

Education and Employment Statistics in the Built Environment

**Prepared for the CETA
SSP Submission
2005-2009**

March 2004

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1 The Built Environment

The Built Environment is made up of the following disciplines:

- Architecture
- Building Science
- Civil Engineering
- Construction Management
- Quantity Survey
- Town Planning
- Survey

1.1 The Challenges

Each of these disciplines has grappled with problems in terms of activity and employment over the years resulting from:

- the economy
- what theoretical and practical training is required
- salary levels
- attracting students into the professions
- etc

1.2 Staff Composition

Traditionally professionals in these fields have been white males with tertiary education, mainly degrees. To address the transformation challenge, a dramatic swing in the demographics of entrants is required. However, requirements for entry into Built Environment professions preclude many previously disadvantaged individuals (PDI) from entering the field at professional levels.

1.3 Scope

This report is a 'quick and dirty' examination of the current status in terms of training and capacity in the Built Environment, required for CETA to prepare its 2005-2009 Sector Skills Plan (SSP). The following areas were investigated:

- Matriculation statistics
- tertiary enrolments and graduations
- professional statistics and supporting staff

This is a base analysis to determine the requirements for more comprehensive investigation, on which to base future direction.

2 Secondary education

In order to ensure an adequate supply of competent Built Environmental professionals an adequate supply of entrants into the profession is required. There are a number of factors, which affect this supply. They are:

- Numbers qualifying for University entry
- Competition from other professions
- Maths and Science competence
- Awareness of the Built Environment professions
- Selection and funding

2.1 Numbers qualifying for University entry

Graduations in the year 2002 indicate that some 37000 students were awarded first time qualifications

UNIVERSITY GRADUATIONS - ALL FIELDS 2002					
2ND-ORDER CESM CATEGORY	OCCAS- IONAL	DIP/CERT	GENERAL 1ST BACH.	PROF. 1ST BACH.	TOTAL
01 Ag. and Renewable Resources	0	22	113	226	361
02 Arch. and Env. Design	0	4	280	193	477
03 Arts, Visual and Performing	1	63	221	342	627
04 Business, Commerce & Mgmt. Sc.	2	161	6,256	683	7,103
05 Communication	10	40	543	124	717
06 Computer Sc. and Data Proc.	0	160	1,408	41	1,608
07 Education	0	6,162	376	1,094	7,632
08 Engineering and Eng. Tech.	0	7	49	1,266	1,322
09 Health Care and Health Sciences	2	378	733	2,981	4,094
10 Home Economics	0	38	28	158	224
11 Industrial Arts, Trades and Tech.	0	7	45	5	57
12 Language, Linguistics, and Lit.	9	142	1,153	81	1,385
13 Law	0	72	748	1,746	2,565
14 Libraries and Museums	0	15	155	52	222
15 Life Sciences and Physical Sc.	0	27	1,100	59	1,186
16 Mathematical Sciences	0	139	687	19	845
17 Military Sciences	0	0	0	0	0
18 Philosophy, Religion and Theology	0	29	519	33	581
19 Phys. Ed., Health Ed. and Leisure	0	28	180	9	217
20 Psychology	0	86	1,782	98	1,965
21 Public Admin. and Social Services	0	111	420	295	825
22 Social Sciences and Social Studies	1	77	2,507	76	2,661
TOTAL (FRACTIONAL COUNTS)	24	7,767	19,303	9,581	36,675

Entry into University requires that Matriculants attain an Exemption Certificate. Given that the drop out rate at University is about 30%, this means that some 54 000 students would have entered University at the outset. A further 16000 graduated with first time qualifications from South African Technikons in the year 2002.

2.2 Competition from other professions

Built Environment professionals train at both University and Technikons. Their work is highly numerate and entry to tertiary institutions is reliant on gaining not only a Matriculation Exemption but also an adequate pass in Higher Grades Mathematics.

There are many professions and careers with similar requirements such as accounting and commerce, medicine, science, statistics, and as well as other industrial and engineering disciplines. The 2002 tertiary graduations in these fields show that some 14000 HG learners graduated who would have required HG Maths for entry. See the table below.

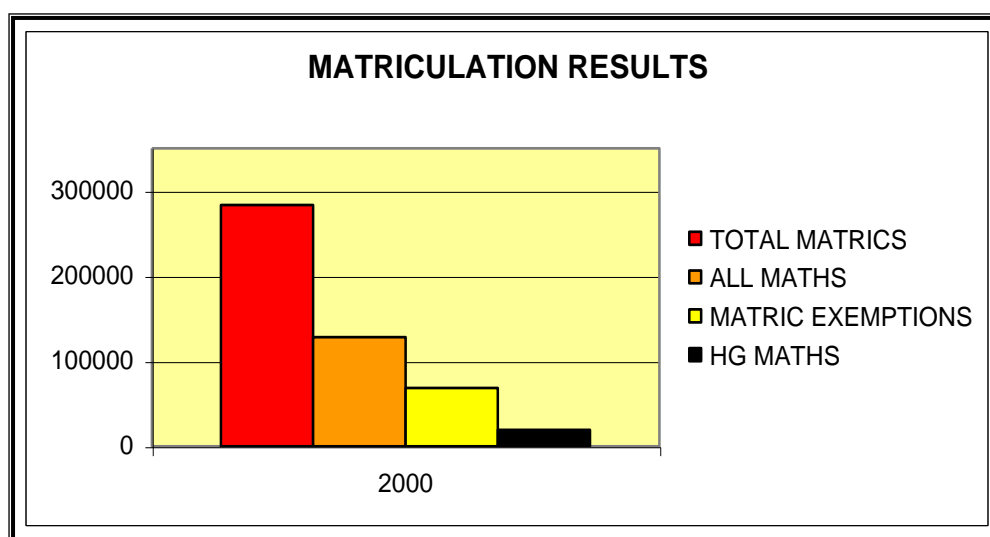
University Under Graduate qualifications requiring maths competence for entry - Graduations 2002					
	UG DIP/CERT	UG 1ST BACH.	PROF. 1ST BACH.	TOTAL	
2ND-ORDER CESM CATEGORY					
01 Ag. and Renewable Resources	22	71	130	222	222
0101 Agricultural Economics	0	41	27	69	
0102 Agricultural Extension	7	17	0	25	
0103 Agricultural Food Technology	0	9	28	37	
0104 Animal Sciences	15	3	75	92	
02 Arch. and Env. Design	4	280	193	477	477
0201 Environmental Design	3	124	71	198	
0202 Design and Planning Technology	0	54	57	111	
0203 History of Environments	0	29	0	29	
0204 Construction and Design Implementation	1	46	22	69	
0205 Communication in Arch. & Env. Design	0	9	5	14	
0206 Structural Technology	0	0	0	0	
0207 Environmental Technology	0	0	0	0	
0208 Materials of Arch. and Env. Design	0	0	0	0	
0209 Management in Arch. and Env. Design	0	7	4	11	
0210 Prof. Practices of Arch. and Env. Design	0	0	5	5	
0211 Planning	0	2	29	31	
0299 Other Arch. and Env. Design	0	10	0	10	
04 Business, Commerce & Mgmt. Sc.	56	4029	175	4260	4260
0401 Accounting	16	3625	143	3784	
0403 Banking and Finance	13	226	13	252	
0406 Information Communications	17	116	0	133	
0407 Insurance and Risk Management	0	42	19	61	
0412 Quantitative Methods	10	20	0	30	
06 Computer Sc. and Data Proc.	107	1031	38	1176	
0601 Applications in Computer Sc. & Data Proc	28	369	5	401	
0602 Computer Ops. and Operations Control	0	0	0	0	
0605 Information and Data Base Systems	1	283	33	316	
0606 Numerical Computations	46	162	0	207	
0607 Programming Languages	0	107	0	107	
0608 Programming Systems	32	104	0	135	
0609 Software Methodology	0	7	0	7	
0610 Theory of Computation	2	0	0	2	
07 Education	200	10	15	225	225
0704 Teaching – Maths and Science	200	10	15	225	
08 Engineering and Eng. Tech.	7	49	1266	1322	1322
0801 Aerospace & Aeronautical Eng. & Tech.	0	0	7	7	
0802 Agricultural Engineering & Technology	0	1	13	14	
0803 Automotive Engineering & Technology	1	0	0	1	
0804 Bio-Engineering and Technology	0	0	0	0	
0805 Chemical Engineering and Technology	0	2	175	176	
0806 Civil Engineering and Technology	1	33	181	215	
0807 Computer Engineering and Technology	0	0	40	40	
0808 Electrical Engineering and Technology	2	4	400	406	
0809 Graphics and Drafting for Eng. & Tech.	0	0	0	0	
0810 Engineering Mechanics	0	0	0	0	
0811 Engineering Science	0	0	0	0	
0812 Environmental Engineering and Tech.	0	0	0	0	
0813 Geological Engineering	0	0	0	0	
0814 Industrial Engineering and Technology	0	0	76	76	
0815 Instrumentation Engineering and Tech.	0	0	0	0	
0816 Manufacturing Engineering and Tech.	1	0	0	1	
0817 Marine Engineering and Naval Arch.	0	0	0	0	
0818 Materials Engineering and Technology	0	0	12	12	
0819 Mechanical Engineering and Tech.	3	2	268	272	
0820 Metallurgical Engineering and Tech.	0	0	16	16	
0821 Mining Engineering and Technology	0	8	33	41	
0822 Nuclear Engineering and Technology	0	0	0	0	
0823 Ocean Engineering	0	0	0	0	
0824 Petroleum Engineering	0	0	0	0	
0825 Surveying and Mapping	0	0	10	10	
0899 Other Engineering and Eng. Tech.	0	0	35	35	
09 Health Care and Health Sciences	182	272	1883	2337	2337
0902 Clinical Health Sciences	144	268	1407	1819	
0904 Pharmaceutical Science	0	0	325	325	
0906 Veterinary Health Sciences	38	0	101	138	
0909 General Persp. Health Care & Health Sc.	0	0	50	50	
0999 Other Health Care and Health Sciences	0	4	1	4	
13 Law	72	748	1746	673	673
1303 Mercantile Law	4	396	273	673	
15 Life Sciences and Physical Sc.	24	549	20	594	594
1501 Astronomy	0	2	0	2	
1502 Atmospheric Sciences	0	6	1	7	
1504 Chemistry	12	340	12	364	
1505 Geology	0	58	1	59	
1506 Oceanology	0	9	0	9	
1507 Physics	12	86	7	105	
1508 General Earth-Space Science	0	14	0	14	
1599 Other Life Sciences and Physical Sc.	0	35	0	35	
16 Mathematical Sciences	139	687	19	845	845
1601 Mathematical Sc., General Perspective	52	150	2	203	
1602 Logic, sets, and Foundations	0	4	0	5	
1603 Arithmetic and Algebra	75	51	2	128	
1604 Classical Analysis	0	27	1	28	
1605 Functional Analysis	7	6	0	13	
1606 Geometry and Topology	0	0	0	0	
1607 Probability	0	63	1	65	
1608 Statistics	4	249	12	265	
1609 Numerical Analysis & Approx. Theory	0	43	2	45	
1610 Classical Applied Mathematics	0	30	1	30	
1611 Applications of Mathematics	0	32	0	32	
1612 User-oriented Mathematics	0	4	0	4	
1699 Other Mathematical Sciences	0	29	0	29	
20 Psychology	86	1782	98	1965	1965
2001 Foundations of Psychology	1	672	37	711	
2002 Biopsychology	0	12	0	12	
2003 Environmental Psychology	0	8	0	8	
2004 Experimental Psychology	0	88	0	89	
2005 Psychology Applied to Health	0	134	8	142	
2006 Psychology Applied to Education	22	0	1	23	
2007 Psych. applied to Ind., Gov. & other	62	616	8	686	
2008 Psychometrics	0	20	0	20	
2009 Social Psychology	0	10	4	14	
2010 Developmental Psychology	0	9	1	10	
2011 Cognitive Psychology	0	14	0	14	
2099 Other Psychology	0	198	39	238	
22 Social Sciences and Social Studies	0	1023	24	1047	1047
2202 Economics	0	1023	24	1047	
TOTAL (FRACTIONAL COUNTS)					13966

Given that the attrition rate at Universities from first year to final graduation is some 30%, the numbers entering with HG Maths in 1999/2000 would have been 20000. A further 7500 graduated from Technikons in 2002, requiring some 10000 entrants or more at the outset. As such a total of 30000 students with competence in Maths were required for entry into tertiary institutions in 1999/2000.

2.3 Matriculation results

The Matric results in 2000, shown below indicate that Matric Exemptions almost equate with the first time entries into University (65000). The Minister of Education's call to double the number of students entering tertiary education in the next 10 years is dependent on increasing the general standard of Matriculation.

The HG Maths pass figures of 19300 in 1999/2000 were not quite adequate for the numbers entering Universities to study the scientific professions at the time. Further, simply having just passed HG Maths does not necessarily mean that the student is adequately prepared for tertiary studies. Most institutions require at least a C symbol in Maths. This would probably explain the 30% attrition rate at Universities and higher at Technikons!



2.4 Improving the results

If it is necessary to increase the number of professionals, major effort is required to dramatically increase the number of adequate Matric results. Interventions are required at 3 levels:

2.4.1 Long term

- Curricula reform in Maths teaching at primary level to develop competence in dealing with numbers
- Competence in the language of instruction has been found to be major stumbling block in grasping complex subjects such as Maths and Science. Improving English competence would go a long way to improving results overall. (The alternative of teaching subjects in the mother tongue dictates that tertiary institutions should also offer their courses in all languages, which would not be practical)

2.4.2 Medium term

- Increasing the number of teachers competent to teach higher grade Maths and English is essential
- Educating grade 9 learners to make the HG Maths choice is key to increasing the number of HG Matriculants

2.4.3 Short term

- Nurturing those students currently in the system is essential. Intervention is required from grade 10, as students failing their first grade 11 higher-grade tests are dropped to standard grade, to ensure that they pass at the end of Grade 12.

2.5 Awareness of the Built Environment professions

There is limited career guidance in secondary schools. The problem is particularly acute in rural areas. There are however many examples of good old-fashioned schools in these areas that are disciplined, drill learners well and achieve good results. However without access to career guidance, technology to access web sites etc, these learners are not aware of either the professions in the Built Environment, or how to access funds to enter tertiary education. By targeting the top students in these areas high calibre entrants can be identified, although they will require orientation in terms of foundation training, to develop many skills which they have not been exposed to - such as social awareness, IT, banking, report writing, public speaking etc.

2.6 Selection and funding

The SAICE 100x100 initiative of 2003, to recruit 100 rural students into civil engineering as part of the SAICE centenary celebrations, has resulted in some interesting findings.

Funded by RAU, SAICE, SAISC, Stewart Scott and GMKS, a highly qualified mathematician and Maths teacher, Dudu Mkhize was appointed to identify suitable students to enter civil engineering studies.

Mrs Mkhize visited schools in rural areas, including Limpopo, the North West, the KZN Midlands, as well as townships in Gauteng. Armed with career guidance material, a Maths competency test which she devised, and questionnaire Mrs Mkhize introduced learners to opportunities in civil engineering, and invited those interested to complete her test and questionnaire.

Those who scored below 60% were advised that they should not be considering civil engineering as a profession, and the questionnaires were used as a further filter to determine capable students.

Most of students came from very disadvantaged backgrounds, with parents either unemployed, or earning part time or unskilled wages of below R 2000 per month. These students would therefore all qualify for TEFSA loans, if they were unable to secure bursaries.

The Matric results yielded 32 excellent candidates, several with straight A's. Several would not have considered civil engineering, or even the possibility of tertiary education if Mrs Mkhize has not visited the schools and identified such potential.

We were able to secure merit bursaries for several, industry bursaries for others and TEFSA funding for the rest. Industry was impressed with the calibre of student offered to them, stating that the quality was better than had been made available to them in the past through other sources, and the tertiary institutions have also been happy with this group of students.

However, the project has not been without challenges. From such disadvantaged backgrounds, the families could not cope with the additional financial demands made on them by way of registration as well as academic, boarding and bookshop deposits. The various bursaries and loans will cover these expenses, but funds only become available in May/June each year whilst the payment of the above is required in January/February.

If industry is to transform, such fundamentals must be addressed, to make it possible for disadvantaged students to enter tertiary education. Without the contact these students had with both Mrs Mkhize and the civil network, they would not have had the finances to get through the first six weeks!

Assessment of results, awarding of bursaries and paying of the funds must be resolved by the end of January. It is therefore necessary that industry extend Mrs Mkhize's tests and other selection mechanisms in order to have prepared short lists in the previous year, to speed up the process once Matric results are published.

2.7 The social environment and support from the profession and tertiary institutions

Another challenge is that of the dramatic change in the social environment from that of rural life to tertiary residences in a sophisticated environment. SAICA (the S A Institute of Chartered accountants) has found that the average pass rate for black students at University is only 20%. They have found that mixing these unsophisticated students with urbane students places too much pressure on the new recruits and they cannot cope socially or with course work. They have now developed a structured programme for disadvantaged students. When funding many students at one University SAICA calls for the following:

“Requirements for these programmes

- 2.1 Students will be fully bursared and will be placed in groups of between 50 – 100 at selected higher education institutions.
- 2.2 These bursaries will include:
 - Registration fees.
 - Lecture and tutorial fees.
 - Accommodation and meals.
 - Textbooks.
- 2.3 The profession will require the following:
 - The students need to be accommodated together.
 - The students need to be placed on special 4-year undergraduate programmes.
 - These undergraduate programmes must include the development of literacy, numeracy and life skills.
 - If possible, these students need to be worked with separately. If this is not possible they will then require separate and additional tutorial groups.
 - The University will be required to enter into a Memorandum of Understanding with SAICA as it relates to these students.
 - The University will be require to appoint a project manager to take responsibility for the group and who will be in close contact with the relevant project manager at SAICA.
 - The project manager from the University will be responsible for the preparation of quarterly reports on the status of the students, problems encountered and advances made with the group.
 - The project manager from the University will work with the project manager from SAICA to appoint properly trained mentors to mentor the students. This will be closely monitored by SAICA.
 - The aim of the undergraduate programme is to ensure that (a) we increase the number of African Black and Coloured students entering Higher Education Institutions and (b) the throughput percentages of these students are equal to if not better than those of their White counterparts.

In order to put less pressure on the SAICE 100x100 students, they are being housed together in an under utilized school boarding establishment, where they can support each other in a less threatening environment. Senior disadvantaged students have also been offered accommodation in the boarding school in order to mentor the new recruits. This model has meant that the students have settled in very quickly.

SAICA guidelines need to be considered to improve the success rates of disadvantaged students.

In particular the range of life skills which require development are not limited to the ability to be able to communicate, write reports, understand management, authority etc, but such activities as opening a bank account, using a bank or credit card, cheque book etc and managing personal finance is a totally new experience for a student from a severely disadvantaged background.

Use of computers and libraries are also new experiences, hence study methods and research techniques need to be covered over and above the need to urgently grasp the use of computers for assignments. Few disadvantaged students have attended schools offering D & T (Design and Technology), so few have ever done engineering drawing and require much support with this subject.

In addition few of these students have learnt to drive, which presents stumbling blocks in terms of getting experiential training.

3 Tertiary education

In order to understand the supply of professionals, a comprehensive study of tertiary education has been carried out.

3.1 Sources of data

3.1.1 Department of Education – 1986-2002

Two data sources exist within the Dept of Educations as follows:

- Data from 1986 to 1998 is available in SQL but total enrolments can only be supplied per major category and not per degree.
- From 1999 to 2002 (2002 not received from all institutions) the data is available in an Access database and is published per discipline and per qualification. See the Appendices for typical University and Technikon data

Sets of data have been collected as follows:

- All graduations – no racial or gender break down
- All enrolments – no individual degree breakdown prior to 1999
- 374 graduation files, per race and gender group and total for the period 1986-2002

3.1.2 Tertiary registrars – 2004 enrolments

In order to understand enrolments in 2004 and gain an understanding of first year versus subsequent years, figures were BEGGED from Tertiary institutions. Since registration is not yet complete some figures are missing and some institutions are not able to collect or make data available in the format required.

In particular there appears to be major confusion over what constitutes a Foundation course. As these courses are not funded by the Dept of Education, and at many institutions serve all departments, the figures are given as an indication of activity, but do not relate directly to first year entrants to Built Environment professions. Attention needs to be given to this aspect of study as it is incongruous for the Dept of Education to fund schools and Universities, but not the essential stepping stone from one to the other.

3.1.3 Civil Engineering departments – 1960-1985 graduations

For civil engineering graduations prior to 1986, the only way to get reasonable data was to count the people on graduation photos (except at UCT where their records go back to 1918!)

