

CONTINUOUS IMPROVEMENT OF TEACHING TO PROMOTE STUDENT LEARNING

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Abstract

The Cape Technikon is an institution offering educational programmes up to the doctorate level. The engineering programmes offered are characterised by a system of co-operative education, i.e. work-integrated learning.

The Cape Technikon is committed to providing and facilitating quality career and technology education. To fulfill its mission the Technikon introduced a comprehensive quality assurance model some years ago whereby the outcomes of its programmes are regularly reviewed and evaluated in consultation with the industries and communities which it serves. The paper briefly outlines this review process with reference to various performance indicators and questionnaires completed by freshmen, graduates, alumni and employer organisations and the assessment by quality assurance panels specially appointed for every programme offered.

The paper focuses on the strategies followed to ensure continuous improvement of the teaching in the institution to promote student learning. These measures inter alia are the

- selection of suitable faculty,
- induction and development of faculty on an on-going basis,
- proper curriculum design to reflect the specific and critical educational outcomes as required by the working environment,
- student selection practices to determine potential for success,
- paradigm shift in teaching to promote student learning ,
- introduction of a variety of student assessment methods, notably integrated assessment.

Reference is also made to the “Alternative Teaching Week” introduced during 1998, the role of the South African Qualifications Authority in developing a National Qualifications Framework and the important facilitating role of the Engineering Council of South Africa in promoting quality outcomes-based education.

1. Introduction

The Cape Technikon is an institution offering educational programmes up to the D Tech degree, a doctorate in technology based on research. The engineering programmes offered are characterised by a system of co-operative education, i.e. work-integrated learning.

The Cape Technikon is a public higher education institution whose mission is to:

- provide and facilitate quality career and technology education and training in partnership with relevant stakeholders;
- encourage and develop individual creativity, skills acquisition and knowledge production on a lifelong basis;
- empower and develop its communities on a national and regional basis.

In order to achieve the above objectives, it is important for the Technikon to be in a position to improve its educational quality on a regular basis. A model for quality control, based on institutional self-evaluation, was developed during 1990. The system was developed to ensure:

- accountability to students, employees, employers and the community.
- maintenance and improvement of standards.
- realistic decision-making regarding funding and planning, based on valid and reliable information.

The discussion that follows briefly outlines the outcomes of the quality assurance model of the Cape Technikon. Furthermore, it focuses on the strategies followed in response to the transformation process in South African higher education to ensure continuous improvement of the teaching of the institution to promote student learning.

2. Outcomes and Performance Indicators

Institution-wide surveys are annually conducted by means of questionnaires to obtain the views of students and alumni on the Cape Technikon and all its facilities, services, etc. These evaluations reflect the perceptions of

- first-year students after six weeks of attendance;
- graduates on graduation day;
- alumni who graduated during the previous five years.

In the case of graduates, the respondents also have to indicate their future plans, their views on their personal development at the Technikon and their opinion regarding the quality of teaching.

The Cape Technikon is understandably proud of its graduate employment rate in a depressed economy running to unemployment of up to 30 %. The 1997 alumni survey indicated that almost 90 % of the respondents was employed, with 18 % of them self-employed.

A very important aspect of the quality assurance model of the Cape Technikon is the comparison of the institution to the other fourteen technikons in South Africa regarding the following performance or quality indicators:

- the profile of the freshmen;
- availability of student accommodation;
- examination pass rates;
- number of higher qualifications;
- qualifications awarded per 1000 students;
- qualifications awarded per faculty;
- qualifications of faculty;
- library spending per student;
- research projects completed;
- expenditure per faculty;
- cost per qualification awarded;
- permanent employment of graduates.

These quality indicators are used very effectively to recruit students for the institution.

Since 1991 a comprehensive set of these performance indicators, compiled in graphical format, has been published as annual "Profiles of the Cape Technikon".

3. Academic Quality Assurance

The quality assurance model supports the institutional research and planning activities. The implementation of this model in both the academic area and central departments (support services and general administration) is vital, especially during a period of transformation and in a climate of economic stringency, when state funding is dwindling and the cost of Higher Education rising.

