If yes, for how long and in which field?
7. Are more pupils opting for Industrial Arts subjects now than before? If this is so, what would be the approximate percentage increase?
8. If there has been an increase, what would you attribute this to?
9. Has there been a distinct improvement in the matric results of pupils pursuing Industrial Arts subjects over the years? If there has, what would you attribute this to?
10. Are you satisfied with the way in which Industrial Arts subjects are grouped and offered to the pupil at the end of standard seven?
11. If not, what changes would you like to see so that the Industrial Arts subjects can be given wider scope and acceptance?
12. Are you contemplating to add any new subjects as additions to what is already offered in the Industrial Arts course? If yes, elaborate.
13. If you had to introduce a new technical subject, would you do it in consultation with business organization and industries and then make your recommendation to the Planners?
14. Do you liaise with business and industries to test the effect of technical training at secondary level? What are their views on the quality of our Industrial Arts pupils?
15. How many girls are doing Basic Techniques at the primary level?
16. Are there many females engaged in Industrial Arts at the secondary level?
17. Should girls be exposed to Industrial Arts? Motivate your response.
18. Are your teachers better equipped to handle your subjects now? If yes, what can you attribute this to?
19. Are all teachers of Industrial Arts certificated specialists?

APPENDIX V CONTINUED

20. If not, why is this so?

21. Are there teachers with Industrial Arts specialisation not teaching the subject? If yes, why is this so?

22. What are your future plans in respect of re-training and orientation courses?

23. Is there a shortage of Industrial Arts teachers? If yes, how are you coping and what are you doing to remedy the situation?

24. In your daily inspection of teachers, what is your cause of greatest concern?

25. What can you say about the standard of teaching of Industrial Arts teachers at your schools?

26. Do Industrial Arts teachers enjoy similar prospects for promotions as their colleagues?

27. Why would you consider Industrial Arts as relevant education in today's context?

28. Half of the Indian matriculants (+/- 5000) who passed last year (1985) are without any future. Has the education system failed, or has the system educated for unemployment? In view of this, how do you forsee the future role of technical education in South Africa in the latter 1980's?

APPENDIX VI

RESEARCH QUESTIONNAIRE TO INDUSTRIAL ARTS TEACHERS

SHOW BY MEANS OF A CROSS IN THE APPROPRIATE SQUARE BELOW, WHICH OF THE FOLLOWING APPLY TO YOU.

1. I matriculated in the:-

   1.1 1960's
   1.2 1970's
   1.3 1980's
   1.4 Before 1960

2. Did you at the matriculation level offer (study) technical subject(s)?

   2.1 Yes
   2.2 No

3. If your answer to number 2 above was yes, state the subject(s)

   3.1 .....
   3.2 .....
   3.3 .....

4. I received my tertiary education at a:-

   4.1 college of education
   4.2 university
   4.3 technikon/technical college
   4.4 institution other than the ones listed above

5. My Industrial Arts specialisation was done at:-

   5.1 college of education
   5.2 university
   5.3 technikon/technical college
   5.4 institution other than the ones listed above
   5.5 inservice training
   5.6 not applicable because I am not an Industrial Arts teacher but I am teaching the subject

6. My field of specialisation enables me to teach:-

   6.1 Languages
   6.2 Sciences
   6.3 Technical Subjects
   6.4 Subject(s)/field(s) other than the ones listed (more than one cross can be placed for this question)

APPENDIX VI CONTINUED

7. If you are an Industrial Arts specialist teacher, who would you say influenced you most in your choice?:-

   7.1 Parent(s) ☐
   7.2 Teacher(s) ☐
   7.3 Counsellor(s) ☐
   7.4 Family/Friends ☐
   7.5 Your own decision ☐
   7.6 Persons other than the ones listed above ☐
   7.7 Not applicable because I am not a specialist ☐

8. As an Industrial Arts specialist teacher, do you feel adequately equipped to teach the subject?

   8.1 Yes ☐
   8.2 No ☐
   8.3 Not sure ☐
   8.4 Not applicable because I am not a specialist ☐

9. Do the majority of pupils (50% and over) approach Industrial Arts with:-

   9.1 Much enthusiasm ☐
   9.2 Little enthusiasm ☐
   9.3 No enthusiasm ☐

10. Which would you say applies most to your Industrial Arts pupils:- "They follow Industrial Arts course because ...."

   10.1 It gives them greater vocational scope for later careers ☐
   10.2 They love to work with their hands ☐
   10.3 It gets them away from the routine and formal bookwork in the class ☐
   10.4 They are less academically inclined ☐

11. Is there need for theory in Technical Education?

   11.1 Yes ☐
   11.2 No ☐
   11.3 Not sure ☐

12. What can you say about theory in Technical Education?

   12.1 Too much theory ☐
   12.2 Just the right amount ☐
   12.3 Too little theory ☐

13. Is there prejudice against the technical subjects you teach from your colleagues?

   13.1 Yes ☐
   13.2 No ☐
   13.3 Not sure ☐

APPENDIX VI CONTINUED

14. The Technical subject I enjoy teaching best is:-

    14.1 Woodworking
    14.2 Metalworking
    14.3 Technical Drawing
    14.4 Other

15. The Technical subject I am not at ease with is:-

    15.1 Woodworking
    15.2 Metalworking
    15.3 Technical Drawing
    15.4 Other

16. Is the Guidance Counsellor "advertising" the Technical subjects sufficiently prior to pupils choosing their direction of study?