3.2 Fields of study

The following fields of study were identified:

- Architecture
- Building Science
- Civil Engineering
- Construction Management
- Landscape Architecture
- Quantity Survey
- Town Planning
- Survey

3.3 The qualifications

The full range of qualifications is included in total graduation and enrolment figures, unless otherwise noted. They are as follows:

University

- Professional Degree
- Post graduate diploma / certificate
- Honours
- Masters
- Doctorate
-

Technikon

- National Certificate
- National Diploma
- National Higher Diploma
- B Tech
- M Dip Tech
- M Tech
- D Tech

3.4 Institutions training in the Built Environment

Several institutions offer courses in the above fields. The mergers taking place at present have caused some confusion as to who has been accounted for – Technikon statistics are presented based on the new structures. Universities have reported their data based on the old structures. The institutions and courses offered are as follows:

BUILT ENVIRONMENT COURSES OFFERED AT UNIVERSITIES IN SOUTH AFRICA								
UNIVERSITY	ARCHITECTURE	BUILDING SCIENCE	CIVIL ENGINEERING	CONSTRUCTION MNGT	LANDSCAPE ARCH	QUANTITY SURVEYING	TOWN PLANNING	SURVEY
Rand Afrikaans			Yes					
University of Cape Town	Yes		Yes	Yes				Yes
University of Natal (Durban)	Yes		Yes	Yes		Yes	Yes	Yes
University of Port Elizabeth	Yes			Yes		Yes		
University of Pretoria	Yes		Yes	Yes	Yes	Yes	Yes	
University of Stellenbosch			Yes					
University of the Witwatersrand	Yes	Yes	Yes	Yes		Yes	Yes	

BUILT ENVIRONMENT COURSES OFFERED AT TECHNIKONS IN SOUTH AFRICA								
TECHNIKON	ARCHITECTURE	BUILDING SCIENCE	CIVIL ENGINEERING	CONSTRUCTION MNGT	LANDSCAPE ARCH	QUANTITY SURVEYING	TOWN PLANNING	SURVEY
Border Technikon		Yes	Yes					
Cape Technikon	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Durban Institute of Technology (DIT)	Yes	Yes	Yes				Yes	Yes
Eastern Cape Technikon		Yes						
Mangosuthu Technikon			Yes					Yes
M.L. Sultan Technikon (now part of DIT)								
Peninsula Technikon	Yes	Yes	Yes	Yes		Yes		
Port Elizabeth Technikon	Yes	Yes	Yes	Yes		Yes		
Technikon Free State		Yes	Yes					
Technikon Natal (now part of DIT)								
Technikon Northern Gauteng (now part of TUT)								
Technikon Pretoria (now part of TUT)								
Technikon SA			Yes					
Technikon Witwatersrand			Yes	Yes			Yes	
Tswane University of Technology (TUT)	Yes	Yes	Yes					Yes
Vaal University of Technology		Yes	Yes					

The highlighted institutions did not report on their own, as they are now part of new structures

3.5 Graduation and enrolment trends

The department of education databases are divided into broad categories, with several qualifications per category. The fields of study for this exercise are:

Architecture, which is made up of:

- Construction management
- Architecture
- Town Planning
- Quantity Survey

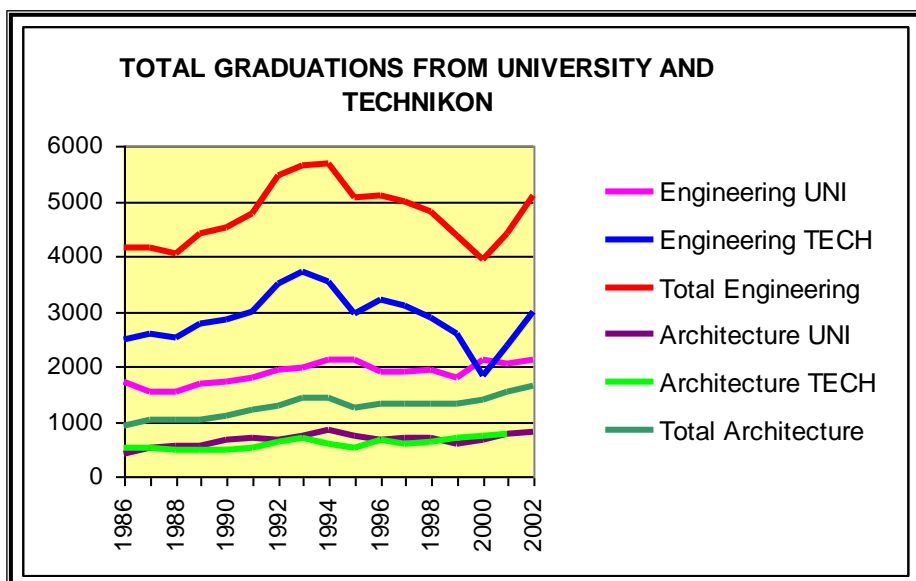
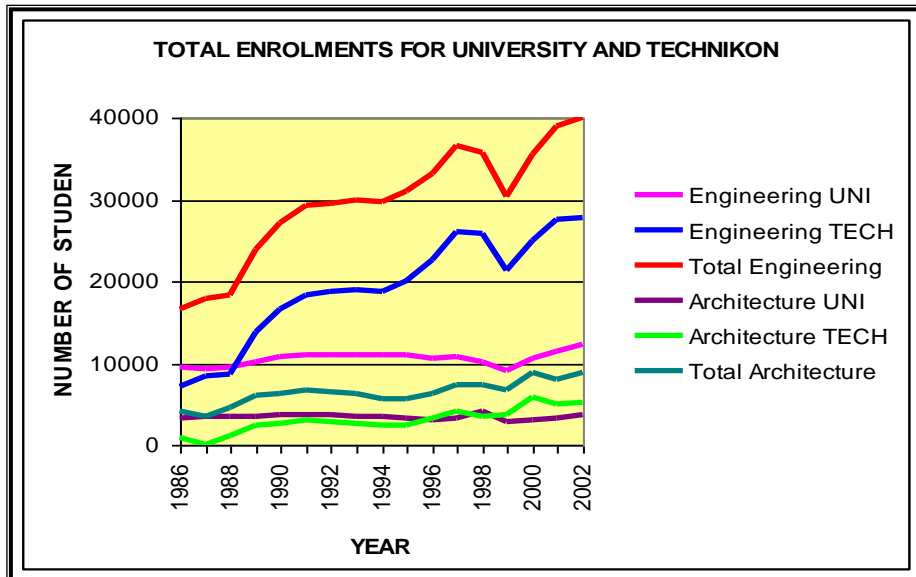
- Building Science

Engineering is made up of:

- Aeronautical
- Agriculture
- Chemical
- Civil
- Electrical
- Industrial
- Marine
- Mechanical
- Metallurgic
- Mining

In analysing graduations only those fields pertaining to the Built Environment are considered. However, when considering enrolment trends, all fields of engineering are included as the Department's statistics were not broken down prior to 1999.

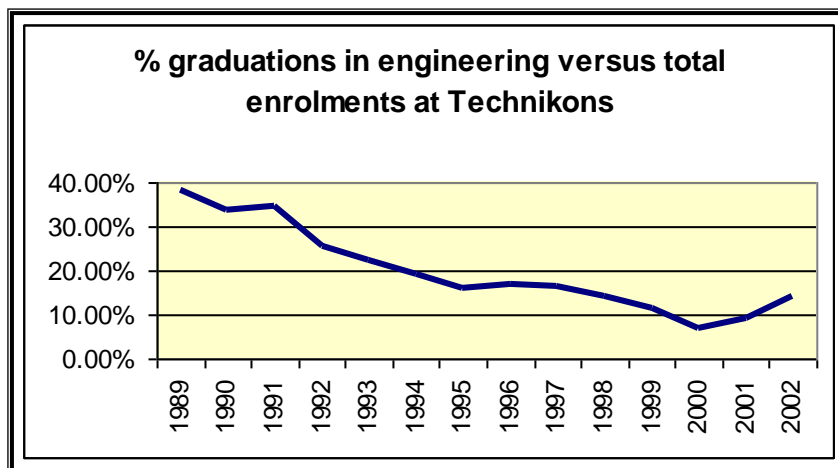
Enrolment is defined as ALL students enrolled at all levels. The Department is unable to supply meaningful first time entry data.



Looking at statistics over the 18-year period it appears that in general enrolment is on the increase, whilst graduations decreased progressively in latter part of the nineties. There were several reasons for this:

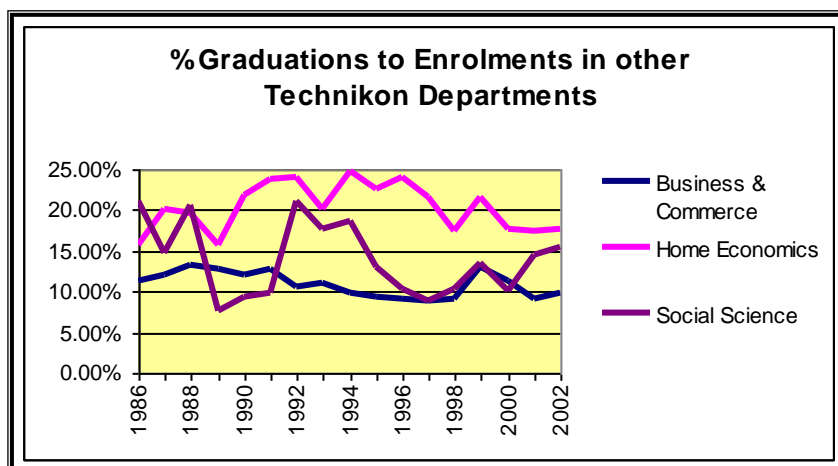
- Major campaigns were mounted in the late eighties and early nineties to encourage previously disadvantaged to enter tertiary education
- Institutions were not geared up to offer supplementary training required to prepare previously disadvantaged entrants to cope with tertiary education so students did not pass.
- The major drop off is at Technikons where it is necessary to do in service training before qualifying. Companies have increasingly resisted employing the inexperienced – calling for staff to have at least 5 years experience. As such large numbers of students have not been able to graduate

More recently, Foundation courses have been introduced to assist students cope with the challenges of tertiary education. However, many students still struggle to gain experiential training. This is particularly so in the mechanical and electrical fields, hence the dramatic drop in graduation versus total enrolment figures which is now only just starting to turn.



The introduction of in-service learnerships is essential to ensure that industry is reimbursed for their training efforts, - otherwise the number of Technikon ‘drop outs’ will continue – a massive waste of money, effort and time, both in on the part of the Technikons and the students.

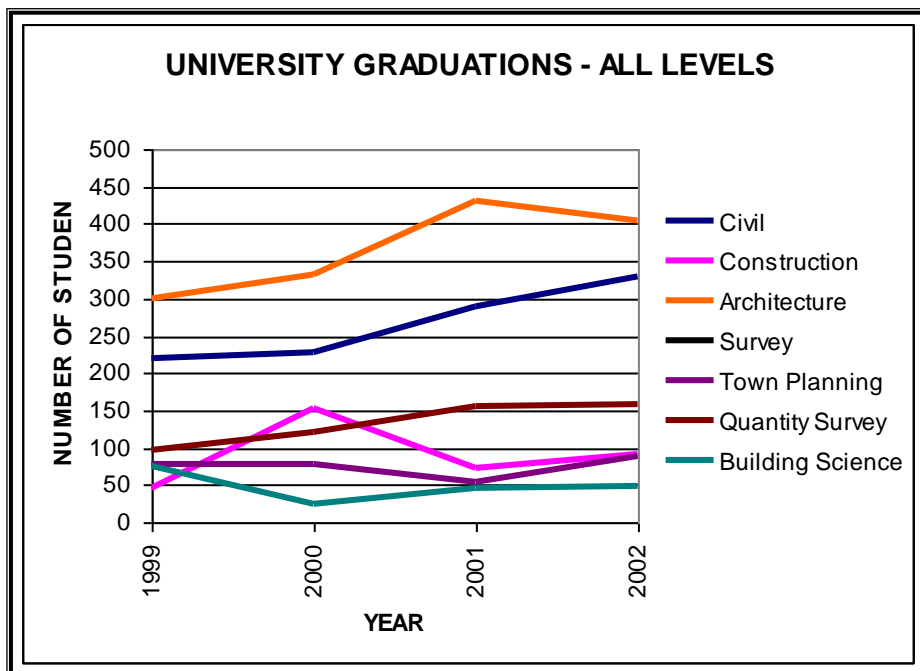
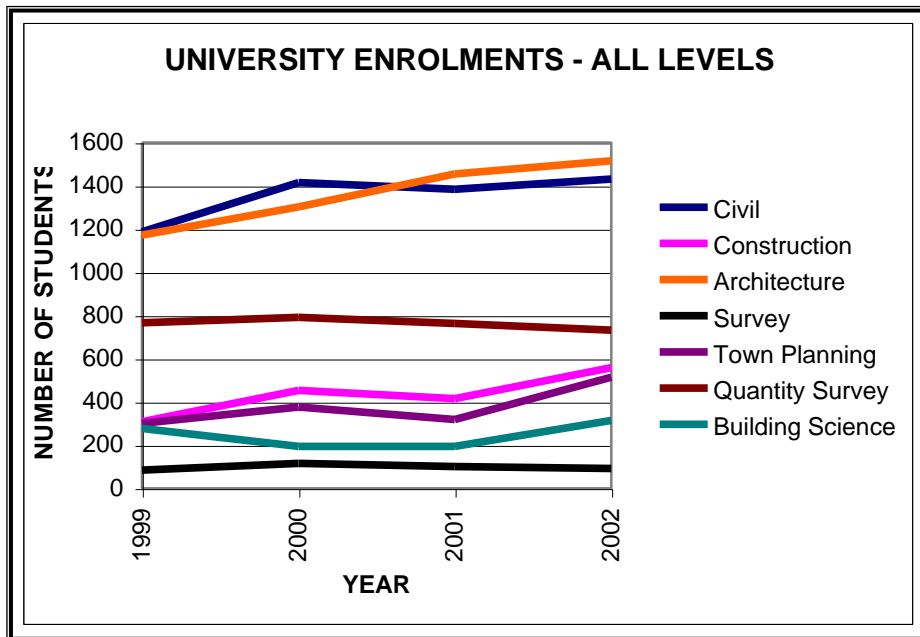
Further as indicated in the secondary education section, improved Matric leaving results are desperately needed for those entering Technikons. The belief that Maths is a major stumbling block for the large numbers of previously disadvantaged entering Technikons, is confirmed by looking at enrolment versus graduations ratio for less technical qualifications.

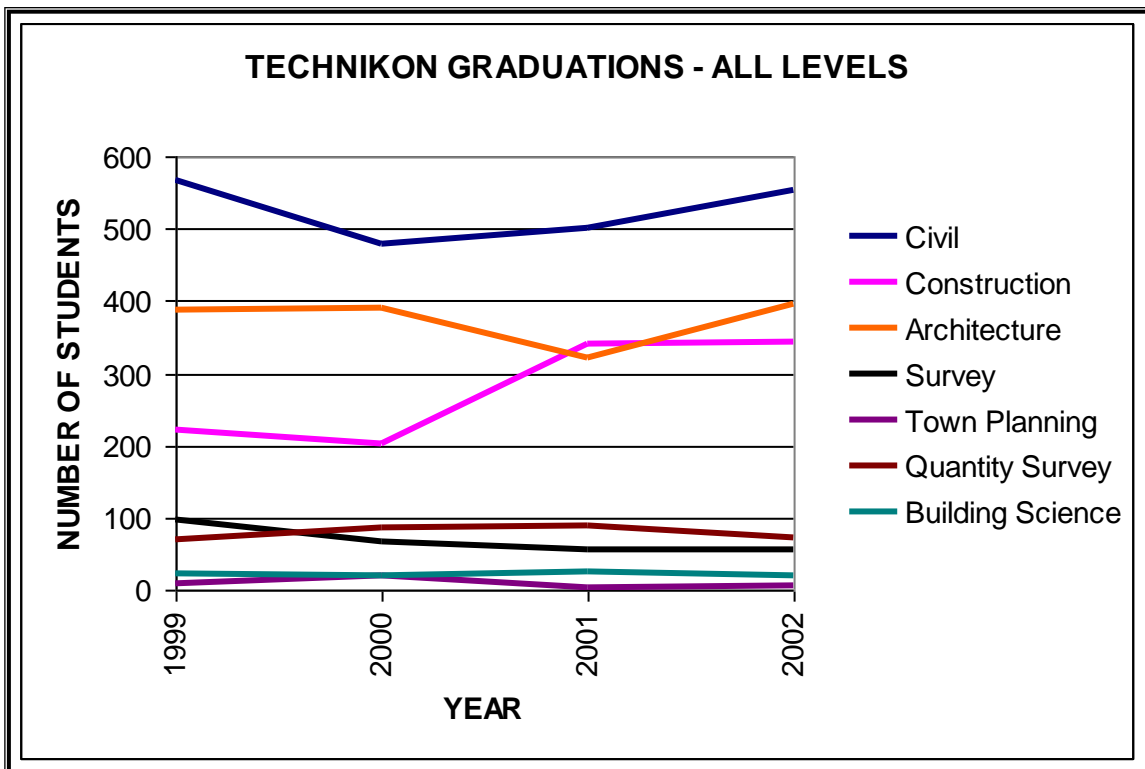
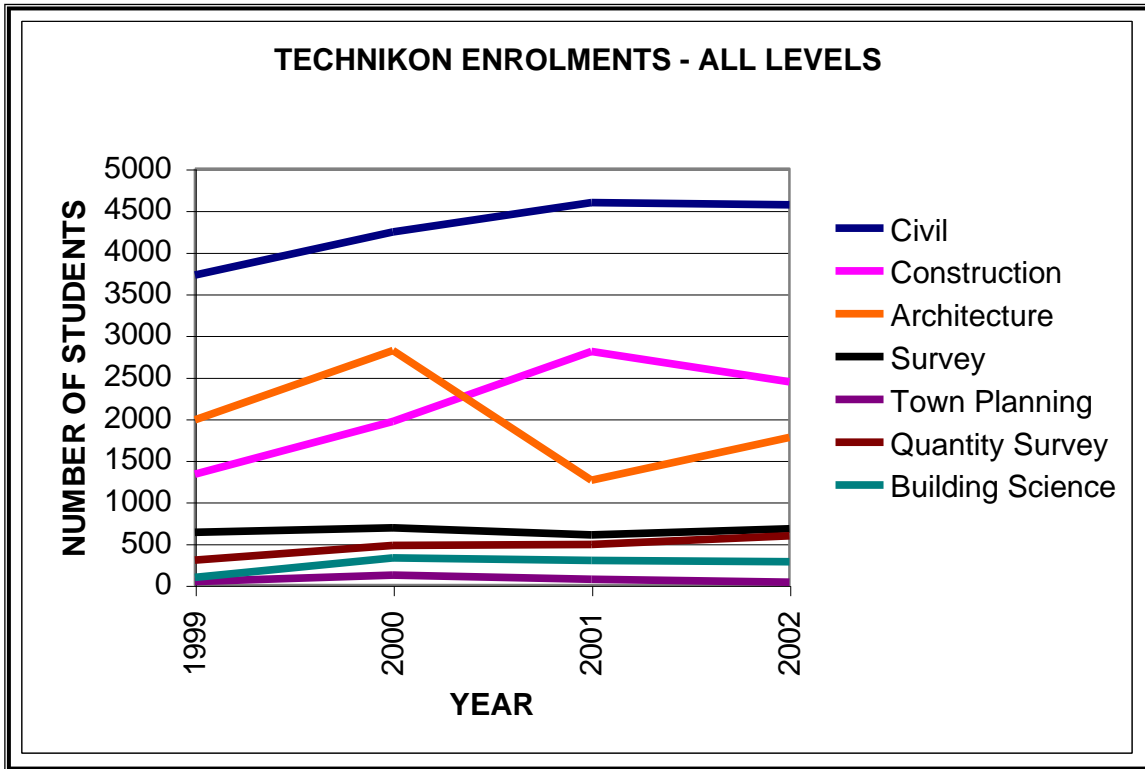


It is interesting to note that Business and Economics reflect a 10% ratio, being another sector, which requires an aptitude for Maths.

The 4-year period from 1999 to 2002, when enrolment and graduation figures are available for each discipline shows that the high 'drop out' is not as drastic in the Built Environment, but still requires attention.

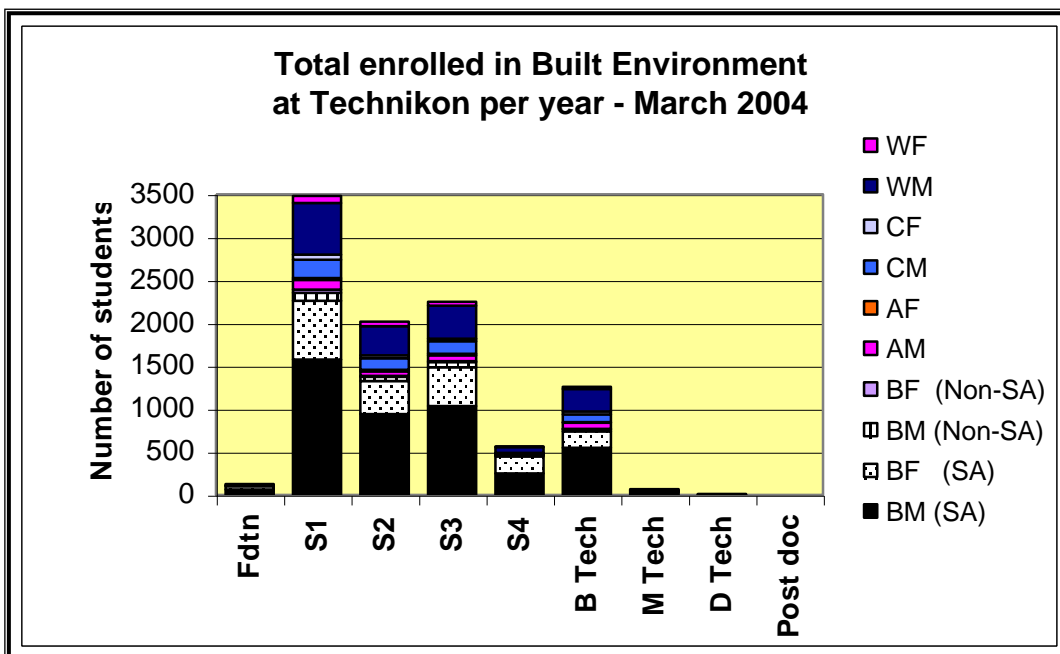
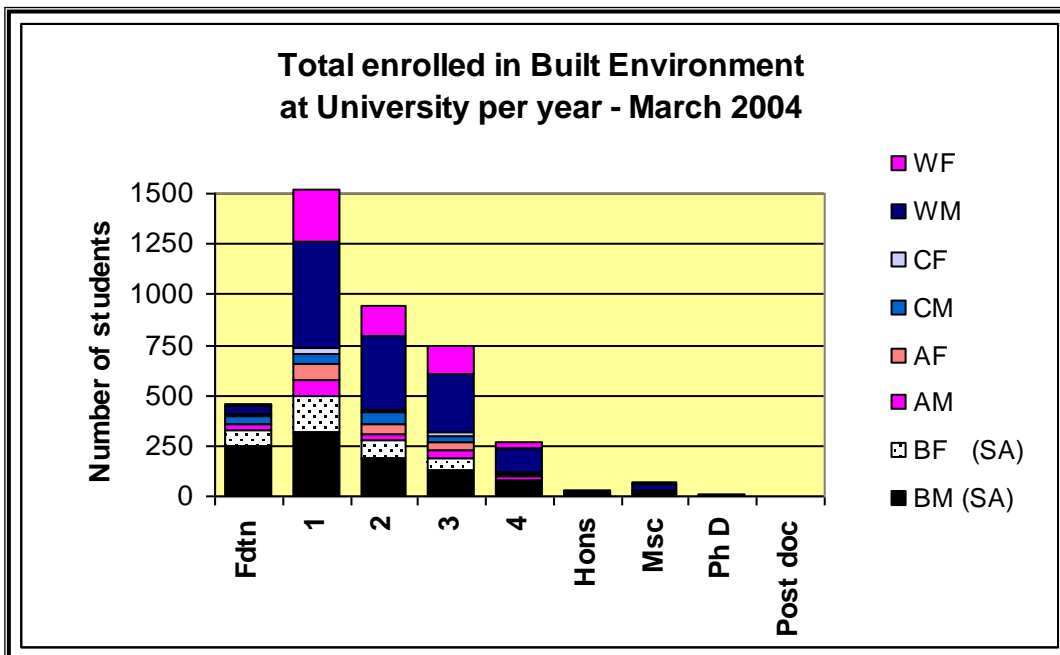
Increased enrolments at Universities from 2000, should result in more graduates in most disciplines from 2005 onwards.