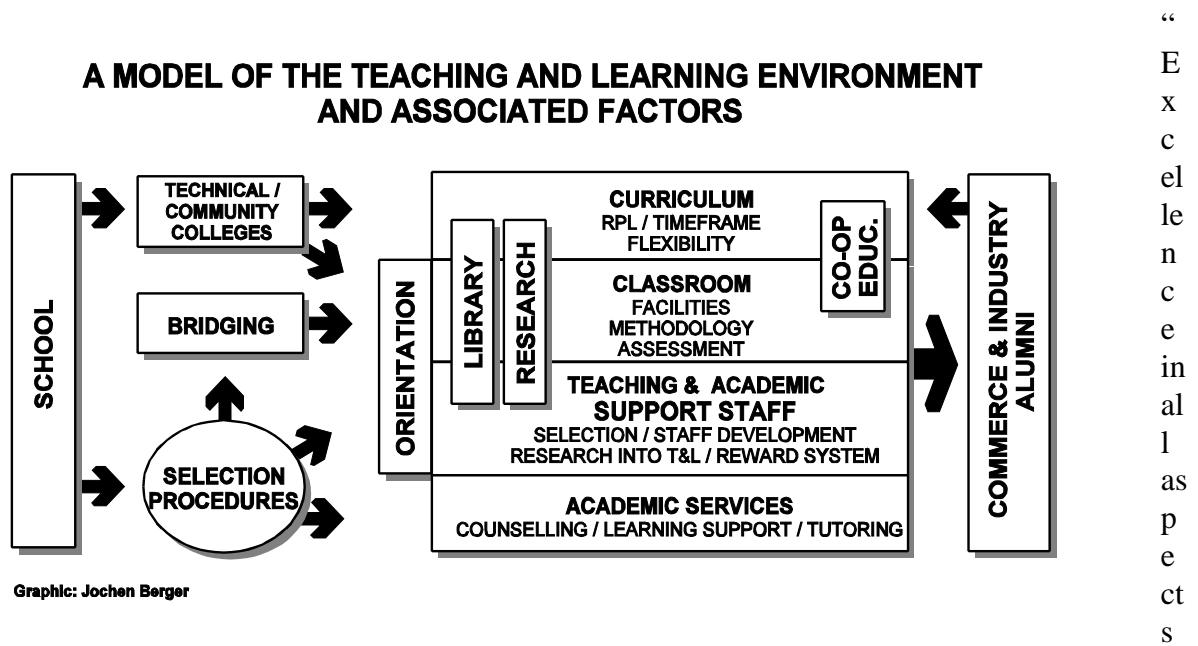
Currently the Quality Assurance system relies on selected panels for investigating and evaluating all facets of the various Technikon activity areas, for example faculty expertise, teaching methods, assessment methods, student success rates, employment of graduates, service provision and utilisation of resources. The composition of panels also provides for representation of professional bodies, employer organisations, students and alumni. All panel reports are submitted for scrutiny to the Quality Assurance Committee, which in turn reports to the Senate.

4. A New Teaching Vision

Higher education in South Africa is rapidly being transformed. During the last two years the Cape Technikon has been reviewing its policies and strategies to effectively respond to the transformation process. The rapid change in the demography of student intakes and the rapid increase in the numbers of students, many of whom are often ill prepared for higher education, represent enormous challenges to faculty.

It is envisaged that there will be a threefold increase in the numbers of students seeking access to higher education by 2005 and that the proportion of black students will rise by 60 %.

The following Teaching Vision was consequently formally adopted by the Cape Technikon during 1998, after consultation with all the relevant role players:



of teaching and learning”. A policy document relating to a Model of the Teaching (as the facilitation of learning) and Learning process at the Cape Technikon was subsequently formulated. A diagrammatic illustration of the model is indicated in Figure 1.

FIGURE 1

NOTE: The above model attempts to capture the substantive elements in the teaching and learning environment; it does not try to represent the complex interrelationships between these factors.

Strategies regarding the important elements of the model were developed over a period. These strategies are aimed at ensuring an environment conducive to student learning. Some of the strategies that are in place are explained below.