    16.1 Yes
    16.2 No
    16.3 Not sure

17. Do you think parents play a role in helping pupils choose their direction of study?

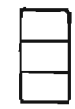
    17.1 Yes
    17.2 No
    17.3 Not sure

18. Do you think that parents are prejudiced against their sons pursuing Industrial Arts subjects?

    18.1 Yes
    18.2 No
    18.3 Not sure

19. If you had the opportunity to "re-qualify", would you choose to specialise in Industrial Arts?

    19.1 Most definitely
    19.2 Certainly not
    19.3 Not sure



APPENDIX VII

INTERVIEW SCHEDULE FOR INDUSTRIAL ARTS TEACHERS

1. In which year did you matriculate?
2. Did you study any Industrial Arts subject(s) at secondary school? If yes, state the subjects
3. At which tertiary institution did you specialise?
4. Which is your special Industrial Arts subject?
5. For how many completed years have you been teaching?
6. Have you been teaching Industrial Arts all the time? If not, why?
7. If you are not a trained Industrial Arts teacher, why are you teaching the subject?
8. As an Industrial Arts specialist, do you feel adequately equipped and competent to handle and teach the subject?
9. If not, what is the problem?

   Is the problem unique to Industrial Arts teachers only?
10. How do your pupils approach their Industrial Arts lessons?
11. What makes them choose the Industrial Arts subjects?
12. Has there been an increase in the number of pupils pursuing Industrial Arts subjects? If yes, can you quote figures?
13. How can you account for this / what would you attribute this to?
14. Is there an equitable and justifiable time distribution between theory and practical work in the Industrial Arts lessons? If yes or no, is this justifiable?
15. Are you in favour of teaching just one component of Industrial Arts or more than one? State your choice and give reasons.
16. Is the Guidance Counsellor "advertising" the Industrial Arts subjects sufficiently prior to students choosing direction/course/s of study?
17. What is his attitude to Industrial Arts subjects?
18. Do you think that parents have a major influence in their sons choosing directions of study?
19. Are the present male school going population prejudiced against Industrial Arts subjects? If yes, can you account for their dislike?
20. From home visits/parental visits and interviews, what is the thinking of parents towards the Technical field of study?
21. The presently offered subject sets - are you happy with the scope Industrial Arts subjects are given or would you like to see a change?
22. Do you enjoy a cordial relationship with the subject advisers of Industrial Arts or do you feel that their demands are too great?
23. Do you encounter problems with stock?

APPENDIX VII CONTINUED

24. What, in your opinion, would give the Industrial Arts subjects a boost?

25. Lastly, if you had the opportunity to re-qualify, would you opt for Industrial Arts specialisation again?

APPENDIX VIII

RESEARCH WITH THE UNIVERSITY OF DURBAN-WESTVILLE

INTERVIEW SCHEDULE FOR INDUSTRIES AND BUSINESS ORGANISATIONS

1. How has your company coped with recession during the period 1984/1985?
2. Did your company have occasion to re-trench staff? If yes, how many technical/administrative staff?
3. What other economic measures were undertaken by your company during this period?
4. Did/do you have problems finding personnel? If yes, what was/ is the problem?
5. Do you have a particular shortage of artisans/apprentices? Any reason for such a shortage? How do Indians compare with Whites in respect of technical staff?
6. From which tertiary institutions do artisans, tradesmen and apprentices reach your organisation?
7. Do technical staff, first out of trade schools, fit in smoothly when they join the company or is there a lot of re-training?
8. Do you think that artisans should have "on-the-job" training or should they attend an institution like a technikon before joining industries?
9. Does your company, directly or indirectly involve itself in the training of artisans at a tertiary institution like the technikon? (lecturing / funding / availability of premises)
10. Does your company organise courses to upgrade qualifications of personnel? If not, have you considered this matter?
11. Would you be prepared to give time off to your employees who are endeavouring to upgrade their qualifications?
12. What is your opinion of the education system of the country? Is it relevant and a preparation for life?
13. Are there any deficiencies?
14. What changes would you like to see?
15. What are your views about technical education as offered presently in schools?
16. Would you object to your children offering technical education at secondary schools? If yes, what would be your objection?
17. Are you, (the Industrialist/Business Sector) consulted when new technical courses are initiated by Education Departments/Technikons? If not, is this justifiable?

APPENDIX VIII CONTINUED

18. Do you think that industries, like your company, have a role to play in determining the type of education a country should offer its students? If yes, what should be the role?

19. Would you object to apprenticing a full time matric pupil on a part-time basis? Substantiate.

20. At least half of the 10 000 Indian pupils who matriculated last year are without any "opening" or scope. From an industrialist's point of view, what can be done to assist them?

21. Why do pupils prefer to continue their tertiary education at universities, rather than at technikons?

22. How do you forsee the future role of the technikon as compared to the university?

23. Lastly, did you have any technical education at:-

    a) the secondary level
    b) the tertiary level.

APPENDIX IX

RESEARCH WITH THE UNIVERSITY OF DURBAN-WESTVILLE

INTERVIEW SCHEDULE FOR LAYMAN SAMPLE

1. What is your highest level of education? Did you study any Industrial Arts subjects at school?
2. How long have you been in employment since your stopped schooling?
3. Where are you employed presently?
4. Name other types of "jobs" you have held?
5. Are you happy at your present place of employment?
6. If no, what are the problems?
7. Do you think that a high level of education will assist in getting a better paid job?
8. Why do you think that the Industrial Arts subjects (Woodworking, Metalworking and Technical Drawing) presently offered in schools are important?
9. Do you think that there will be jobs for the thousands of matriculants who will complete schooling at the end of this year?
10. Finally, what advice can you give those looking for a job?