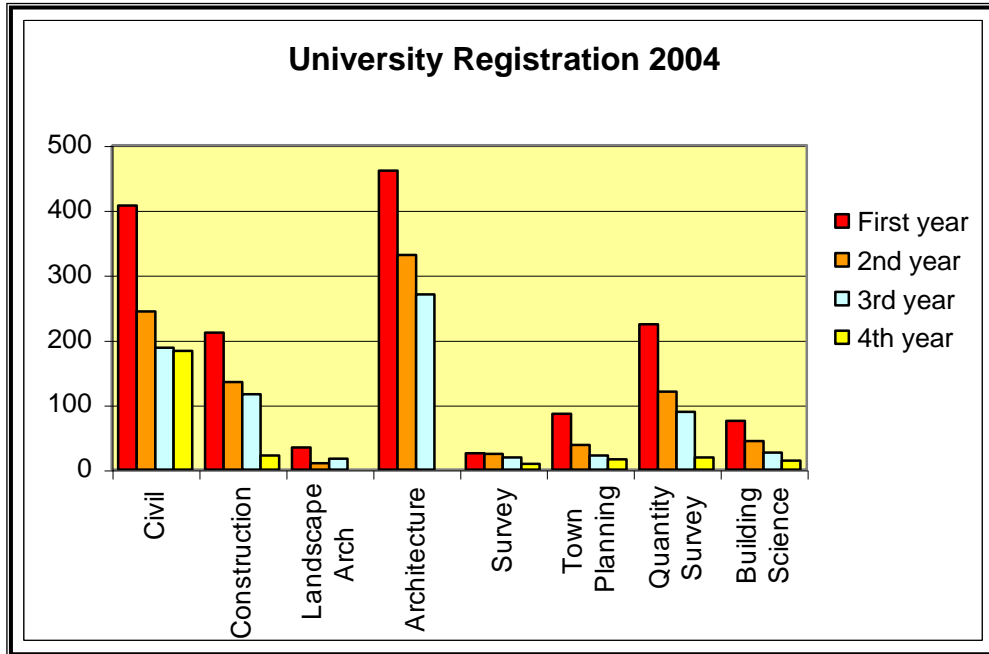
3.6 First time entry 2004

In order to gain a perspective of the current student make up and determine the ratio of first year students to graduates, a survey of the current registration at all Universities and Technikons in South Africa was carried out. The nomenclature used is as follows:
 B=Black, A=Asian, C=Coloured, W=White, M=Male, F=Female

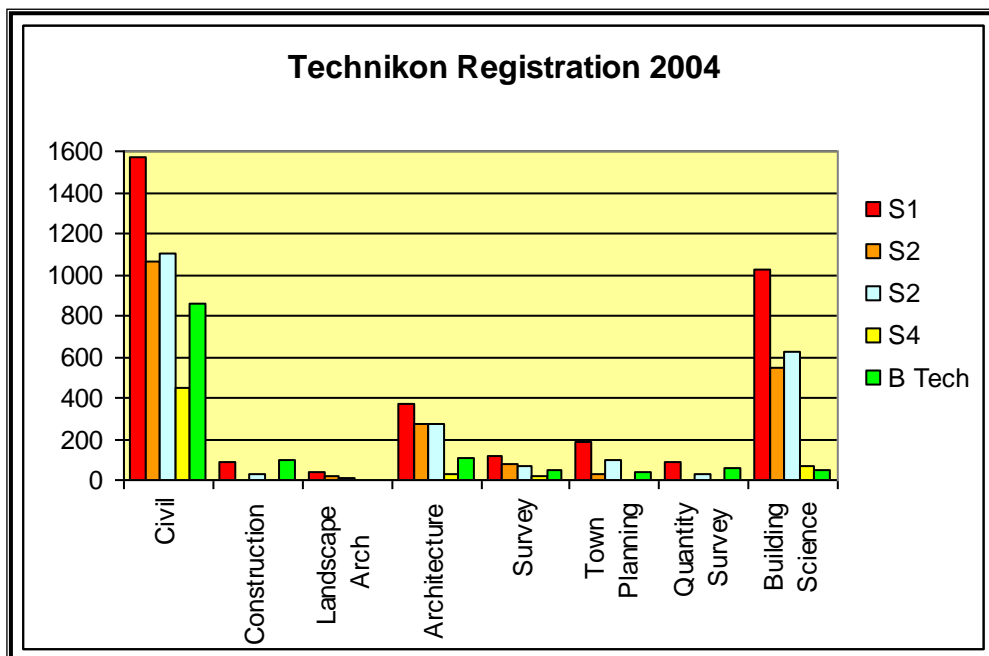


Institutions were asked to indicate non South African students where possible. This information was not available from all institutions, but Technikons appear to have at least 5% foreign students from the figures received.

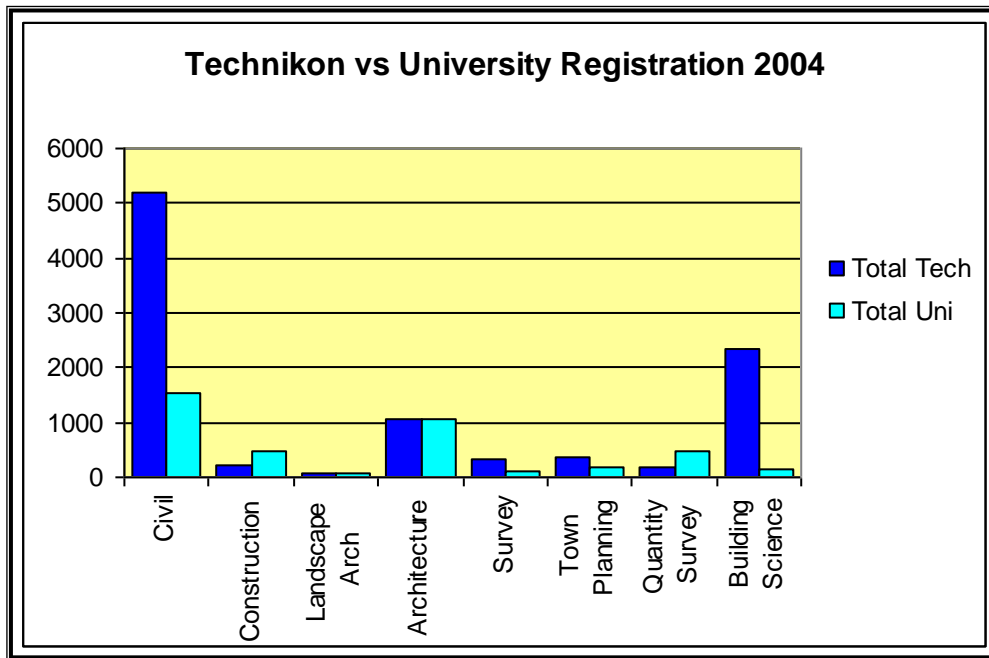
It was expected that a ratio of first year to graduates could be determined to apply to the general DOE figures supplied. However, most institutions indicated that they had had dramatically increased registrations in 2004, particularly in Civil Engineering and Architecture.



The above graph reflects the increase in University registration over the past 2 or 3 years, with first year students almost 50% higher than second year. The picture at Technikons is similar with large numbers registering to study civil engineering.

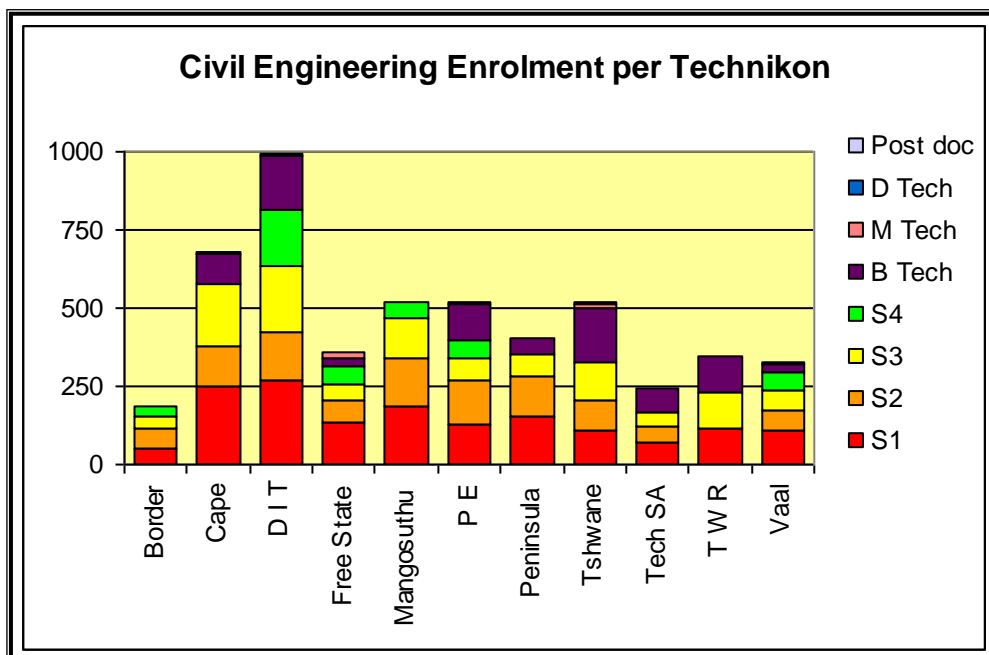


Comparing the total registration figures begs the question whether the civil engineering industry requires this number of technicians and technologists? Courses may need review in order to channel many more of the students into capacitating construction sites and government departments.



Looking later at the professional statistics, the ratio of approximately 4:1 is not seen in the professional sector. The question is whether as many Technikon students are required, or whether their training is not suitable to compliment the engineering team in the professional sector. Urgent research is required in this area.

Several provinces do not have local Technikons. Whilst students find it difficult to gain experiential training, it may be that it is simply not possible for them to identify, or get to employment opportunities elsewhere in the country. An assessment of vacant posts versus students not being able to gain experience needs to be carried.



This research also highlighted many different approaches to the bridging / foundation phase. Some institutions have dedicated foundation courses for each degree course. Students are taught in a separate Foundation course for a year before starting their formal degree studies.

This is particularly so at University. In other instances, the dedicated one-year is not linked to a particular qualification, but students needing assistance in a large range of scientific studies are taught together in the Foundation year, and there after make their career selections for the following year.

In other institutions, the 4-year degree is simply converted to a 5-year degree and students are taught slower, particularly in the first 3 years – which effectively covers the first 2 years of a standard length degree.

At Technikons a similar approach was found, with some dedicated foundation courses, and others choosing to teach the first semester over 2 semesters. At present DOE funding is not available for this training, but Government is now considering contributing to foundation training for a percentage of all first year students. Institutions have recently been asked to submit the curricula and results to date, to the DOE in order to apply for this funding.

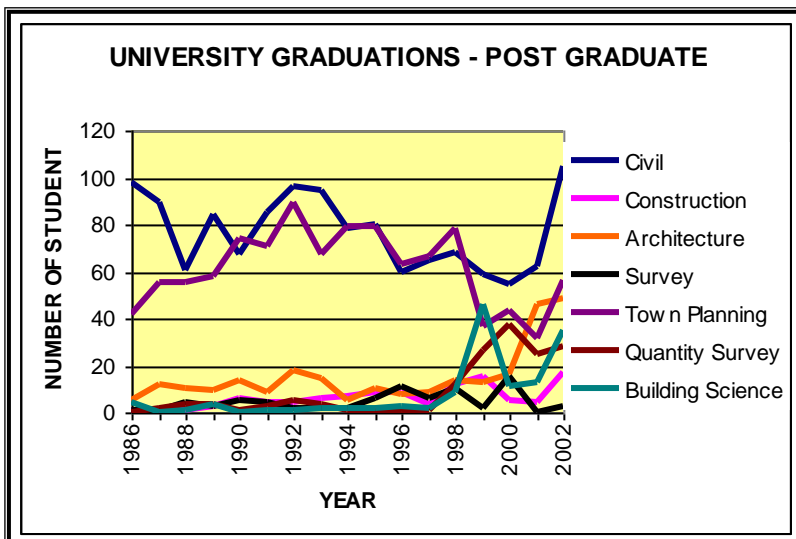
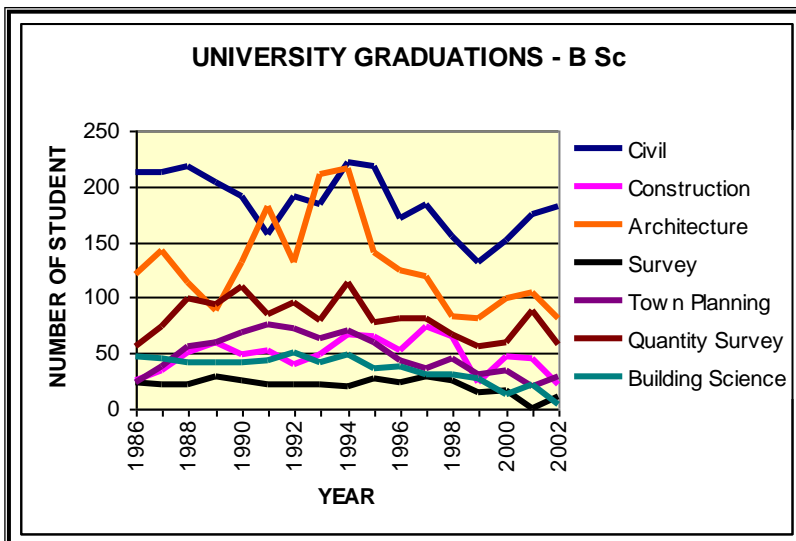
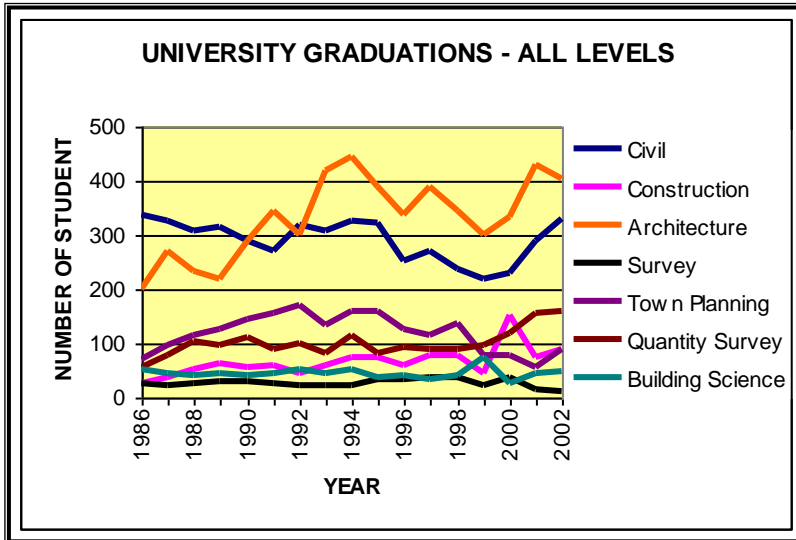
Results of some foundation courses appear to be good and in others appear to have had no impact. A comprehensive investigation into all these courses and the results should be considered, so that our industry follows the most suitable model through out.

As a result of the many approaches used, it was difficult to present the foundation registrations in a meaningful way. Further, some institutions would not publish these figures as they are privately funded initiatives.

What appears to be one of the most critical requirements for future engineering capability seems to be the most under funded and least understood / researched aspect of tertiary education.

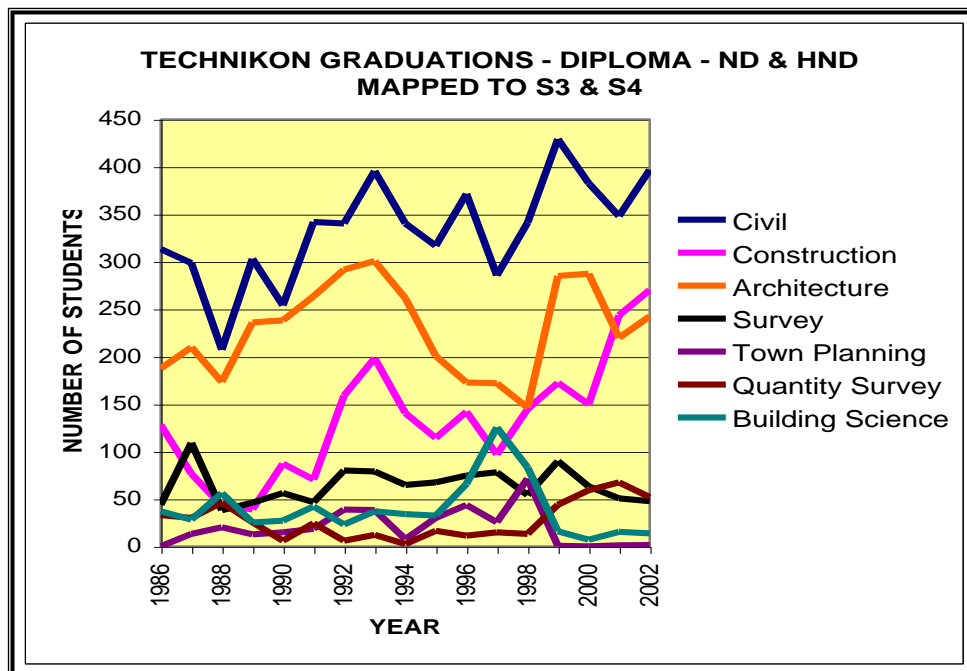
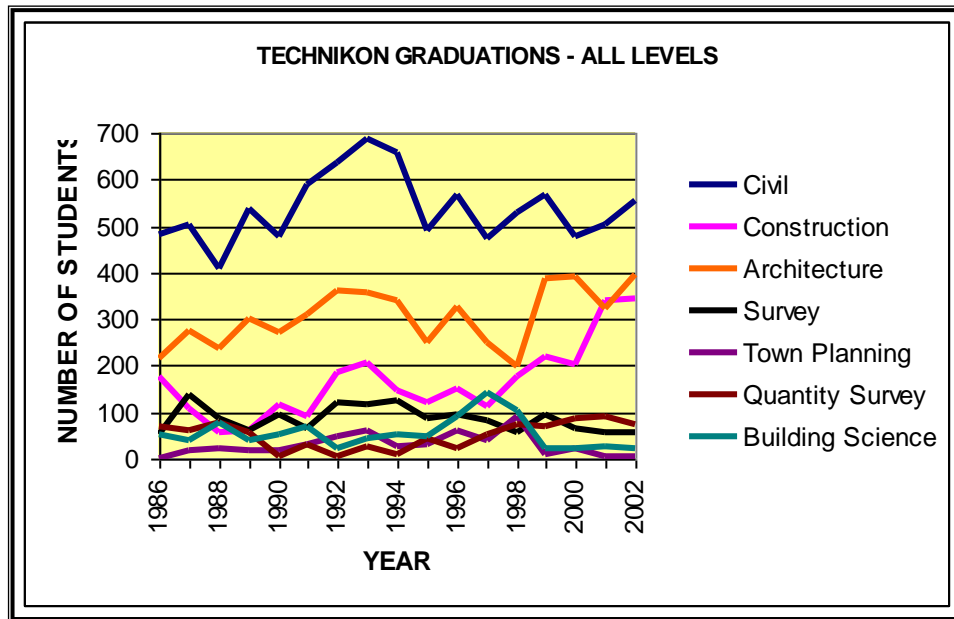
3.7 Professional graduations

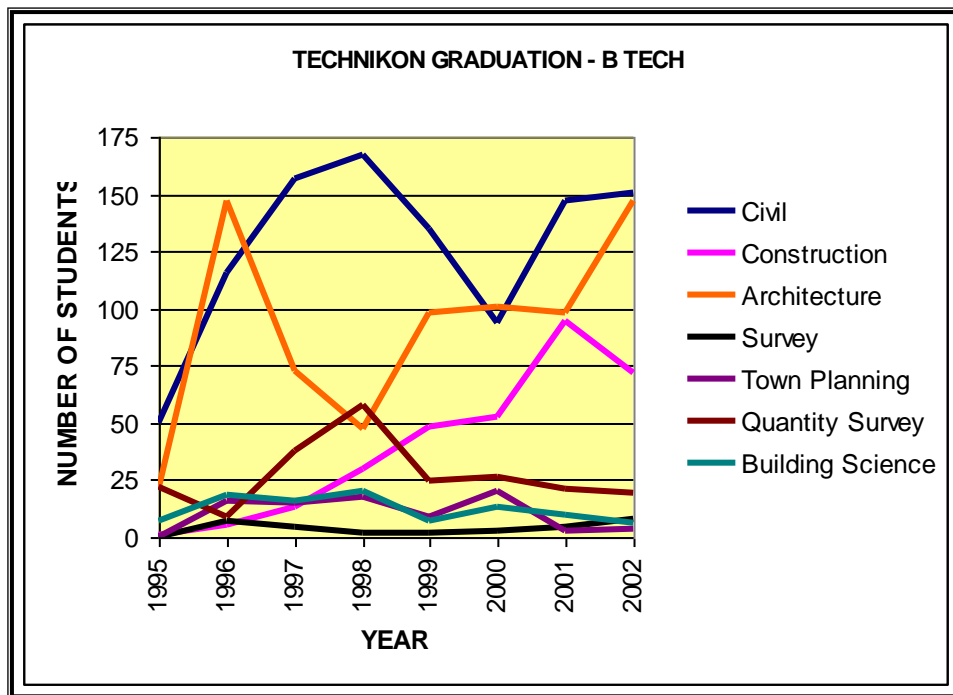
Graduations over the 18-year period show some interesting trends in terms of research. Whilst the number of graduates from professional first degrees has on the whole declines slightly, the number involved in research has increased.