5. Strategies to Ensure Continuous Improvement of Teaching and Learning

5.1 Student Selection Procedures

Student selection procedures are recognised as an important factor influencing the quality of teaching and learning and career success. In addition to being exposed to evaluation procedures (covering eg. learning potential, relevant interests, aptitudes, exposure, prior learning, motivation and personality characteristics), candidates are also tested for proficiency levels in key areas such as language and numeracy. Prospective students who lack the required proficiency levels are directed to specific core curriculum or bridging courses before admission to the mainstream programme, or could be accommodated via special admissions programmes for the disadvantaged.

The orientation of students to higher education is accorded a significant role in the institution's programme, is not confined to the first few days of the academic year, and is planned to encompass a broad range of activities, both social and academic.

5.2 Selection of Suitable Faculty

Until June 1994 faculty recruitment was mainly based on finding suitable applicants with the appropriate academic qualifications and industrial experience. Although all applicants were subjected to interviews, an orientation course and a weekly support programme for new educators, it turned out that some of the appointees apparently did not have the basic characteristics of an educator.

The following staff selection procedure was consequently implemented during July 1994 and is now applied throughout the institution:

- The list of applicants is carefully analysed by the head of department and, in consultation with the dean, a short list compiled according to qualifications, industrial and other experience and referees' reports.
- Informal interviews are subsequently held in the department concerned to expose applicants to their potential future working environment.
- All applicants on the short list are then to lecture to a peer group of staff as well as experts from the Technikon's Teaching Development Unit, who evaluate the applicant's performance.
- Subsequently a battery of psychometric tests is used to determine whether the applicant is a stable person capable of managing conflict, caring about others, etc.
- At the final interview the Technikon's Appointment Committee considers all the

information obtained on each candidate before deciding on an appointment.

Since the introduction of the revised staff selection procedure, no problem with newly appointed staff has been experienced at the Cape Technikon.

5.3 Faculty Development

All new full-time faculty are required to complete successfully a 40-hour programme on teaching in higher education (or an equivalent formal post-graduate programme in higher education), or to demonstrate proficiency on the basis of prior experience. Part-time staff are encouraged to participate in this programme where possible.

An on-going developmental programme is also provided to enable all teaching staff to cope with changes in the higher education system.

5.4 Faculty Evaluation

Faculty evaluation by students is standard practice at the Cape Technikon. Normally faculty would request their students to complete a questionnaire anonymously to reflect student opinion on a variety of aspects regarding each course and the faculty member(s) concerned. Positive student opinion of faculty is a prerequisite when deserving faculty members are considered for merit promotion. Student opinion is one of a number of instruments used by the institution to identify and reward good teaching.

5.5 Curriculum Changes

During the past two years the South African Qualifications Authority developed a National Qualifications Framework (NQF) based on educational outcomes. The NQF is a seamless system (taking prior learning of the learner into account) with the emphasis on student learning on a lifelong basis. Apart from the specific outcomes for every field of study, the so called “critical cross-field outcomes” (or educational outcomes) are fundamental to the NQF. These critical outcomes are generic and are the characteristics employers normally require from graduates.

All programmes are currently being reviewed to ensure that outcomes comply with the requirements of the NQF. The Engineering Council of South Africa is providing a very supportive role in this regard.

5.6 Teaching Methodology

Faculty are increasingly required to take on the role of learning facilitators, which might mean a decrease in the number of lecture periods per course, and an increase in the amount of group and independent learning required. Some examples of strategies implemented in this regard are given below.

5.6.1 Active learning in large classes

The concern to promote active learning in large classes must be seen against the background of a scenario which requires the teaching of larger numbers of students with the same (or diminishing) resources. The following are guidelines established to encourage staff (and students) to work smarter, not harder, to meet this goal:

- The teaching method should be such that voice projection is clear and audible, good discipline is maintained, aims and objectives are communicated effectively, teaching media used effectively, practical applications are emphasised, active student participation is encouraged in class, and smaller work groups are used for problem-solving activities.
- Student needs should be taken into account, e.g. high expectation of achievement, visible rewards for achievement, differentiated assignments, continuous evaluation progress, individual attention to poor performers, an interest in individual students, and co-operative learning should be encouraged.

5.6.2 Alternative Teaching Week

Lecturers are often keen to try innovative teaching methods but time pressures and lack of opportunity inhibit change. It was therefore decided to institute an “Alternative Teaching Week in 1998 to create such opportunities.