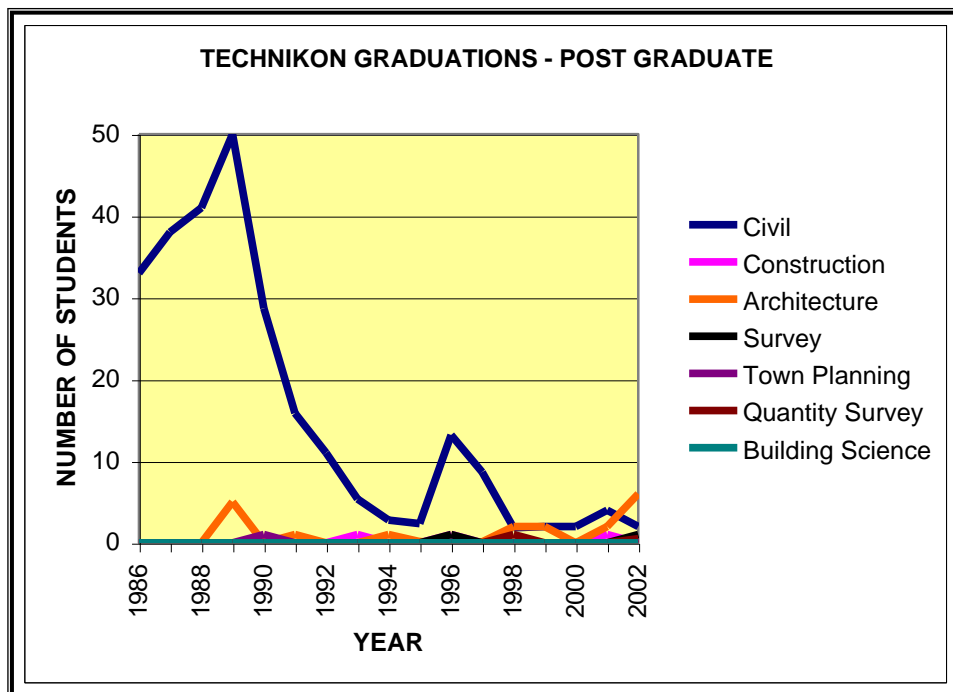
Technikon graduations look very different with a drop in under graduate graduations in some courses and a huge drop in post-graduate studies. Studying 18 years data illustrates the folly of assuming trends from only 4 years data, such as the sampling used previously to examine enrolments versus graduations per discipline.

Technikon data over the 18 years was difficult to collate, as qualifications have been restructured over this period. The National Diploma and Higher National Diploma of the past have been mapped to S3 and S4, and B Tech was only introduced in 1994.



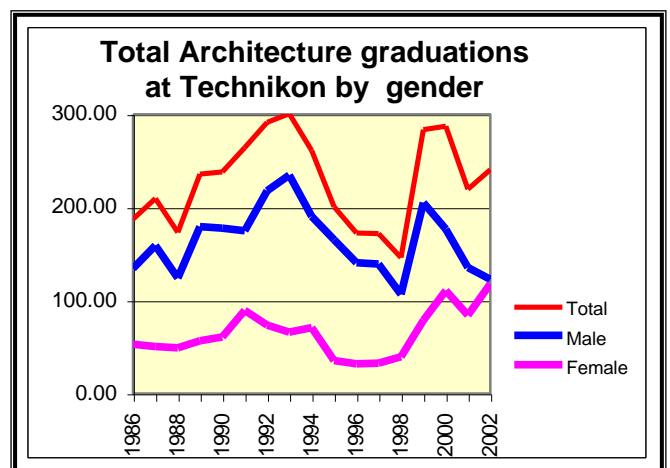
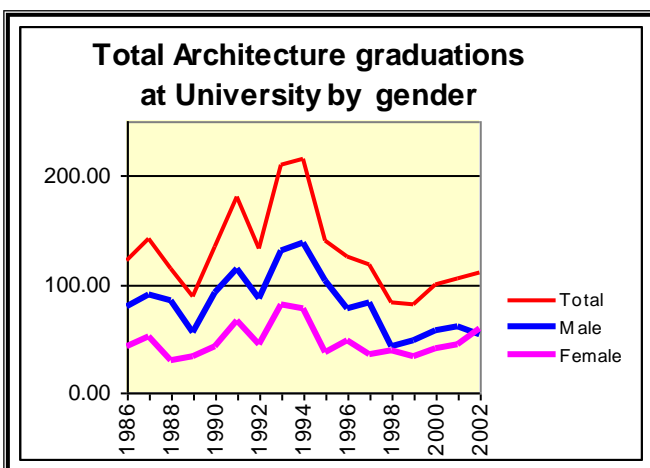
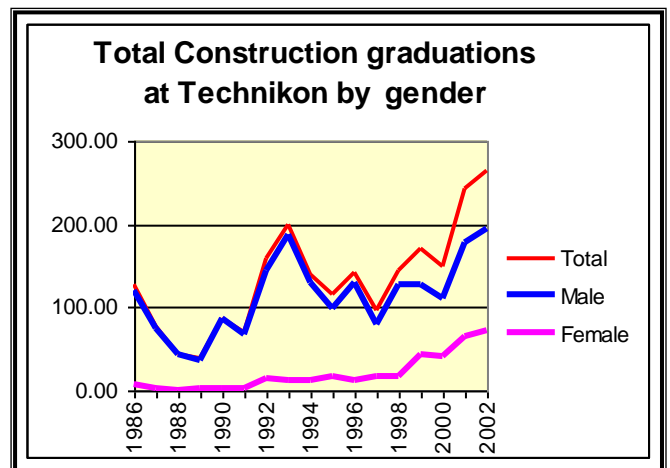
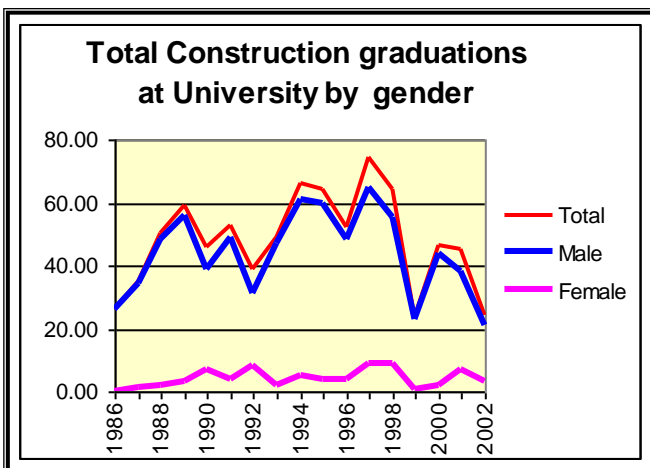
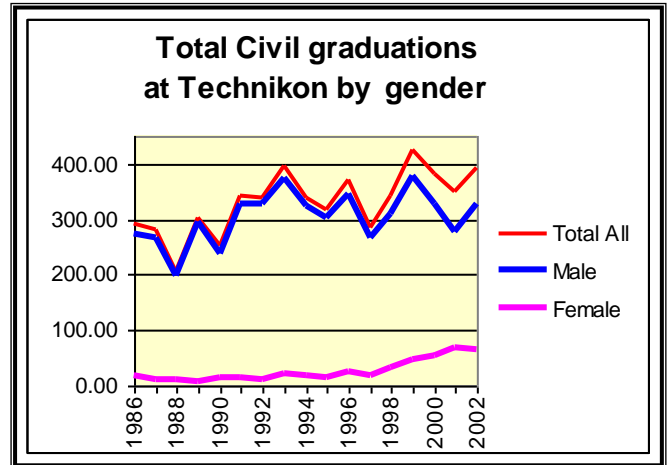
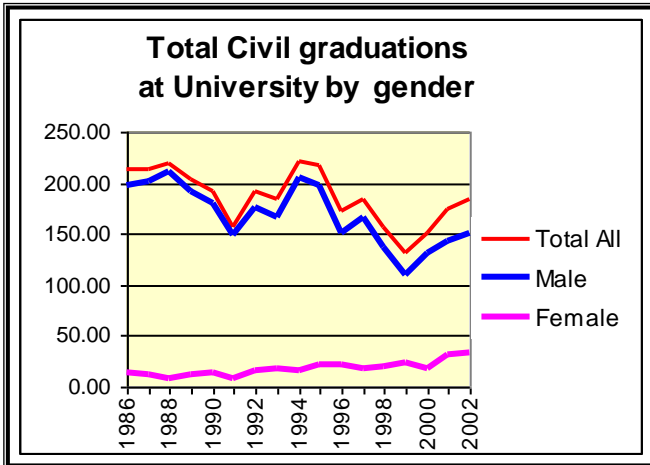


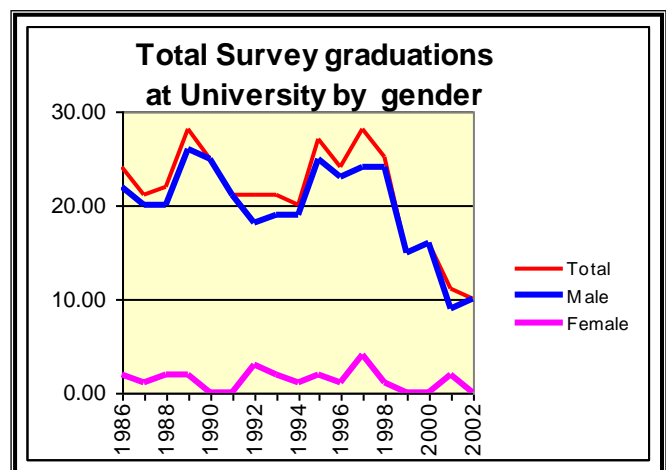
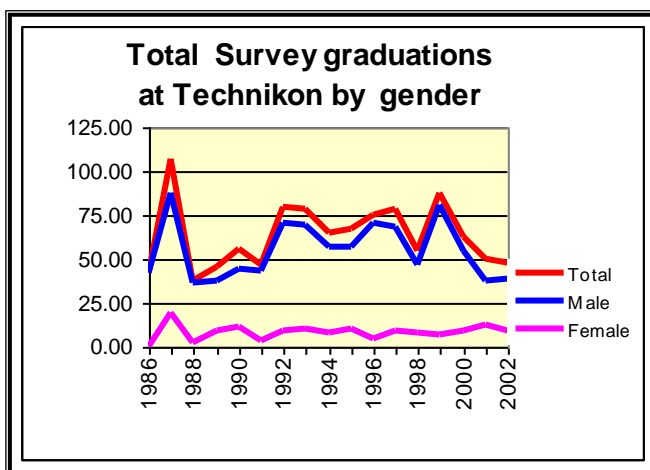
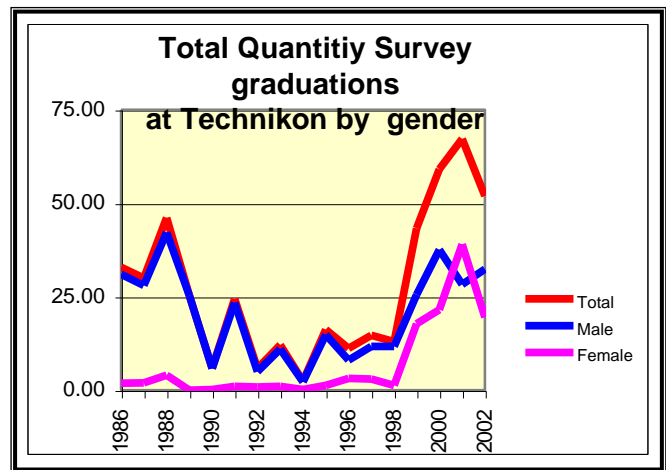
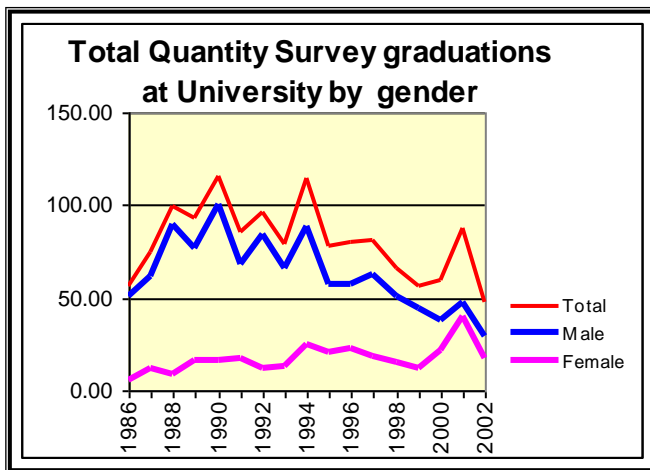
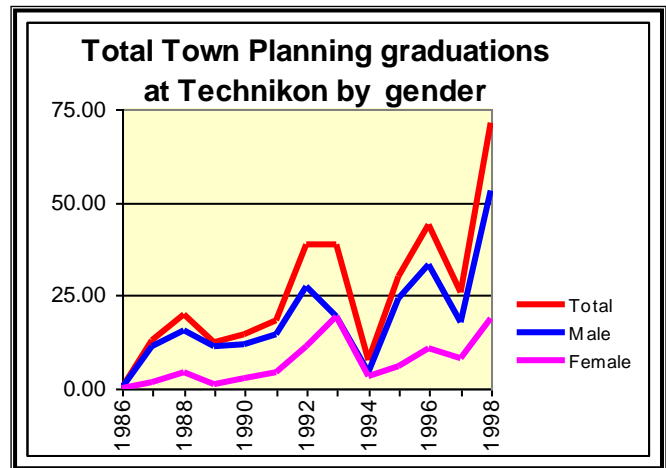
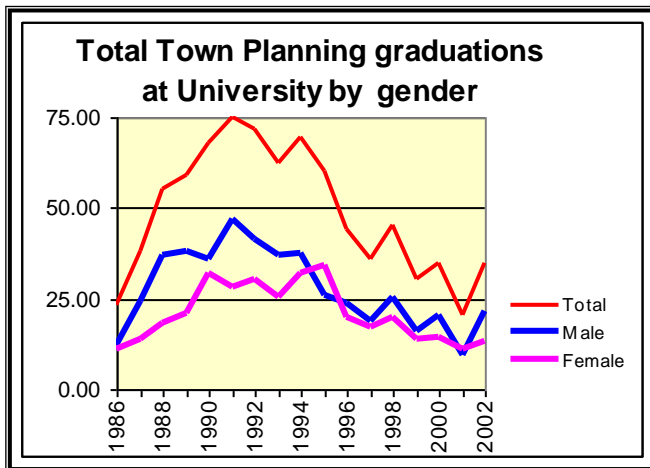
As the B Tech qualification was only introduced in 1994, each profession mounted campaigns to encourage their diploma graduates to return to Technikon to enhance their qualifications. The various peaks between 1996 and 1998 reflect the initial flurry of activity as those in practice returned to study.



3.8 Gender

The Built Environment still appears to be a male domain, with meaningful change appearing in Technikon enrolments and graduations. Some qualifications appeal more than others, with survey reflecting the lowest registration of females. This is perhaps understandable in terms of field work, but many survey posts are office based and manning of SG offices nationwide needs to be considered as a matter of urgency.





Given that engineering seeks to attract the upper echelon of school leavers it is incongruous that an industry appears to deliberately exclude over 50% of those suitably qualified. Medicine and law attract the vast majority of these high achievers.

Given that women have many attributes valuable to the business world and in particular considering the humanitarian aspects of the Built Environment, much effort is still needed to encourage and retain women into the industry.

It is well documented that:

- Women are natural negotiators
- Women are excellent multi-taskers
- Women are hard workers
- Women have empathy with the client/community – in South Africa with matriarchal nature of the rural community, women command respect and can make excellent progress with community negotiations.

Yet, these attributes are not valued when selecting suitable staff. All too often well qualified women have been offered employment on condition that they agree not to fall pregnant within the first 3 years of employment! It is also made very clear that promotion opportunities are limited if they are planning to start a family at any stage.

Their male counterparts have rarely been offered employment based on their remaining with the company for a minimum of three years.

Companies fearing pregnancy are extremely short sighted. When an experienced professional resigns, seldom is it possible to find a replacement to start immediately the post becomes vacant. Hence there is a gap of a month or 2 before the successor is available. The new incumbent needs to learn the ways of the company, get to know the clients etc, and is rarely up to speed in less than 6 months. This means that the company has suffered reduced productivity for 6-8 months.

When a female professional takes time off for the birth of a child, she is rarely away more than 4 months, and is usually available telephonically to answer questions about projects, and pops into the office from time to time to help out.

Swedish research has shown that women have to work 260% harder than their male counterparts to achieve the same levels of promotion – further proof of their willingness to work hard - a great asset to any company. However, there has never been a female town engineer, and there are only one or two female senior technical partners or directors in consulting firms or contracting.

Guidelines or policies need to be developed to allow women to take their places in the industry and awareness campaigns are needed to encourage women to enter the professions and companies to employ women appropriately.

3.9 Transformation

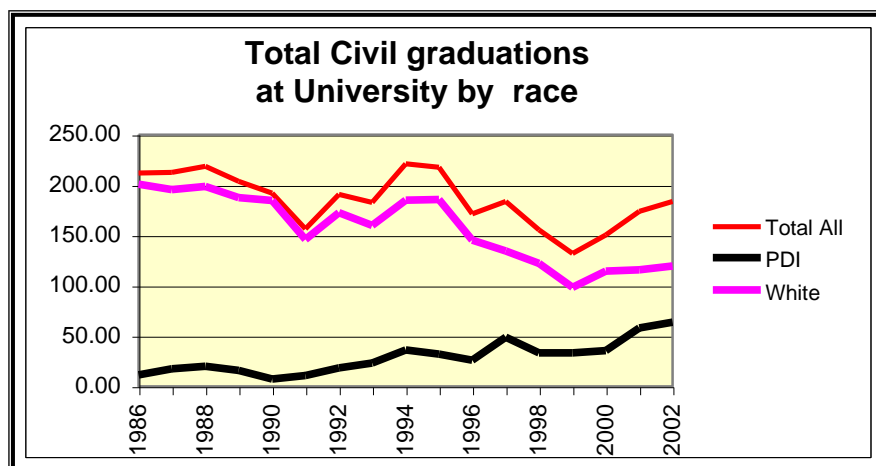
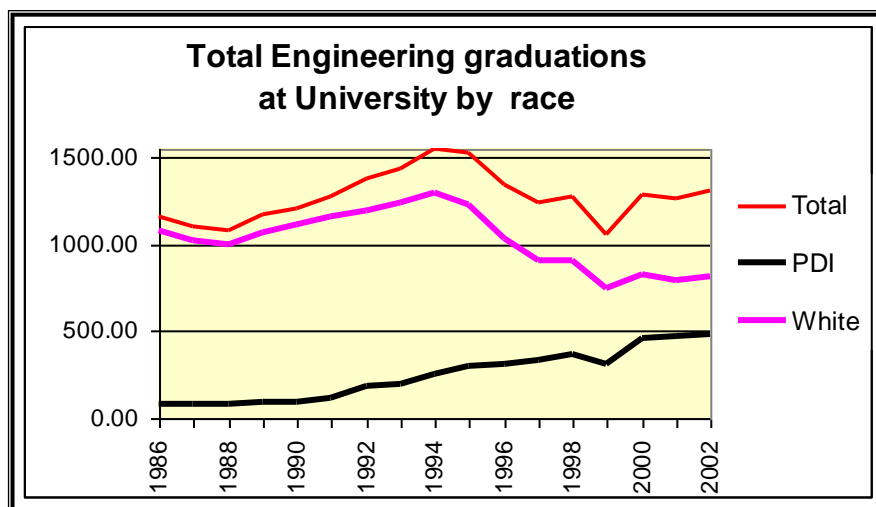
As mentioned earlier career guidance at all schools – rural and urban, co-ed and single sex schools commenced in the mid to late eighties and slowly but surely, tertiary institutions have seen an increase in females, and previously disadvantaged students.

At the outset, changes were not significant. However, the release of Mandela and the move to democracy, paved the way for many more previously disadvantaged students to enter tertiary studies in the Built Environment, and by 1998 graduations of previously disadvantaged students at Technikons exceeded those of the previously dominant white males.

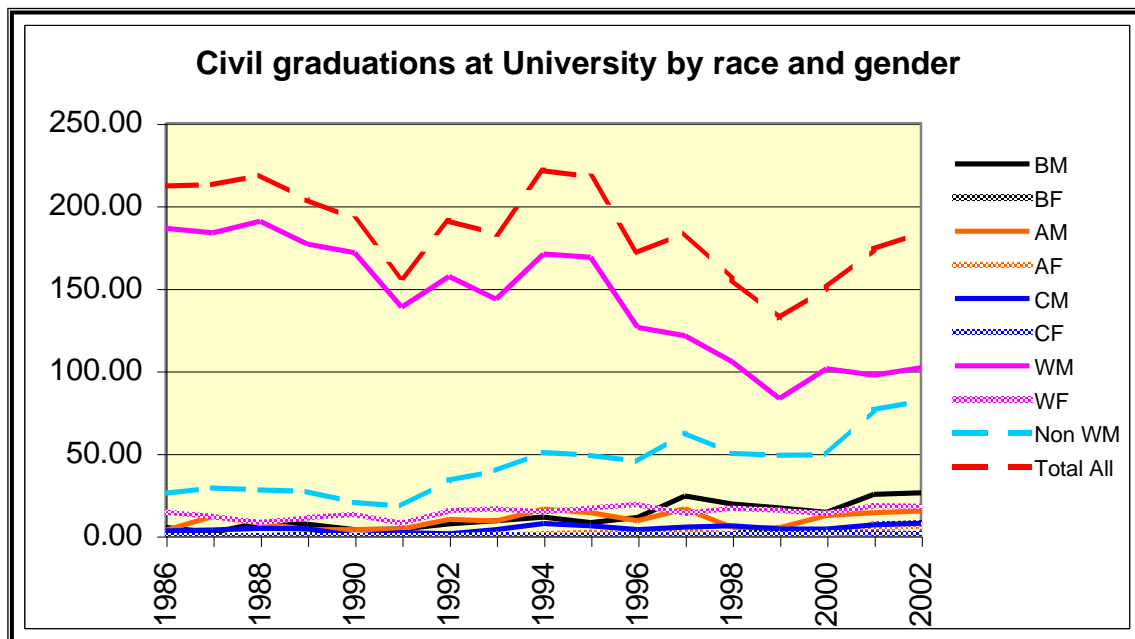
The data being studied in this section is a comparison of the University professional undergraduate degree (B Sc) and both the National Diploma and the National Higher Diploma at Technikons. The abbreviations used are B=Black, A=Asian, C=Coloured, W=White, M=Male, F=Female

3.9.1 Engineering graduations – Universities

Total engineering graduations in this context relates to B Sc degrees in all engineering disciplines – including aeronautical, chemical, civil, electrical, mechanical, marine, etc. It is interesting to note that the trend applying to all engineering is close to that applying to civil engineering, however the % of students that graduate in civil engineering is approximately 30%, where as in engineering as a whole, it is 40%. Other fields of engineering, particularly electrical and electronics, appeal more to the pdi entrants with double the number entering this field compared to civil engineering.



Looking at the engineering qualifications in more detail it is interesting to note which groups favours studies in civil engineering and survey.



The Non WM referred to in the table above, is the total of all graduates who are not-white males. This had increased, and while the actual number of white males graduates has decreased there are still 25% more white males graduating than the total of the other groupings.. The next largest group of graduates is the black male, but at the rate of graduation to date, there is little hope of short to medium term transformation at management level in civil engineering organisations.

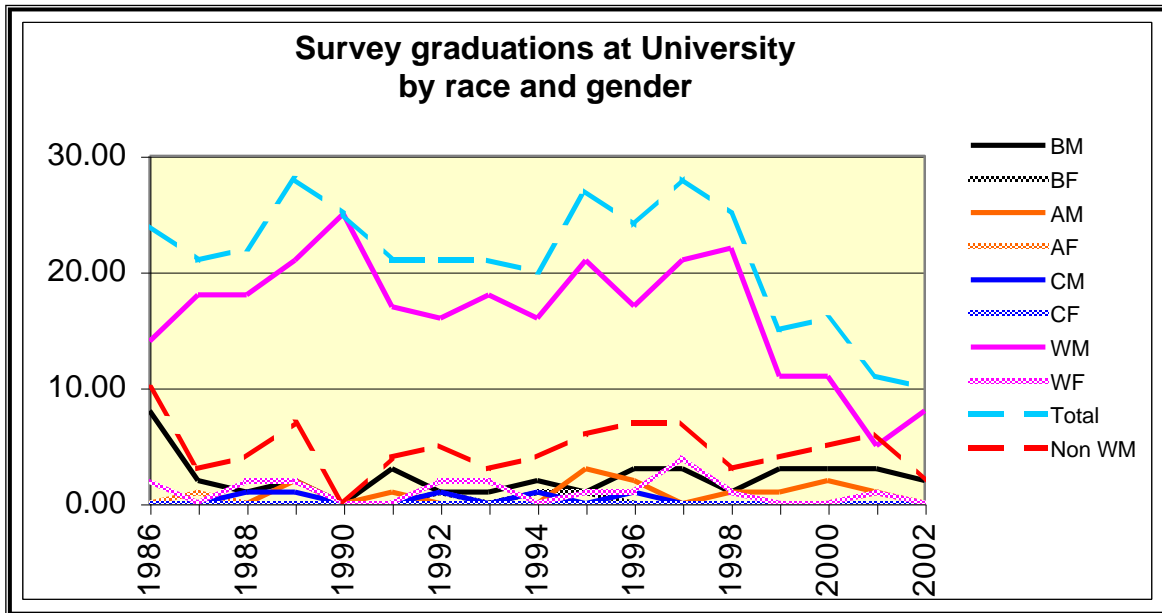
Issues that must be addressed are as follows:

- Promote the profession more in disadvantaged communities
- Identify candidates of the appropriate Matriculation standard and nurture them
- Ensure comprehensive bridging/ foundation programmes to ensure that these entrants actually graduate
- Put comprehensive in-service training and mentorship in place to ensure that these graduates remain in the industry
- Be careful not to set BEE targets in the industry unrealistically high, as this will only result in window dressing due to the shortage of young black professionals

First year registrations at Universities in 2004 show the same trend with a low % of black males (24%) and total numbers of pdi students still below 50%.

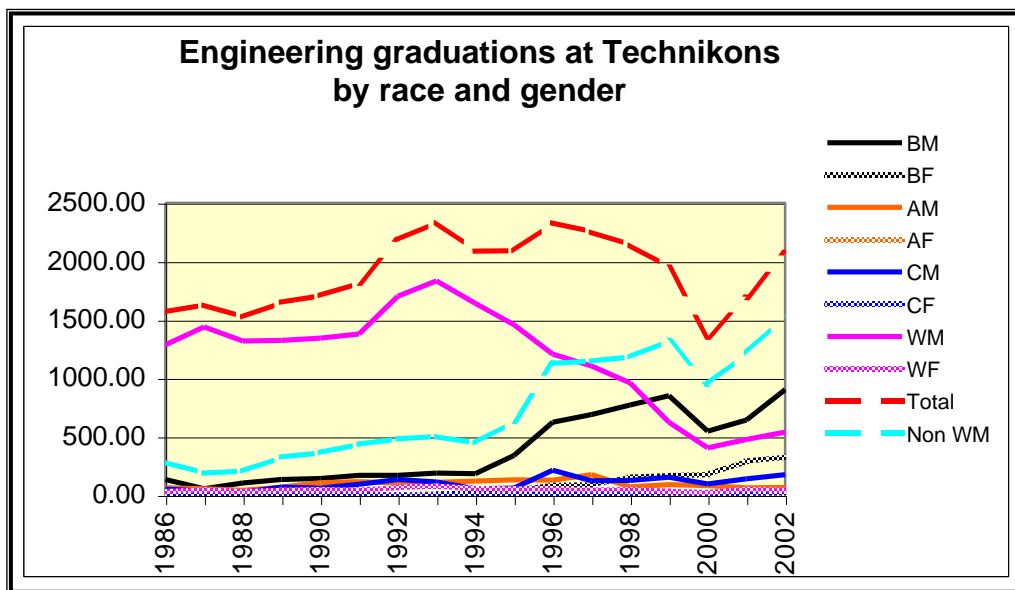
These students have still to qualify, be trained, register and gain experience before they can take their place in management positions, so there is still a long way to go in terms of transformation in this industry.

Transformation in the Survey field is minimal, but bells need to be ringing for Survey as a whole. The profession recognised that the numbers graduating in the seventies and the early eighties were too high given the introduction of electronic instruments, satellites and GPS systems. Promotion of the profession has therefore not taken place, and now the numbers have dropped too low to even support the statutory aspects of Survey. Research into the numbers required, and a recovery plan is urgently needed.

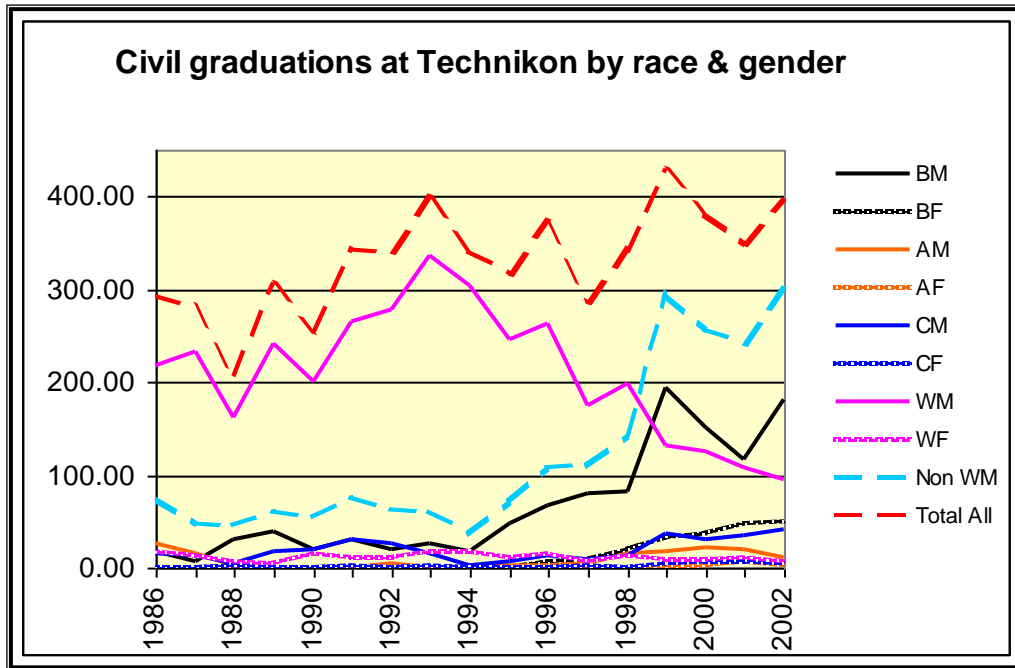


3.9.2 Engineering graduations - Technikon

The picture is somewhat different at Technikon, with the student population transforming dramatically.



The picture is similar when looking at civil engineering – all engineering and civil engineering graduations have now reached 75% who are not white males.

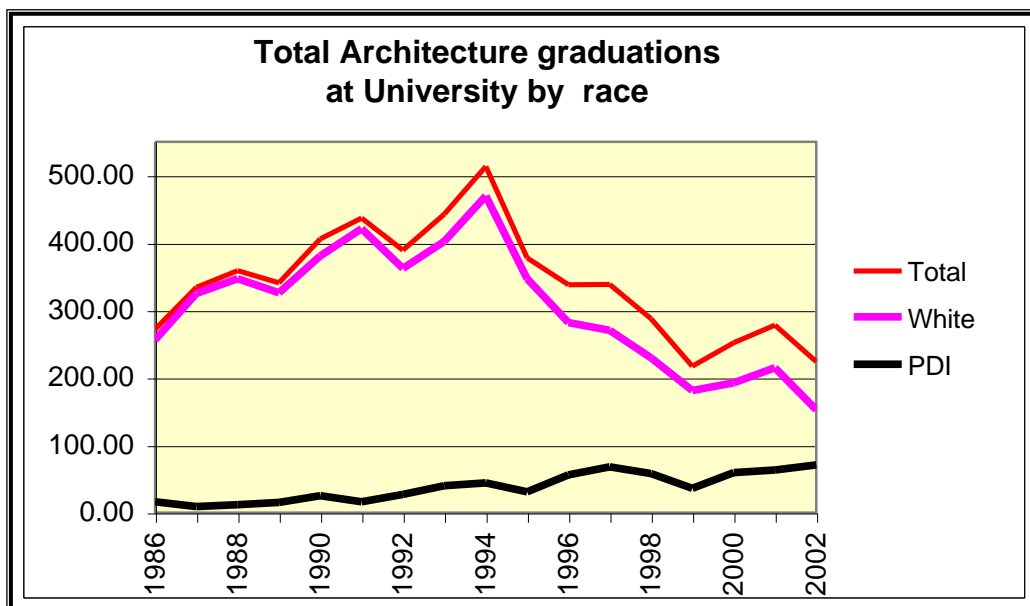


However, these numbers are not reflected in industry, and much work needs to be done to ensure that all graduates are employed. Learnerships and research into the numbers actually required needs to be put in place to ensure that the capacity that has already had tertiary training is not wasted.

3.9.3 Architectural graduations – Universities

Here the trends are similar to those in civil engineering, with pdi graduations being some 30% of the total. The total architectural figure is made up of

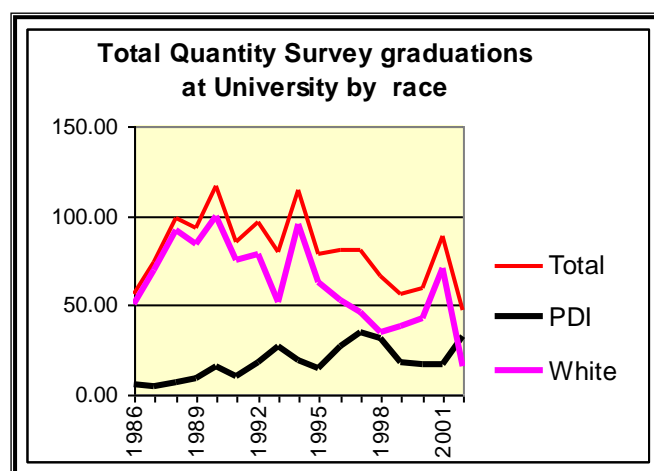
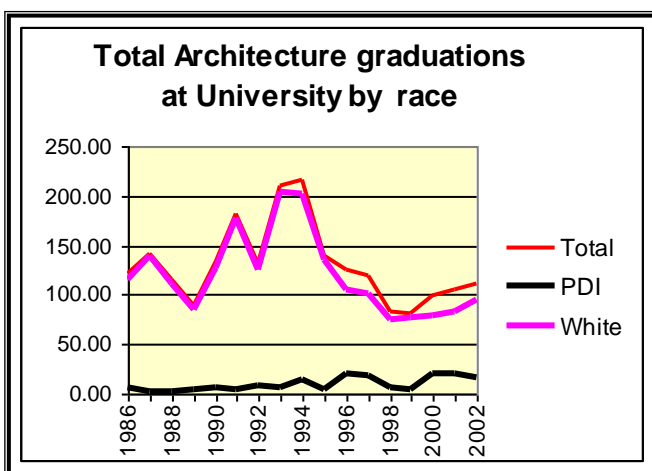
- Architecture
- Building Science
- Construction management
- Landscape architecture
- Quantity survey
- Town planning



Looking at each of the fields on their own, it is interesting to note that architecture itself is not popular amongst the previously disadvantaged, whilst quantity surveying has transformed the most with 68% pdi graduation in 2002

Discipline	Total	PDI% of Total
Architecuture	111	14%
Building	7	9%
Construction Man	24	38%
QS	47	68%
Town Planning	35	40%

Basic degree – Graduations in 2002



3.9.4 Architectural graduations - Technikons

Quantity Surveying is again shown as the most popular of the architecture qualifications amongst pdis at Technikons.

Discipline	Total	PDI% of Total
Architecuture	241	50%
Building	14	51%
Construction Man	265	79%
QS	52	90%
Town Planning	1	100%

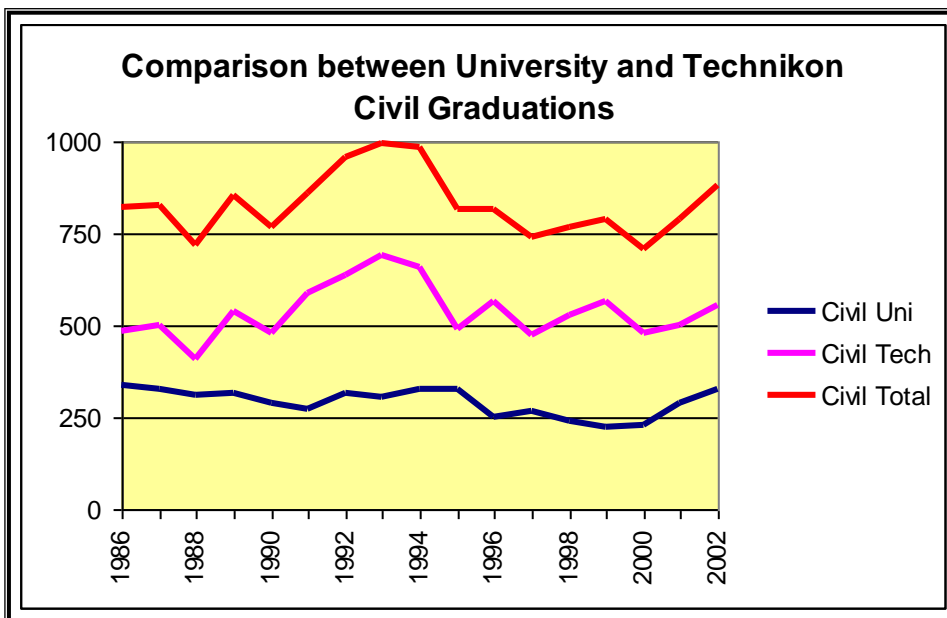
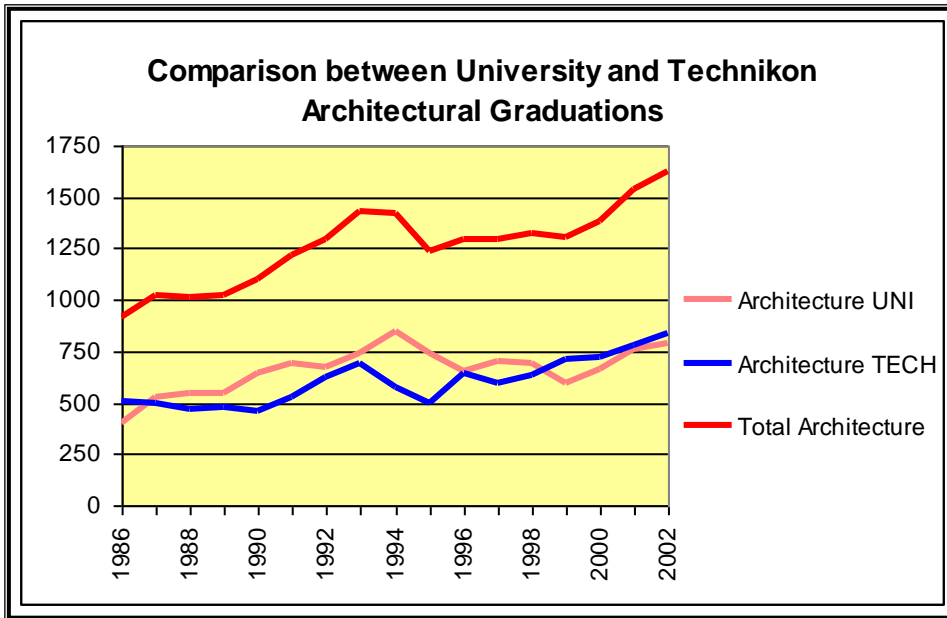
Diploma – Graduations in 2002

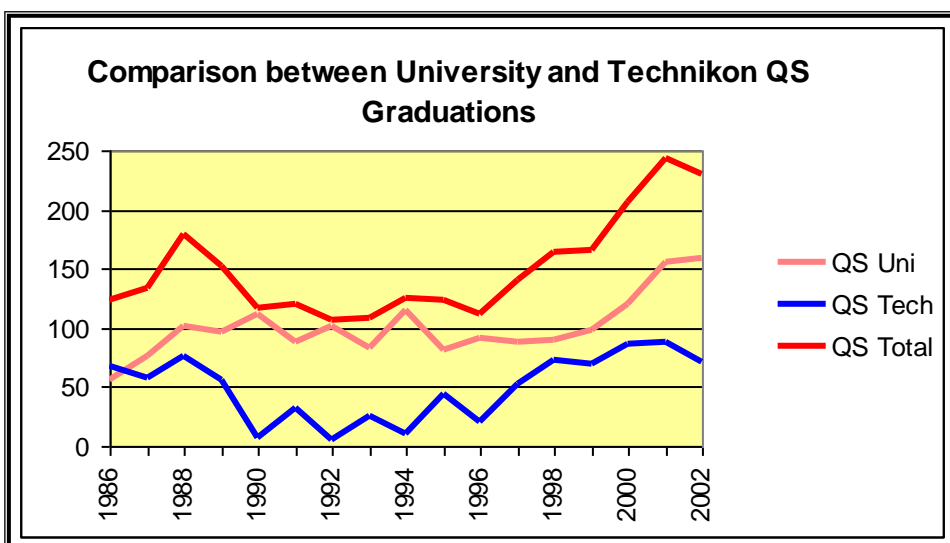
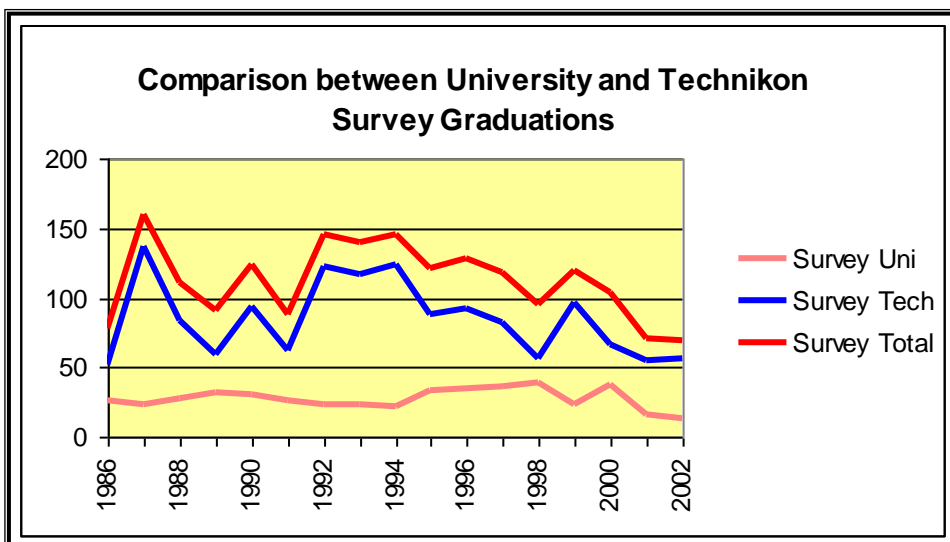
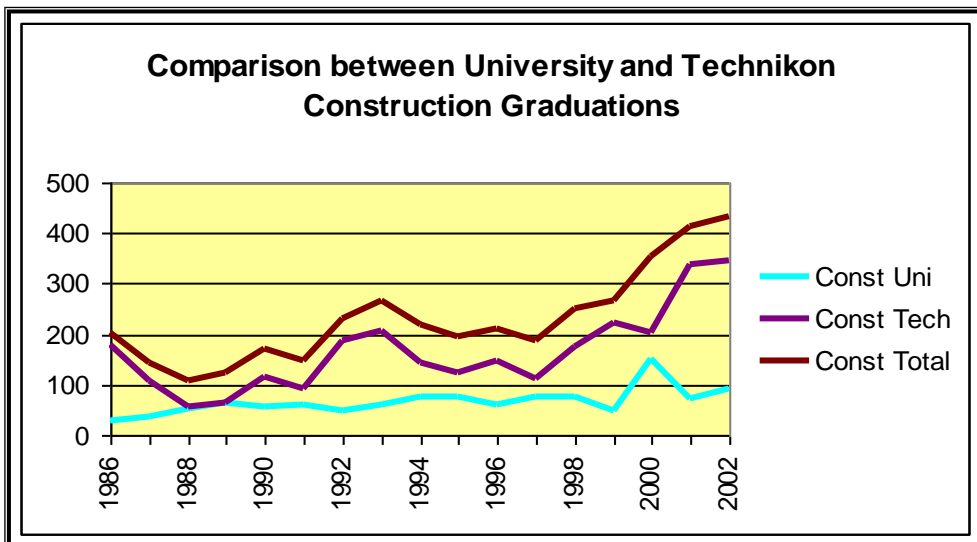
There appears to be a problem with the Town Planning classification. It is possibly because Town Planning is generally a postgraduate qualification. An investigation will have to be carried out. The DOE SQL dataset reflected a steady increase in the number of town planning graduates up to 1998, but shows few in the Access database.