The programme for such a week takes the following form:

- Faculty from various divisions are invited - on a strictly voluntary basis - to present one or more sessions using non-traditional teaching methods.
- Faculty, either from that division or from the Technikon as a whole, are invited to attend these sessions.
- The week is widely publicised before the time.
- The co-operation and participation of the student body is sought.
- Well before the time, the Teaching Development Unit disseminates material on possible strategies for alternative teaching sessions.
- Faculty are invited to submit a written report on the sessions that they conducted.

Although a relatively small number of faculty participated in the 1998 Alternative Teaching Week, it was regarded as a very important staff development exercise by all those who participated.

5.7 Student Assessment Methods

Innovative student assessment methods imply innovative teaching methods and techniques.

It is important for learners to be exposed to a variety of assessment methods in order to ascertain which methods are more appropriate for the learning activity concerned.

In the engineering programmes integrated assessment is applied in the final year of the four-year under-graduate programme by means of, *inter alia*, a comprehensive project. These individual student projects (incorporating research elements in most cases) are appropriately set to ensure that the purpose of the qualification is achieved as far as possible by incorporating into the project what the individual learnt in the majority of final year courses.

5.8 Important Academic Support Services for Student Success

The following support services have played an important role to promote student learning.

5.8.1 Academic Development

The Academic Development Department was established in 1994 to offer assistance to all students who experience study problems. The Department offers, *inter alia*, the following services:

- The Writing Centre has trained consultants to help students with all aspects of academic writing. In addition, students who do not have any other access to computers, may use the computer laboratory to produce a hard copy of assignments. To encourage computer usage, the Centre has developed a word processing course for students.
- Various small group workshops are offered on request in order to assist students in dealing with areas such as study skills, examination preparation, stress management, time management and other relevant topics.
- The Integrated First Year Experience (IFYE), launched during 1997, involves all freshers, and attempts to increase the pass rate of students by incorporating as part of their studies the various skills needed for academic success. IFYE is the product of the Educational Development Resource Centre, a collaboration between the Academic Development Department, the Teaching Development Unit and the Media Production Centre, and integrates the necessary academic skills with various aspects of the existing curricula.

5.8.2 Co-operative Education (Work-integrated learning)

Co-operative education refers to any programme of study which comprises a mutually interdependent academic component plus an experiential training component, which enhance one another in an endeavour to obtain a career-orientated formal qualification.

The Cape Technikon has formally endorsed the adoption of co-operative education as a strategy of applied learning. This educational strategy is implemented in partnership with participating employers and academic advisory committees. Working together, the academic co-ordinators

and participating employers develop learning objectives, extending classroom learning into the work environment. Co-operative education is an important vehicle to ensure that graduates are largely productive from the time they take up any employment.

6. Conclusion

The quality assurance model has been in force at the Cape Technikon for the past eight years. The awareness of the prerequisites and strategies for good teaching has led to a more confident faculty and better teaching practices in general.

The initiatives taken by the Cape Technikon have resulted in it being regarded as one of the leading technikons in South Africa.

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NICK KOK

Nick J Kok has been a Vice President at the Cape Technikon, Cape Town, South Africa, since 1986, charged with Academic Affairs. In 1995 he was honoured with a professorship and in 1997 he was promoted, on merit, to Senior Vice President: Academic Affairs. He received his BSc and BSc Honours (Physics) degrees at the University of Stellenbosch, and his BSc Eng (1st class honours), MSc Eng and PhD (all in Civil Engineering) at the University of Cape Town. He held various lecturing positions at the Cape Technikon and was the Director and head of the School of Civil Engineering from 1978 until 1985. His main task is strategic planning, quality assurance, academic development and the co-ordination of co-operative education, technology promotion and research activities. His research areas are quality assurance and institutional research. He is a council member of WACE (World Association for Co-operative Education), the Engineering Council of South Africa and the South African Quality Authority. He also is a member of the American Society for Engineering Education, the South African Society for Co-operative Education, the South African Institution of Civil Engineering and serves as trustee on four educational trusts. He has presented more than 40 papers at national and international conferences and is the author and co-author of 15 publications since 1991.

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