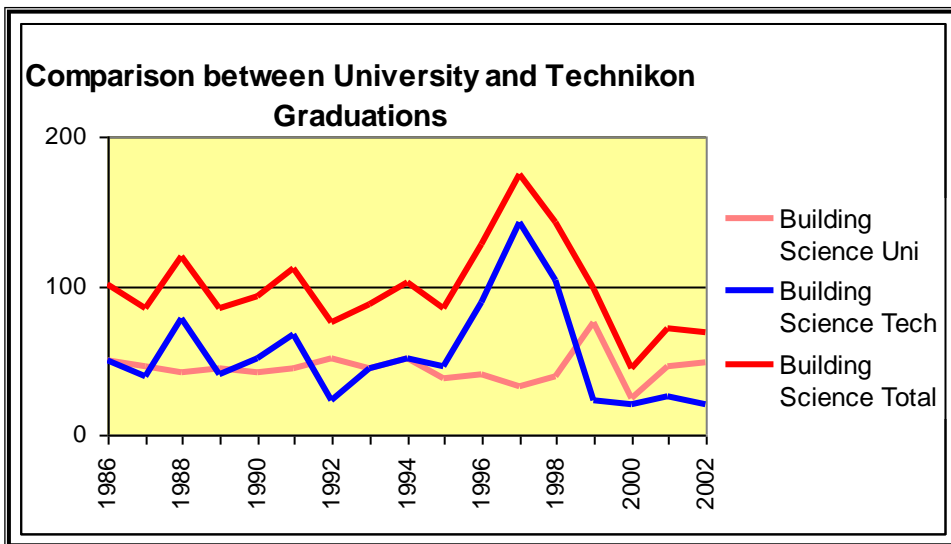
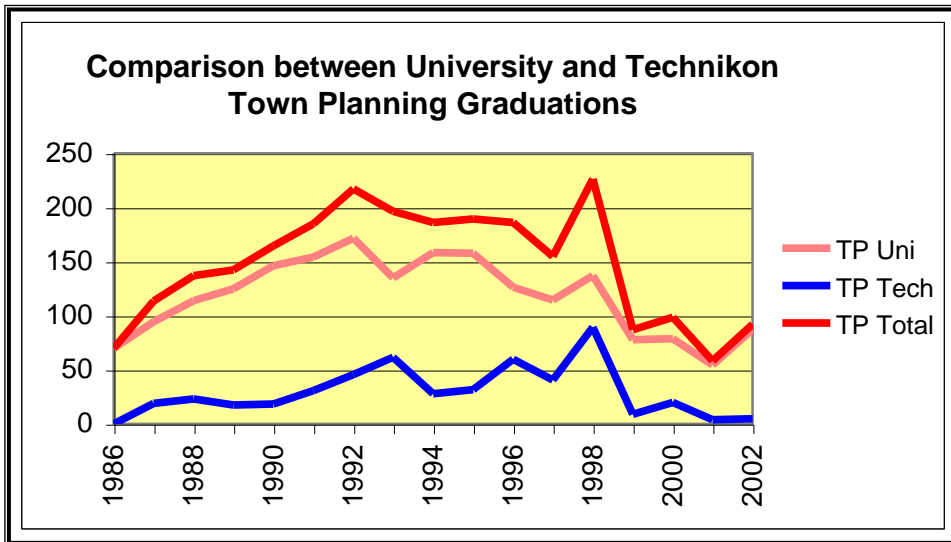
Once again however, these numbers are not reflected in practice and effort must be put in to ensure that all graduates succeed in their chosen professions.

3.10 Comparison between University and Technikon graduations

Many of the above statistics have given some indication of the difference between University and Technikon graduations and student preferences. A closer look is required to determine whether the split of Technikon to University students is accommodated in industry.







Technikon data relating to both Town Planning and Building Science after 1998 is suspect – but trends can be seen up to 1998.

Looking at all the comparisons, it rests with the professional bodies to comment on the suitability of this mix of students – but observations will be made when studying the statistics relating to professional submissions ex the representative bodies.

4 The professions

4.1 Methodology

The Association of Consulting Engineers (SAACE) has carried out regular surveys over a number of years, amongst its member companies. The data collected has proved very useful in many situations. As part of the Skills Plan however, a clearer understanding of the professional qualification split was required, and questionnaires based on SAACE's material were prepared, modified to suit the current investigation.

In addition, an individual salary survey was added in the hope that we would get a rough indication of remuneration levels in various fields and for various qualifications.

In the time given, we could not hope for a comprehensive set of responses, but did receive enough to give some indication of professional splits, salary levels, and perceptions about Skills Development and the SETAs.

Each body in the industry modified the questionnaire for their own particular members, distributed and collated data where they had capacity. A range of methods was used for distribution such as emailing, faxing and posting.

The organisations that were involved were as follows:

SAACE	the SA Association of Consulting engineers
SAIA	the SA Institute of Architects
SACAP	the South African Council of Architectural Professionals (The above two surveys were managed by SAIA)
ILASA	the Institute of Landscape Architects of SA
AQSAS	the Association of Quantity Surveyors of SA
ACTRP	the Association of Consulting Town and Regional Planners
SAIG	the SA Institute of Geomaticians
ITESSA	Institute of Topographical and Engineering Surveyors of SA (The above two surveys were managed by SAIA)
SABTACO	the SA Black Technical & Allied Careers Organization
IMESA	the Institute of Municipal Engineers of South Africa

Many organisations do not represent companies, but have only individual members. However, the questionnaire was structured to have a section to be answered by individuals, and another section for company principals to submit company details in instances where they have not submitted such information to any other body collecting data. Many company responses were therefore received as a result of individual approaches.

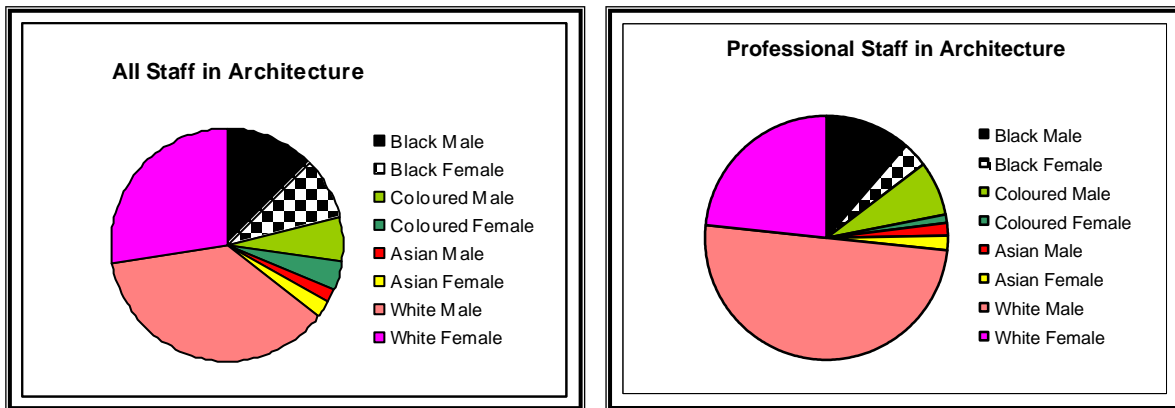
The distribution and response profile was as follows:

Discipline	Organisation	COMPANIES			INDIVIDUALS		
		No of companies contacted	No of member companies	No responded	No of members contacted	No of members	No responded
Architecture	SAIA - Incorporating Institute of Architects and Council of Architectural Professionals - hence some duplication in distribution (SACAP)			50	3000	2200	437
Civil Engineering	SAICE			60	3631	5900	260
Consulting	SAACE (data already extrapolated to the real world)	440	440	100			
Landscape architecture	ILASA			3	60	60	8
Quantity survey	ASAQS	664	690	65		3300	
Townplanning	ACTRP	67	100	32			
Survey - eng and land	PLATO			161	753	1310	161
Other networks responding into SAICE research							
SABTACO		170	200	8			
IMESA				2	300	600	8
Industrial (overlap with SAICE, sent later to catch any missing)					300		12
TOTAL		1341	1430	481	8044	13370	886

Copies of the questionnaires are published in the appendices.

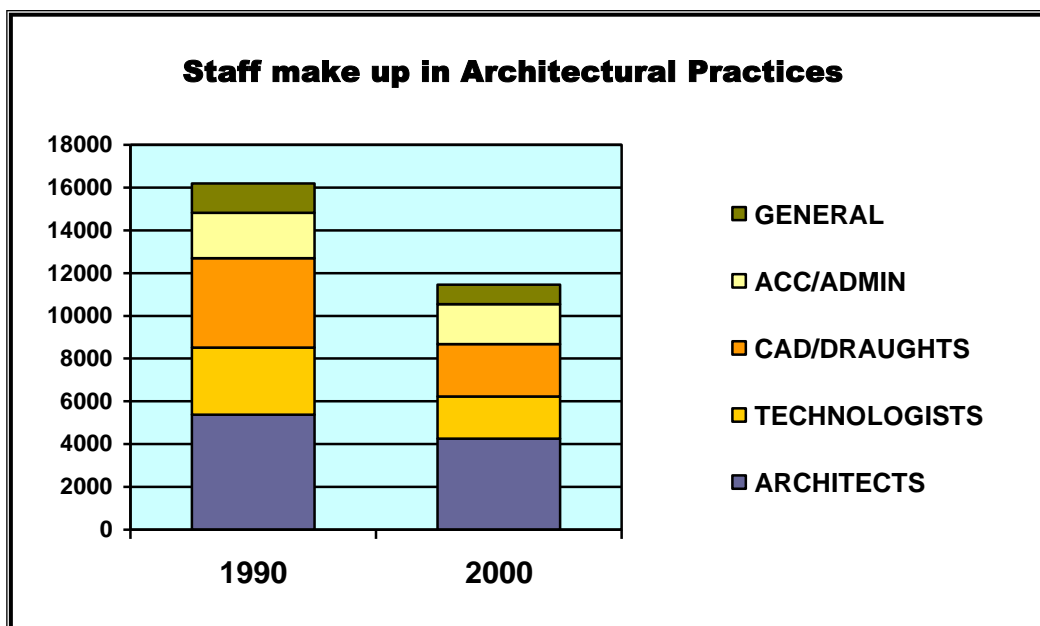
4.2 Architecture

The architectural profession has shown the most marked changes in terms of gender from those pale male days.



Professional staff here are considered as all staff other than administration and accounting staff- generally a small percentage of pdi black architects are now operating in the field, but the majority are involved as draughtsman and technicians.

A comprehensive survey of this profession was carried out in 2000. During this survey, companies were asked to submit data from as far back as 1990. Comparative figures over the 10 years show a marked changed in the numbers of technician staff (i.e draughtsmen and technical staff as opposed to architects).

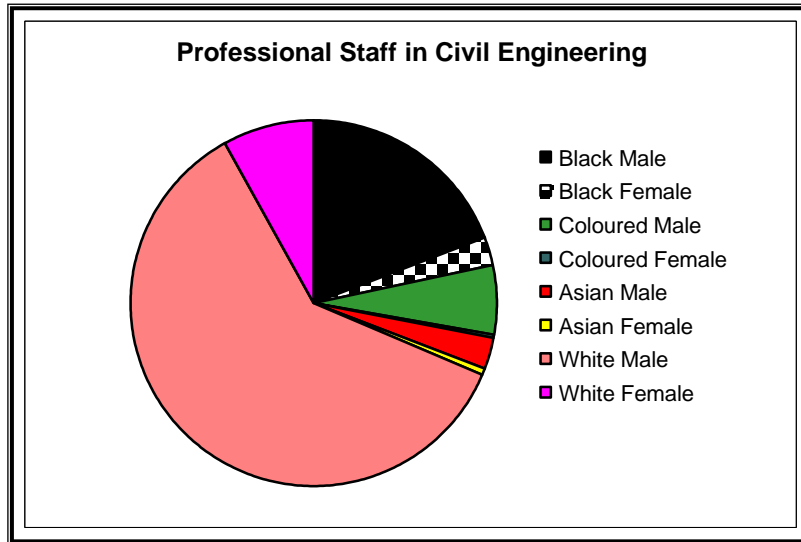


The numbers graduating at University and Technikon are similar in architecture, hence the approximately 50/50 of architects versus technologists and draughtsman in the profession in 2000, relates to current training composition.

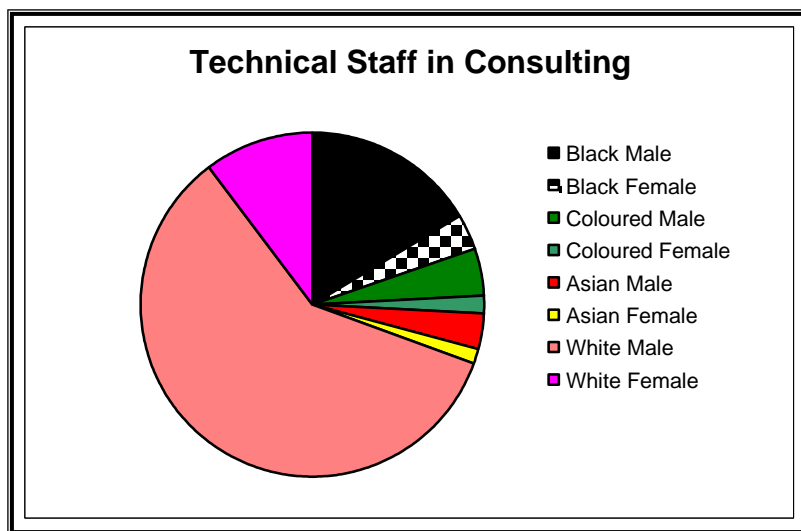
(SAIA achieved a 25% response to the current survey as a result of sending a reminder out again after 5 March soliciting more responses. There had been 297 replies to 5 March 2004 and a further 140 responses were received by 19 March. Thus this set of data can be considered reasonable representative.)

4.3 Civil Engineering

Since we are considering professional practices in this survey, site staff, involved in contracting and local government, have been ignored for the purpose of staff composition.

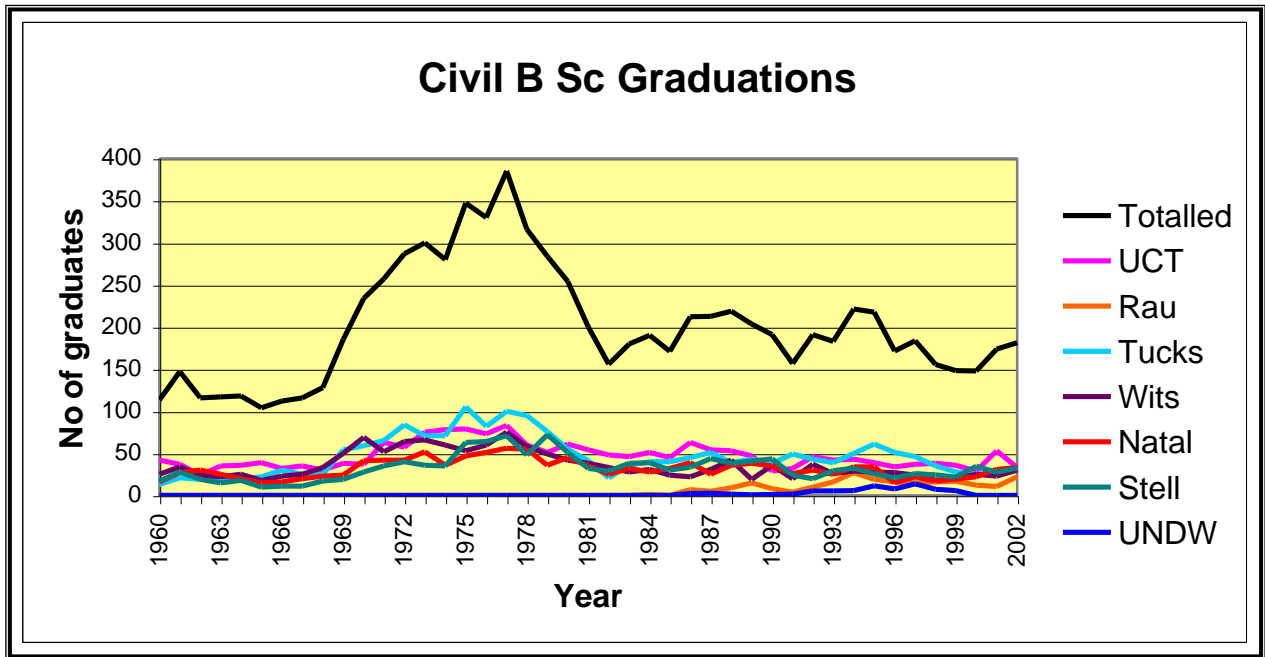


Whilst the white male still dominates, his share has reduced to just less than 70%. Comparing the figures submitted by SAICE members with those collected by SAACE over the years, the statistics are similar. Those submitting company details through the SAICE survey were not members of SAACE, but were involved in consulting, private companies, local, central government and parastatals.



4.3.1 Boom and bust

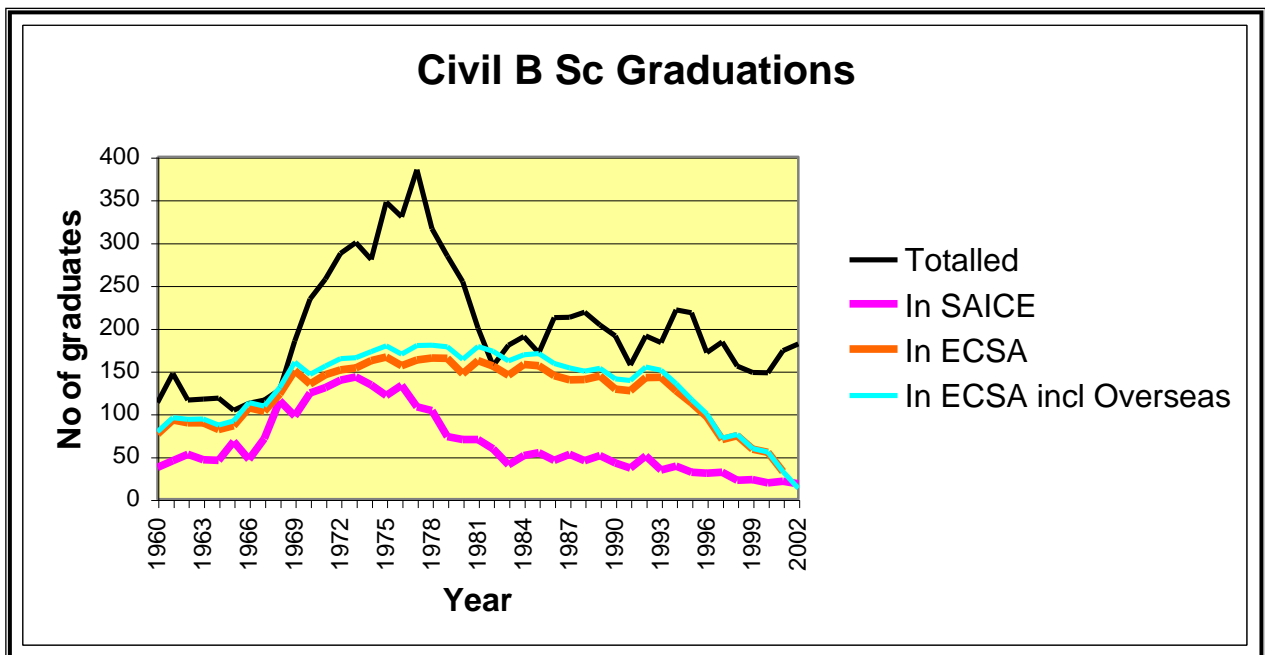
Studying the industry over an extended period also yields some interesting trends. The figures below represent a full working career of engineering graduates – a person graduating in 1960 would be turning 65 this year and would be retiring soon, if not already.



At a time when technical colleges provided draughtsmen and detailers, high numbers of engineers were qualifying during the boom years in South Africa. This number dropped when the economy slowed down in the eighties. At this time the affordable PC came to market. In parallel the technology qualifications were enhanced, and a change of thinking took place in terms of the number of technical staff to degreed professionals required.

Hugo et al suggested in 1988 that the ratio of engineer to technical personal should be 1:4. Tertiary institutions have now achieved this ratio, but the Technikon numbers are not being absorbed into the industry. Their theory was developed at a time when computers were slow and software was not as sophisticated as it is to day. With personal computer on each desk, it is possibly time to review this theory.

Studying the ECSA age profile of those still belonging, it can be seen that the excesses trained in the late seventies and early eighties are no longer in the industry and many are possibly not even in the country.



Also plotting the SAICE age profile offers an interesting perspective of later graduates. When people leave the industry but stay in the country, they general resign from SAICE, but retain their ECSA membership in case they wish to return to the industry.

Whilst SAICE clearly has much PR to do to increase its membership, the numbers between the orange ECSA line and SAICE membership represent at least in part people that have left the industry but remained in the country. This offers a source of staff, if we could only establish and remedy the reasons for them leaving the industry.

Where members have travelled overseas but plan to return, they also cancel their SAIC registration, but retain their ECSA registration, hence the pale blue line. Where people emigrate for good they generally cancel all local memberships.

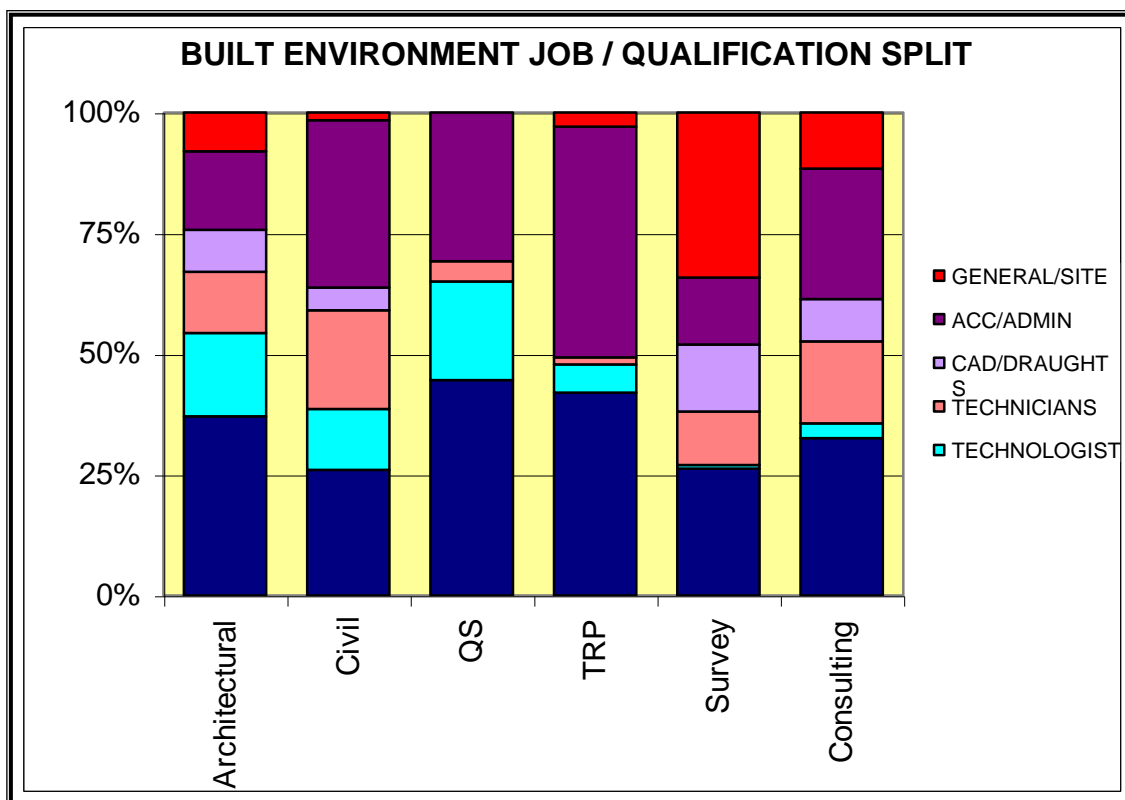
4.3.2 The ratio of engineers to technical personal

Studying the ratio of engineers, technicians and technologists, a disparity exists between employment and those graduating.

From the examination of tertiary training, it was seen that the ratio of technically trained staff is just under 4 times that of University graduates. The ratios in industry seen below are only slightly over 2 to 1.

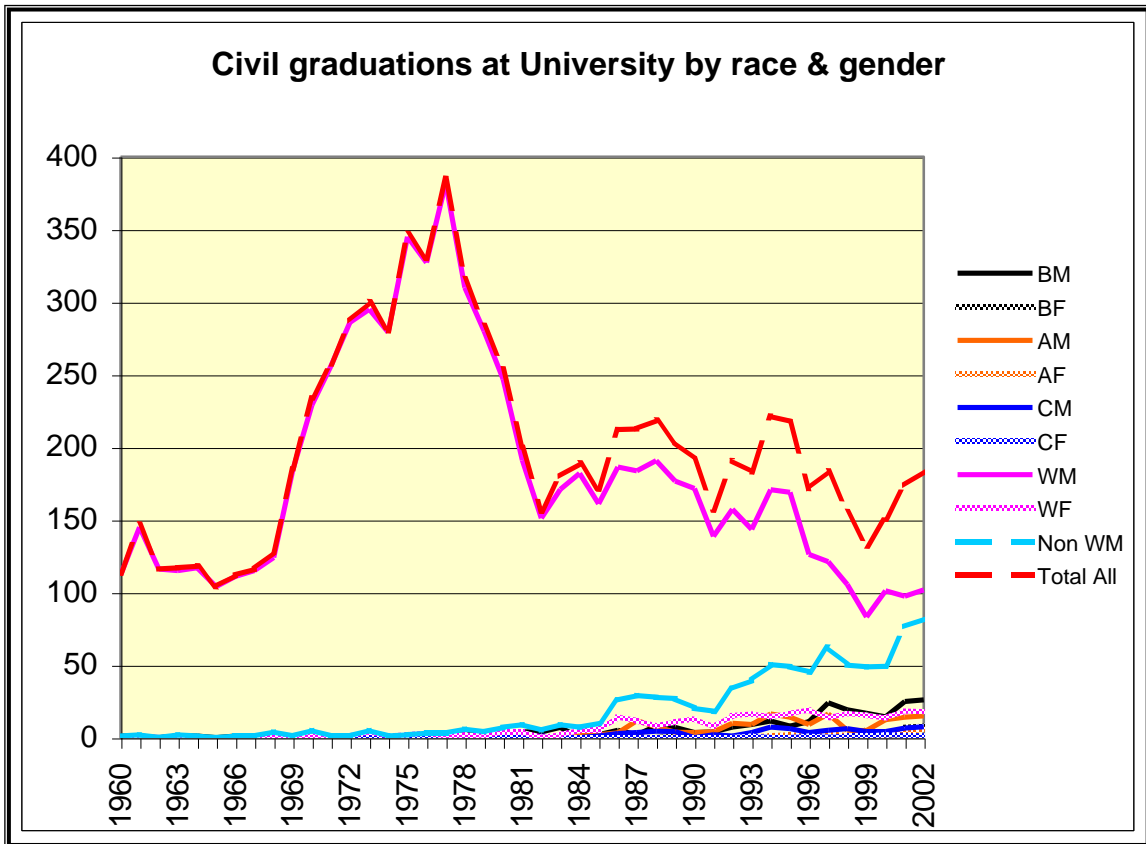
If industry is not able to sustain qualified engineers, can the 1:4 ratio proposed be correct?

Research is required to determine what ratio is appropriate and what training is actually required at Technikons to support the industry.

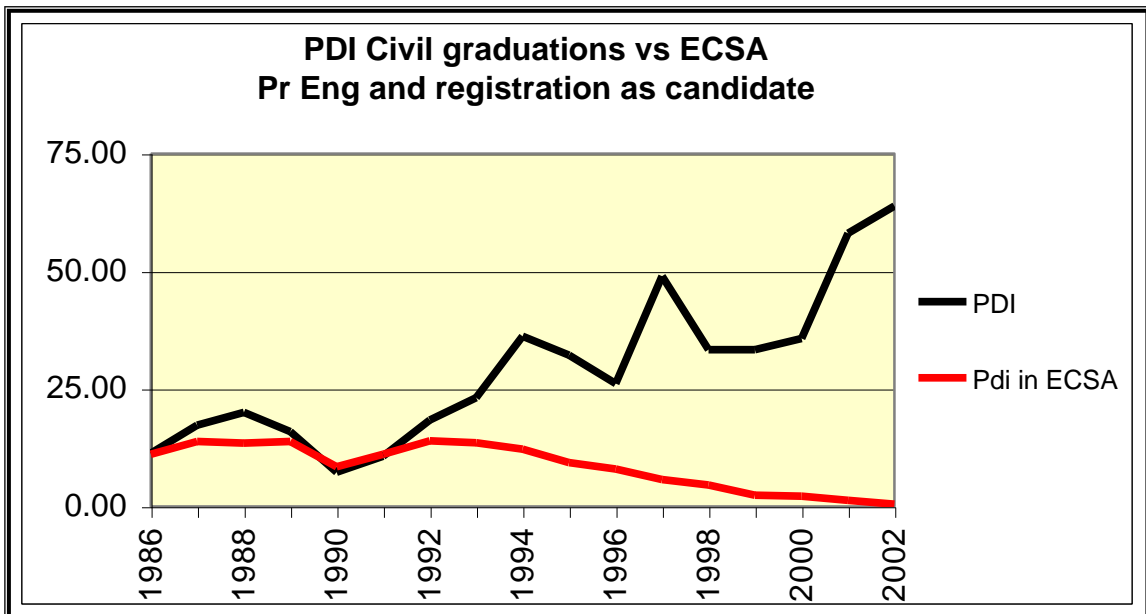


4.3.3 Transformation

To complete the civil engineering picture, transformation when plotted against the society of the sixties makes interesting reading.



Whilst transformation looks impressive against the origins of an all white male industry, there is a worrying trend, in that the % of pdis registering with ECSA is significantly lower than their white counterparts. Both female and black graduates have been slower to register than white males. Whilst most white graduates register within 4 to 5 years of graduating, only half the black graduates have registered in this time frame, and a third of the female graduates.



Attention needs to be paid to this. One of the theories is that industry is too hostile towards these groupings and hence they leave the industry before being fully trained and able to register.

Interviewing some graduates who have left the industry, sights lack of interest / involvement on the part of their employers to spend time with them on career path planning, and adequate supervision, mentorship and training. Young graduates have been taught a particular skill and have then become locked into production in this area as it is most cost effective for their companies. Without developing all round abilities, these young people will not become the leaders of to-morrow.

More research is needed in the area of motivation and retention of young graduates

4.3.4 Unemployment and unfilled posts

The debate in civil engineering continues as to whether there are too many or too few professionals. It appears that many civil professionals cannot find work, and the Professional Engineers Employment service report that they have many, many staff on their books and web-site who cannot find work.

At the same time we hear how it is impossible to find staff.

A detailed analysis of unemployed, or available staff, and vacant posts needs to be carried out to determine the requirements of the industry, and perhaps address the problem by re-training or financial incentives.

4.4 SAACE

The SAACE management information is included here for reference. This set of data has been extrapolated to the real world.

MANAGEMENT INFORMATION SURVEY: Extract

March 2004

Table 1: Employment, salaries and gross fee income earned (12 month totals)

Survey period	Employment	Salaries / Wages 2000 prices	Fee Income, R mill			Cost Deflator	
			Current prices	Constant 2000 prices	Year-on-Year real percentage change	CPI Index	Y-o-y % Change
Jun-96	11,938	1,780	2,660	3,561		74.7	
Jun-97	12,185	2,006	3,266	4,012	12.68%	81.4	
Dec-97	12,618	2,251	3,854	4,502	12.21%	85.6	
Jun-98	12,379	2,161	3,791	4,323	7.74%	87.7	7.7%
Dec-98	11,512	1,799	3,343	3,598	-20.07%	92.9	8.5%
Jun-99	11,035	1,743	3,366	3,558	-17.69%	94.6	7.9%
Dec-99	10,382	1,574	3,061	3,212	-10.74%	95.3	2.6%
Jun-00	10,634	1,564	3,200	3,259	-8.42%	98.2	3.8%
Dec-00	11,006	1,630	3,456	3,395	5.70%	101.8	6.8%
Jun-01	10,236	1,711	3,905	3,719	14.14%	105.0	6.9%
Dec-01	10,686	1,567	3,788	3,562	4.92%	106.4	4.47%
Jun-02	10,365	1,765	4,394	3,922	5.46%	112.0	6.70%
Dec-02	10,863	1,714	4,418	3,725	4.59%	118.6	11.52%
Jun-03	10,537	1,725	4,396	3,593	-8.39%	122.4	9.21%
Dec-03 <i>Forecast</i>	10,298	1,686	4,394	3,512	-5.7%	125.1	5.5%

PROVINCIAL DISTRIBUTION OF FEE INCOME EARNED

Table 1: PROVINCIAL TURNOVER, R mill, 2000 prices

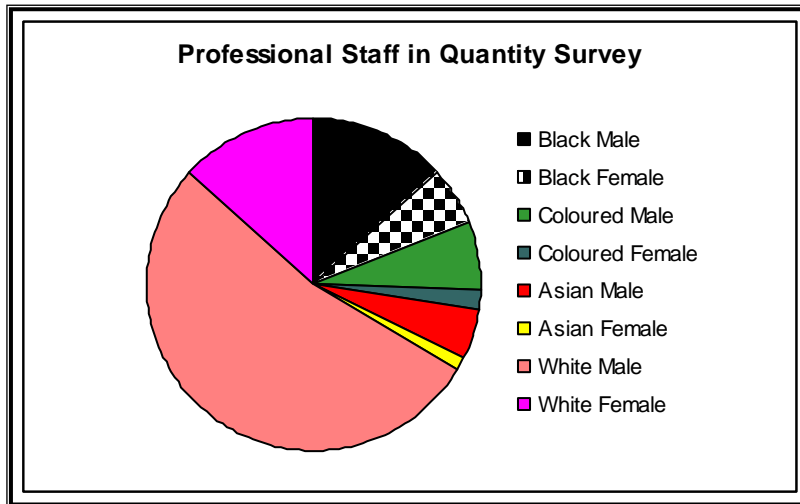
Province	Survey period							
	Dec-99	Jun-00	Dec-00	Jun-01	Dec-01	Jun-02	Dec-02	Jun-03
EC	263	222	130	253	303	276	300	406
WC	507	456	254	417	545	531	522	513
NC	71	68	61	37	43	51	54	47
FS	154	98	101	130	107	117	136	147
NW	61	109	403	197	125	146	98	81
LIM	119	143	204	141	167	191	194	177
GAU	1,185	1,204	1,482	1,484	1,282	1,477	1,209	1,031
MPU	119	117	105	141	160	138	91	112
KZN	369	449	275	398	353	434	340	418
AFRICAN	292	353	336	409	378	459	697	531
INT'L	71	39	44	112	100	102	83	130
Total	3212	3259	3395	3719	3562	3922	3726	3593

Table 2: Provincial distribution by firm size: January – June 2003

Province	Firm size				Total
	More than 100	Between 20 and 100	Between 10 and 20	Less than 10	
Gauteng	24.99%	36.89%	14.89%	29.18%	28.47%
KwaZulu/Natal	8.83%	15.77%	25.73%	12.48%	11.74%
Western Cape	16.17%	10.14%	13.53%	24.94%	14.43%
Eastern Cape	11.75%	8.75%	20.95%	9.86%	11.10%
Northern Cape	1.78%	0.35%	0.05%	3.43%	1.31%
Mpumulanga	2.38%	4.11%	0.39%	9.10%	3.04%
Free State	5.02%	1.76%	12.52%	0.05%	4.13%
Limpopo	4.94%	4.40%	7.78%	4.58%	4.87%
North West	1.67%	3.36%	2.11%	4.10%	2.29%
African	19.01%	9.67%	2.06%	1.91%	14.95%
International	3.46%	4.78%	0.00%	0.37%	3.65%

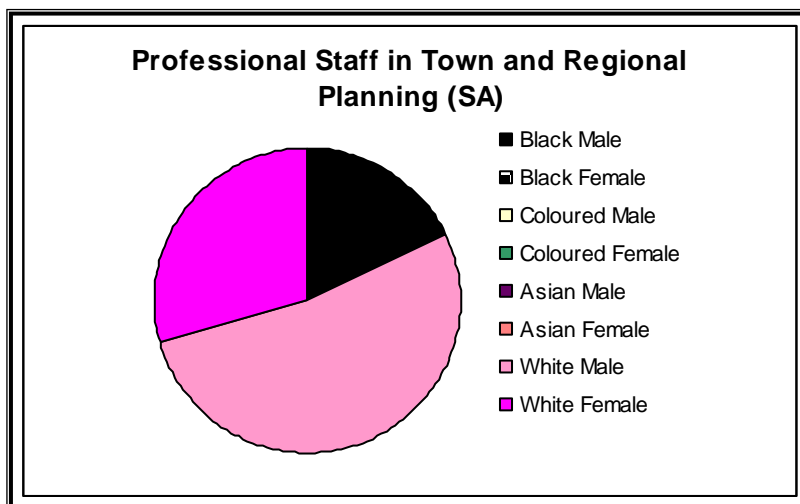
4.5 Quantity Survey

To-day's young graduates are transforming fast. The QS profession employs mostly professionals and few technologists / technicians. Hence it appears that the ratios in tertiary education match those required in practice.



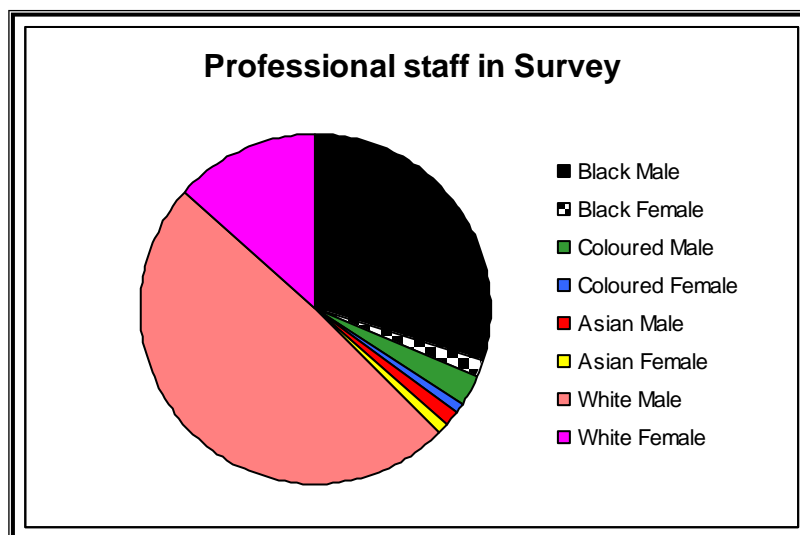
4.6 Town Planning

The sample from Town Planning practices was very small, however the results relate to tertiary research, in that University graduate over the last 10 years of been 50/50 in terms of gender. Small numbers qualify through Technikons and hence the ratio in service matches quite closely to those graduating.



4.7 Survey

The Survey profession is under threat. Studying the returns, low salaries earned by senior professionals except in one or two major posts, does little to encourage new entrants into the profession. Whilst the numbers in practice at present are almost 50/50 degreed versus diploma graduates, the numbers at University have now dropped to a fifth of the Technikon graduates. The drop to such an alarming low requires attention is needed.



4.8 Salary survey

The returns submitted included financial information such as turn over, payroll values and individual salaries against age and qualification. A study of these figures should also be carried out in order to determine whether salaries are also a stumbling block in the various fields.

4.9 Professional ratios

Given that infrastructure civil works such as roads, water, sanitation etc does not require the involvement of architects, and that civil professionals and architects only work together on structural projects, it appears that there may be too many architects or too few civil professionals. Whilst it is true that many architects work in the housing industry where they do not need to team up with civil professionals, a review of the usage of all the professions in relation to each other is necessary in order to ensure that education produces the correct mix of professionals for the industry

The town planning qualification is largely postgraduate. Many industry leaders have risen out of town planning such as Gugu Moloi (CEO of Umgeni Water Board), James Ngobeni (CEO SABBACO), Kevin Wall etc. Since town planning is essentially a postgraduate degree looking at the 'big picture stuff' and training students to take leadership role in planning, one wonders whether more students should not undergo such training.

5 Training, the SDA and SETAs

5.1 SETA affiliation and use of the skills levies

The initial thinking in terms of sending questionnaires to individuals was to verify the profiles returned from the SAACE research project. Using the SAICE database presented problems in that members work in many fields beyond that of the jurisdiction of CETA such as municipal, transport, manufacturing and mining. It was therefore decided to ask all individuals and companies to indicate, if they could, the SETA under which their company fell.

It was shocking to find that less than 5% of the respondents had any notion of the SETA that their company belonged to!

The SAIA decided to extend their questionnaire to determine whether any architectural companies had participated in or benefited in training related to the Skills Development Act and SETAs. Once again, the participation was found to be minimal.

This does not however mean that training does not take place in the Built Environment

5.2 Training in the Built Environment – short courses

There is concern about the low claims being made to CETA and therefore that the industry is not training. This does not appear to be the case, but rather that the many short courses are still being regularly attended without claims being made for repayment of the skills levy.

The reasons for this are as follows:

- Few companies have the understanding or capacity to fill in the forms
- Few short courses are accredited
- Although many are now listed on the WSP training lists, companies do not understand that they can send staff on courses which are not accredited
- The claiming process is tedious

5.3 Training in the Built Environment – in-service training

As has been identified throughout the report, industry is lacking in its efforts to offer experiential training, due to the high cost of training inexperienced staff. It is imperative that in-service learnerships, coupled with mentorship are developed to ensure that this problem is addressed.

5.4 A proactive approach needed

CETA needs to consider a proactive campaign to create awareness and assist its members with claiming and potential members in joining. National road shows, and dedicated but well trained staff visiting companies are urgently needed to ensure that access to funding is understood.

6 Conclusions and recommendations

A clearer understanding of staff needs in the entire Built Environment is required. Graduates above do not only work for companies belonging to CETA, but work in local and central government, parastatals, transport, manufacturing and mining. Several large companies falls under several SETAs for their different activities.

It is therefore critical that CETA sets up a comprehensive research campaign with the other SETAs in order to understand the Built Environment professionals as a whole.

In more detail, to address the various stumbling blocks outlined:

6.1 Drop off at Technikons extremely high

To address this the following is needed:

- More foundation training needed urgently
- Entrance level to be raised – but this can only happen when more students with better passes in Maths and Science come into the system
- In the meantime nurture grade 10-12 and develop selection processes to ensure that the correct candidates are chosen
- Set up intermediate colleges to improve English, Maths and Science before entering tertiary – perhaps like Damelin (talk to SAICA)
- Lobby with government to look at improving literacy and Maths from the primary phase and funding Foundation courses

6.2 Transformation at University limited

Reasons:

- Entrance criteria higher than can be attained from pdi environment – and high achievers go into more lucrative professions
- Bursaries for first year only pay out later in the year and pdi parents do not have the cash to cope with the demands of the first few months

6.3 Too many dropping out after graduating

Problems to be addressed:

- Salaries too low
- Lack of training and looking after young graduates – introduce candidate learnership coupled with formal mentorship

6.4 Limited number of pdi registering with ECSA

- Lack of training and looking after young graduates – introduce candidate learnership coupled with formal mentorship
- Develop general skills, report writing etc which are a stumbling block in terms of essays, and interview for registration

6.5 To entice people back

If, after extensive research as recommend above, it is found that more people are required in the industry, the problems to be addressed are as follows:

- Salaries too low (see Plato survey!!)
- Government sector now too bureaucratic and professionals are not respected – an understanding of, and respect for the role of the engineering professional is required – train decision makers!!!
- Affirmative action policies displace those with experience and knowledge, at a time when there are no where near enough qualified and experience pdi to take over senior posts.

7 Appendices

7.1 Dept of Education data structures

7.1.1 University tables

FRACTIONAL 2ND ORDER CESMS FOR STUDENTS FULFILLING REQUIREMENTS (SAPSE 2.13)											
Institution: Universities					Gender: All						
Year: 2001 User: ADMIN					Race: All						
					Entrance category: All						
2ND-ORDER CESM CATEGORY	OCCAS- IONAL	01 UG DIP/CERT	02 GENERAL UG 1ST BACH.	03 PROF. 1ST BACH.	04 PG DIP/CERT	05 PG BACH.	06 HONOURS	07 MASTERS	08 DOCTOR- ATE	OTHER	TOTAL
01 Ag. and Renewable Resources	0.00	34.00	148.00	262.58	7.75	0.00	128.67	133.50	30.00	0.00	744.50
0101 Agricultural Economics	0.00	0.00	64.00	29.25	0.00	0.00	49.50	38.50	4.00	0.00	185.25
0102 Agricultural Extension	0.00	8.00	23.42	1.08	0.00	0.00	13.50	2.50	1.00	0.00	49.50
0103 Agricultural Food Technology	0.00	0.00	4.25	15.58	0.25	0.00	7.17	11.00	3.00	0.00	41.25
0104 Animal Sciences	0.00	21.00	10.25	101.58	0.00	0.00	9.00	17.00	2.00	0.00	160.83
0105 Horticulture	0.00	0.00	2.83	16.58	0.00	0.00	0.33	14.50	2.00	0.00	36.25
0106 Plant Sciences	0.00	0.00	16.33	66.42	0.00	0.00	15.67	26.00	11.00	0.00	135.42
0107 Soil Sciences	0.00	0.00	13.25	8.50	7.50	0.00	5.00	12.00	4.00	0.00	50.25
0108 Fisheries	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0109 Forestry	0.00	0.00	1.25	9.67	0.00	0.00	0.00	8.00	1.00	0.00	19.92
0110 Outdoor Recreation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0111 Wildlife	0.00	0.00	9.25	9.00	0.00	0.00	21.00	2.00	1.00	0.00	42.25
0112 Land Reclamation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0113 Renewable Natural Resources	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0199 Other Ag. and Renewable Resources	0.00	5.00	3.17	4.92	0.00	0.00	7.50	2.00	1.00	0.00	23.58
02 Arch. and Env. Design	0.00	0.00	231.00	278.25	15.00	116.25	10.25	104.00	5.00	0.00	759.75
0201 Environmental Design	0.00	0.00	125.83	86.00	2.00	103.75	0.00	20.58	1.00	0.00	339.17
0202 Design and Planning Technology	0.00	0.00	32.58	87.92	11.00	0.00	7.50	16.00	1.00	0.00	156.00
0203 History of Environments	0.00	0.00	13.00	0.00	0.00	6.00	0.00	0.00	0.00	0.00	19.00
0204 Construction and Design Implemen	0.00	0.00	23.75	44.92	0.00	0.00	0.00	4.33	0.00	0.00	73.00
0205 Communication in Arch. & Env. Des	0.00	0.00	10.92	4.00	0.00	0.00	0.00	0.00	0.00	0.00	14.92
0206 Structural Technology	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0207 Environmental Technology	0.00	0.00	3.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	8.00
0208 Materials of Arch. and Env. Design	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0209 Management in Arch. and Env. Des	0.00	0.00	10.42	21.00	1.00	0.50	0.58	10.08	2.00	0.00	45.58
0210 Prof. Practices of Arch. and Env. D	0.00	0.00	0.00	4.08	0.00	6.00	0.00	0.00	0.00	0.00	10.08
0211 Planning	0.00	0.00	1.50	20.33	1.00	0.00	1.83	28.83	1.00	0.00	54.50
0299 Other Arch. and Env. Design	0.00	0.00	10.00	10.00	0.00	0.00	0.33	19.17	0.00	0.00	39.50
03 Arts, Visual and Performing	0.00	66.58	140.67	397.50	43.58	0.00	91.33	56.00	15.00	0.00	810.67
0301 Dance	0.00	4.00	0.00	9.00	0.00	0.00	0.00	0.00	0.00	0.00	13.00
0302 Film as Art	0.00	0.00	0.50	0.00	0.00	0.00	0.50	0.00	0.00	0.00	1.00
0303 Music	0.00	52.25	30.50	183.50	20.33	0.00	48.33	30.50	13.00	0.00	378.42
0304 Theatre Arts	0.00	7.33	80.08	43.42	1.00	0.00	24.50	8.00	1.00	0.00	165.33
0305 Visual Arts	0.00	1.00	29.58	148.75	21.25	0.00	14.00	16.50	0.00	0.00	231.08
0306 Related Arts	0.00	2.00	0.00	12.83	0.00	0.00	0.00	0.00	0.00	0.00	14.83
0307 Arts Therapy	0.00	0.00	0.00	0.00	0.00	0.00	2.00	1.00	1.00	0.00	4.00
0399 Other Arts, Visual and Performing	0.00	0.00	0.00	0.00	1.00	0.00	2.00	0.00	0.00	0.00	3.00
04 Business, Commerce & Mgmt. Sc.	112.00	376.17	6,243.50	862.17	1,313.75	92.50	2,985.42	1,333.08	23.00	0.00	13,341.58
0401 Accounting	1.00	14.25	3,563.75	143.17	521.83	3.08	2,019.25	63.58	6.00	0.00	6,335.92
0402 Administrative and Office Services	0.00	0.00	8.00	1.00	0.00	0.00	0.00	3.00	0.00	0.00	12.00
0403 Banking and Finance	0.00	0.50	303.00	0.00	39.25	0.00	115.58	24.25	0.00	0.00	482.58
0404 Business Data Systems	0.00	0.00	172.25	0.58	0.00	0.00	144.33	4.92	1.00	0.00	323.08
0405 Entrepreneurship	0.00	71.42	364.75	161.75	77.17	6.00	132.83	220.67	3.00	0.00	1,037.58
0406 Information Communications	0.00	4.00	112.50	0.00	0.00	0.00	8.67	356.08	1.00	0.00	482.25
0407 Insurance and Risk Management	0.00	0.00	40.92	24.00	11.00	0.00	10.08	2.50	0.00	0.00	88.50
0408 International Business	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00	0.00	4.00
0409 Management	108.00	34.50	1,108.17	29.33	407.00	0.00	226.25	137.67	8.00	0.00	2,058.92
0410 Marketing	0.00	19.00	194.58	0.00	64.00	0.00	77.67	24.42	3.00	0.00	382.67
0411 Personnel Management and Admin	0.00	0.00	109.42	0.25	82.00	83.42	77.42	42.50	0.00	0.00	395.00
0412 Quantitative Methods	0.00	11.00	47.25	2.00	7.50	0.00	14.50	33.67	0.00	0.00	115.92
0413 Real Estate	0.00	0.00	0.00	4.08	0.00	0.00	0.00	0.00	0.00	0.00	4.08
0499 Other Business, Commerce & Mgmt	3.00	221.50	218.92	496.00	104.00	0.00	158.83	415.83	1.00	0.00	1,619.08
05 Communication	0.00	107.25	610.50	108.83	23.75	23.00	123.83	31.00	1.00	0.00	1,029.17
0501 Advertising	0.00	0.00	28.75	9.00	0.00	0.00	6.58	7.50	1.00	0.00	52.83
0502 Code Systems	0.00	0.00	0.33	0.00	6.00	0.00	22.00	3.00	0.00	0.00	31.33
0503 Communication Methodology	0.00	107.25	46.25	17.08	0.00	0.00	17.50	9.00	0.00	0.00	197.08
0504 Communication Technology	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0505 Cybernetics	0.00	0.00	6.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.17
0506 Film as Communication	0.00	0.00	0.00	4.25	0.00	0.00	0.00	0.00	0.00	0.00	4.25
0507 Governmental and State Commun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0508 Innovative Communication	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0509 International Communication	0.00	0.00	1.83	3.67	0.25	0.00	0.25	0.00	0.00	0.00	6.00
0510 Instructional Communication	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0511 Interpersonal Communication	0.00	0.00	7.17	0.75	0.50	0.00	0.00	0.00	0.00	0.00	8.42
0512 Journalism	0.00	0.00	82.25	53.92	15.50	0.00	33.50	9.50	0.00	0.00	194.67
0513 Mass Communication	0.00	0.00	34.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.67
0514 Organisational Communication	0.00	0.00	55.25	16.25	0.00	0.00	13.25	0.00	0.00	0.00	84.75
0515 Print Media	0.00	0.00	283.42	0.00	0.50	0.00	3.00	0.00	0.00	0.00	286.92
0516 Professional Practices in Communi	0.00	0.00	14.58	0.00	0.00	23.00	0.00	0.00	0.00	0.00	37.58
0517 Public Relations	0.00	0.00	8.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	8.25
0518 Radio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0519 Speech Communication	0.00	0.00	3.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.33
0520 Special Communication	0.00	0.00	1.17	0.50	0.00	0.00	2.92	0.00	0.00	0.00	4.58
0521 Television	0.00	0.00	10.42	3.17	0.00	0.00	0.50	0.00	0.00	0.00	14.08
0599 Other Communication	0.00	0.00	26.92	0.00	1.00	0.00	24.33	2.00	0.00	0.00	54.25
06 Computer Sc. and Data Proc.	0.00	230.75	1,150.75	61.00	32.83	5.08	380.08	78.50	12.00	0.00	1,951.00
0601 Applications in Computer Sc. & Dat	0.00	49.50	385.58	29.42	1.50	4.58	169.42	28.17	4.00	0.00	672.17
0602 Computer Ops. and Operations Cor	0.00	0.00	0.00	0.00	0.00	0.00	2.08	0.00	0.00	0.00	2.08
0603 Computer Hardware Systems	0.00	3.00	0.75	0.00	0.50	0.00	0.00	0.00	0.00	0.00	4.25
0604 Computer Hardware	0.00	16.00	0.00	0.00	0.00	0.00	0.50	0.67	0.00	0.00	17.17
0605 Information and Data Base System	0.00	71.00	245.58	25.08	0.83	0.00	91.67	10.08	0.00	0.00	444.25
0606 Numerical Computations	0.00	4.00	142.58	0.00	0.00	0.00	0.25	0.00	0.00	0.00	146.83

7.1.2 Technikon tables

FRACTIONAL 2ND ORDER CESMS FOR STUDENTS FULFILLING REQUIREMENTS (SAPSE 2.13)																
Institution: Technikons				Gender: All												
Year: 2001 User: ADMIN				Race: All												
				Entrance category: All												
				22 NAT. HIGHER CERT.	23 NAT. DIPLOMA	24 POST-DIP DIPLOMA	25 NAT. HIGHER DIP.	26 BACC. TECHNOLOGIAE	27 MASTERS DIP. IN TECH.	28 MAGISTER TECHNOLOGY	29 LAUREATUS IN TECH.	30 DOCTOR TECHNOLOGIAE	OTHER	TOTAL		
2ND-ORDER CESM CATEGORY				OCCASIONAL	21 NAT. CERT.	22 NAT. HIGHER CERT.	23 NAT. DIPLOMA	24 POST-DIP DIPLOMA	25 NAT. HIGHER DIP.	26 BACC. TECHNOLOGIAE	27 MASTERS DIP. IN TECH.	28 MAGISTER TECHNOLOGY	29 LAUREATUS IN TECH.	30 DOCTOR TECHNOLOGIAE	OTHER	TOTAL
01 Ag. and Renewable Resources				0.00	5.00	0.50	495.00	0.00	9.00	177.50	0.00	16.00	0.00	0.00	0.00	703.00
0101 Agricultural Economics				0.00	0.00	0.50	6.33	0.00	0.00	19.00	0.00	0.00	0.00	0.00	0.00	25.83
0102 Agricultural Extension				0.00	0.00	0.00	37.50	0.00	0.00	7.17	0.00	0.00	0.00	0.00	0.00	44.67
0103 Agricultural Food Technology				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0104 Animal Sciences				0.00	1.00	0.00	176.50	0.00	9.00	25.50	0.00	0.00	0.00	0.00	0.00	212.00
0105 Horticulture				0.00	1.00	0.00	50.33	0.00	0.00	16.00	0.00	0.00	0.00	0.00	0.00	67.33
0106 Plant Sciences				0.00	1.00	0.00	31.33	0.00	0.00	19.75	0.00	0.00	0.00	0.00	0.00	52.08
0107 Soil Sciences				0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
0108 Fisheries				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0109 Forestry				0.00	0.00	0.00	26.00	0.00	0.00	7.50	0.00	0.00	0.00	0.00	0.00	33.50
0110 Outdoor Recreation				0.00	1.00	0.00	40.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.00
0111 Wildlife				0.00	0.00	0.00	49.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	59.00
0112 Land Reclamation				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0113 Renewable Natural Resources				0.00	0.00	0.00	58.00	0.00	0.00	14.25	0.00	1.00	0.00	0.00	0.00	73.25
0199 Other Ag. and Renewable Resources				0.00	1.00	0.00	19.00	0.00	0.00	58.33	0.00	15.00	0.00	0.00	0.00	93.33
02 Arch. and Env. Design				1.00	0.00	0.00	546.58	0.00	0.00	226.83	0.00	3.00	0.00	0.00	0.00	777.42
0201 Environmental Design				1.00	0.00	0.00	41.58	0.00	0.00	27.58	0.00	0.00	0.00	0.00	0.00	70.17
0202 Design and Planning Technology				0.00	0.00	0.00	67.25	0.00	0.00	20.83	0.00	0.00	0.00	0.00	0.00	88.08
0203 History of Environments				0.00	0.00	0.00	48.75	0.00	0.00	1.25	0.00	0.00	0.00	0.00	0.00	50.00
0204 Construction and Design Implementation				0.00	0.00	0.00	243.42	0.00	0.00	94.83	0.00	1.00	0.00	0.00	0.00	339.25
0205 Communication in Arch. & Env. Design				0.00	0.00	0.00	43.08	0.00	0.00	12.42	0.00	0.00	0.00	0.00	0.00	55.50
0206 Structural Technology				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0207 Environmental Technology				0.00	0.00	0.00	25.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.25
0208 Materials of Arch. and Env. Design				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0209 Management in Arch. and Env. Design				0.00	0.00	0.00	15.25	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	25.25
0210 Prof. Practices of Arch. and Env. Design				0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.25
0211 Planning				0.00	0.00	0.00	1.00	0.00	0.00	2.83	0.00	0.00	0.00	0.00	0.00	3.83
0299 Other Arch. and Env. Design				0.00	0.00	0.00	61.00	0.00	0.00	56.83	0.00	2.00	0.00	0.00	0.00	119.83
03 Arts, Visual and Performing				0.00	36.50	6.00	378.67	2.50	7.00	118.50	0.00	4.00	0.00	2.00	0.00	555.17
0301 Dance				0.00	4.00	2.00	5.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	14.00
0302 Film as Art				0.00	0.00	0.00	8.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	9.00
0303 Music				0.00	0.00	1.00	30.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	36.00
0304 Theatre Arts				0.00	1.00	0.00	56.00	0.00	1.00	4.00	0.00	0.00	0.00	1.00	0.00	63.00
0305 Visual Arts				0.00	25.50	2.00	230.67	2.50	3.00	82.50	0.00	2.00	0.00	0.00	0.00	348.17
0306 Related Arts				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	2.00
0307 Arts Therapy				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0399 Other Arts, Visual and Performing				0.00	6.00	1.00	49.00	0.00	3.00	23.00	0.00	0.00	0.00	1.00	0.00	83.00
04 Business, Commerce & Mgmt. Sc.				25.00	247.50	99.00	7,717.92	0.00	52.00	1,629.42	1.00	41.00	0.00	5.00	0.00	9,817.83
0401 Accounting				1.00	65.00	57.75	2,980.33	0.00	1.00	298.42	0.00	2.00	0.00	1.00	0.00	3,406.50
0402 Administrative and Office Services				0.00	5.25	0.00	567.75	0.00	0.00	42.83	1.00	0.00	0.00	0.00	0.00	616.83
0403 Banking and Finance				0.00	0.00	1.00	28.50	0.00	0.00	13.33	0.00	0.00	0.00	0.00	0.00	42.83
0404 Business Data Systems				0.00	0.00	0.00	45.83	0.00	0.00	4.00	0.00	0.00	0.00	0.00	0.00	49.83
0405 Entrepreneurship				0.00	23.50	0.00	155.67	0.00	0.00	23.25	0.00	19.00	0.00	0.00	0.00	221.42
0406 Information Communications				0.00	0.00	0.00	149.00	0.00	0.00	6.00	0.00	0.00	0.00	0.00	0.00	155.00
0407 Insurance and Risk Management				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0408 International Business				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0409 Management				23.00	99.50	6.00	1,899.75	0.00	50.00	710.33	0.00	12.50	0.00	3.00	0.00	2,804.08
0410 Marketing				0.00	4.25	6.00	579.92	0.00	1.00	135.67	0.00	4.00	0.00	0.00	0.00	730.83
0411 Personnel Management and Administration				1.00	7.00	12.00	785.92	0.00	0.00	145.50	0.00	1.00	0.00	1.00	0.00	953.42
0412 Quantitative Methods				0.00	0.00	0.00	23.75	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	24.08
0413 Real Estate				0.00	0.00	0.00	10.00	0.00	0.00	23.92	0.00	0.00	0.00	0.00	0.00	33.92
0499 Other Business, Commerce & Mgmt. Sc.				0.00	43.00	16.25	491.50	0.00	0.00	225.83	0.00	2.50	0.00	0.00	0.00	779.08
05 Communication				0.00	34.58	0.00	397.08	0.00	0.00	56.00	0.00	0.00	0.00	0.00	0.00	487.67
0501 Advertising				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0502 Code Systems				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0503 Communication Methodology				0.00	0.00	0.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00
0504 Communication Technology				0.00	0.00	0.00	26.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	27.00
0505 Cybernetics				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0506 Film as Communication				0.00	0.00	0.00	5.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.33
0507 Governmental and State Communication				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0508 Innovative Communication				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0509 International Communication				0.00	1.00	0.00	12.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	16.00
0510 Instructional Communication				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0511 Interpersonal Communication				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0512 Journalism				0.00	8.00	0.00	90.83	0.00	0.00	19.00	0.00	0.00	0.00	0.00	0.00	117.83
0513 Mass Communication				0.00	10.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.67
0514 Organisational Communication				0.00	1.25	0.00	1.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00
0515 Print Media				0.00	0.00	0.00	8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00
0516 Professional Practices in Communication				0.00	0.00	0.00	19.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.33
0517 Public Relations				0.00	0.00	0.00	155.33	0.00	0.00	31.00	0.00	0.00	0.00	0.00	0.00	186.33
0518 Radio				0.00	10.67	0.00	5.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.50
0519 Speech Communication				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0520 Special Communication				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0521 Television				0.00	0.00</											

7.2 Excerpts from other fields - supporting research findings

7.2.1 Matrics need to be better prepared

7.2.2 Profession goes back to the Blackboard

7.2.3 It's tough getting work if you're a white male

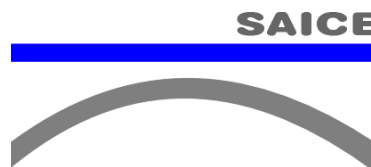
Whilst this is currently not the case in the Built Environment, Labour ministry spokesperson Snuki Zikalala confirms the findings that 'We are still very far from our target and because of the lack of education that black people receivedit is going to take years before the transformation of equality in the work place is reached"

7.3 Questionnaires sent to tertiary institutions to establish 2004 enrolments

7.3.1 The University questionnaire

South African Institution of Civil Engineering
 C/o P O Box 73285
 Fairland, 2030

Tel: (011) 476-4100
 Fax: (011) 678-7518



Built Environment Tertiary statistics

Bridging the gap

As part of Skills development in South Africa, the SETAs are being called upon to submit their preliminary Sector Skills plans in March 2004 and final figures and forecasts in July 2004. With several mega projects about to break in South Africa such as Gautrain, the Wild Coast highway, the complete Coega development, plus the R100 billion infrastructure that the government promises as part of its job creation and poverty alleviation plans, there is growing concern that there will be inadequate staff in the Built Environment Sector.

All institutions in the field are reviewing their membership numbers; efforts are being made to register learnerships for the candidate professional phase etc, to ensure that quality professionals are in place at all levels. The CETA has asked that we research the levels of graduations over the past few years (these we have been able to extract from the Dept of education), plus the current student make-up at all tertiary levels. We would therefore really appreciate it if you could let us have the current statistics for the following degrees / diplomas.

- **Architecture**
- **Landscape architecture**
- **Quantity surveying**
- **Building science**
- **Construction management**
- **Civil Engineering**
- **Town planners**
- **Surveyors – land or engineering**

We would like the data broken up PER DEGREE/DIPLOMA as follows:

DEGREE.....(e.g.Civil, architecture, QS, town planning etc)

YEAR	BM (South African)	BF (South African)	BM (Non-South African)	BF (Non-South African)	AM	AF	CM	CF	WM	WF	Total
Foundation											
1											
2											
3											
4											
Hons											
Msc											
Ph D											
Post doc											
Total											

Where B=Black, A=Asian, C=Coloured, W=White, M=Male, F=Female

We are aware that you may not be able to let us have a split of local versus rest of Africa black students, but we would appreciate such information if it is available.

Thank you,

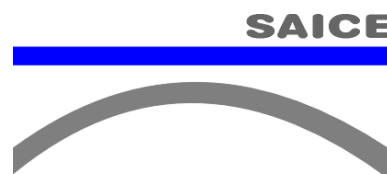
Yours faithfully,

ALLYSON LAWLESS
 SAICE President 2000

7.3.2 The Technikon questionnaire

South African Institution of Civil Engineering
 C/o P O Box 73285
 Fairland, 2030

Tel: (011) 476-4100
 Fax: (011) 678-7518



Built Environment Tertiary statistics

Bridging the gap

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- **Surveyors – land or engineering**

We would like the data broken up PER DEGREE/DIPLOMA as follows:

DIPLOMA / DEGREE.....(e.g.Civil, architecture, QS, town planning etc)

YEAR	BM (South African)	BF (South African)	BM (Non-South African)	BF (Non-South African)	AM	AF	CM	CF	WM	WF	Total
Foundation											
S1											
S2											
S3											
S4											
B Tech											
M Tech											
D Tech											
Post doc											
Total											

Where B=Black, A=Asian, C=Coloured, W=White, M=Male, F=Female

We are aware that you may not be able to let us have a split of local versus rest of Africa black students, but we would appreciate such information if it is available.

Thank you,

Yours faithfully,

ALLYSON LAWLESS
 SAICE President 2000

7.4 Questionnaires sent to professional organisations

7.4.1 Architectural questionnaire – sent to SAIA, SACAP, ILASA members

7.4.2 Civil questionnaire – sent to SAICE and IMESA members, Industrial companies

7.4.3 Consulting questionnaire – sent to SAACE and some SBTACO members

7.4.4 Quantity survey questionnaire – sent to AQASA members

7.4.5 Professional questionnaire – sent to SBTACO members

7.4.6 Town planning questionnaire – sent to ACTRP members