The Impact of Quality Management Practices on the Extended Curriculum Programme at a University of Technology

Felicity Harris
Cape Peninsula University of Technology
Bellville, Cape Town, South Africa
harrisf@cput.ac.za

Professor CM Moll
Head of Prostgraduate Programme in Quality
Cape Peninsula University of Technology
Bellville, Cape Town, South Africa
mollcm@cput.ac.za

Abstract

Academic Development Programmes such as Extended Curriculum Programmes (ECP'S) at higher education institutions in South Africa were implemented and funded in 2004 by the Department of Higher Education and Training as an initiative to address low throughput rate and low graduation output. The objective of this study was to look at whether ECP's were effective in improving throughput rates and graduation output and whether there were quality management practices in place to gauge the effectiveness of ECP's. The ECP in the Department of Mechanical Engineering at a university of technology was used as a sample. Academic histories of the ECP and Mainstream students of the 2007 cohort were analyzed to draw comparisons graduation output of the two programmes. A questionnaire to graduates of the 2007 ECP cohort who were now in the workplace was administered and interviews were conducted with lecturers teaching on the ECP. It was found that the ECP was successful in improving graduation output and that graduates were well placed in industry. It was also found that although quality management practices were in place in the programme, it was not formalized and the results were not properly recorded.

Introduction

Crosby (1984) defines quality as getting it right the first time and conformance to requirements. Crosby (1984) and Juran & Godfrey (1999) further define quality as fit for purpose and meeting customer requirements. The question of quality in higher education is one that requires a more expansive approach as there are various stakeholders in higher education. The emphasis on quality in higher education is placed on accountability. The question is who should be held accountable for what aspect of education. In education there are both internal and external stakeholders who will have different views and different expectations of quality. Quality in education is therefore difficult to define.

External stakeholders in education have concerned themselves mainly with quality assurance in the processes implemented to provide an adequate service. Quality assurance mechanisms are usually used by management to focus on course or programme accreditation. This then places a focus on compliance of higher education institutions from external stakeholders rather than the enhancement of what happens at student-lecturer level. The question is: who focuses on the quality of teaching and learning that happens in the classroom?

Internal stakeholders are the providers of the education and the receivers of the education. Internal stakeholders should be focused on quality enhancement rather than quality assurance. Quality enhancement is the practice of focusing on quality teaching and learning through innovative practices (McKay and Kember, 1999).

Harvey and Knight (1996) have identified 5 approaches to quality for higher education that are linked to the industry definitions of quality and state that these approaches or dimensions are different but related. These approaches are: quality as exceptional (excellence and high standards); quality as performance or consistency

(zero defects); quality as fitness for purpose (meeting requirements and customer satisfaction); quality as value for money (efficient, effective and affordable) and quality as transformation (enhancing and empowering the participant).

With the definition for quality set above, the study looks at what aspects of teaching and learning could be used as measures for determining if an academic programme meets these definitions. Three aspects for the programme in the study were used. These are firstly, academic histories for determining statistics regarding graduation rate, secondly, questionnaires to graduates of the programmes who are currently employed, and lastly interviews with academics who teach on the programme.

Background to the study

Prior to the democratically elected government of South Africa in 1994, the overall policy of education in South Africa was that of segregation and huge disparity in the provision of education to the various race groups. This was during the apartheid years of 1948 to 1994. This segregation applied to universities as well. The Extension of the University Education Act (45 of 1959) provided for the provision of racially exclusive universities for Africans, Indians and Coloureds (Blumfield, 2008). This inequality in the provision of education at Primary, Secondary and Tertiary school level was to be felt for many years, even after the election of a democratic government in 1994.

Three important steps in the restructuring of the higher education system in South Africa were the White Paper 3 from the Department of Education in 1997, recommendations from the Council on Higher Education (CHE) in 2000 and the National Plan from the Minister of Education in 2001. All three steps clearly speak of a need to reform the higher education system in South Africa to meet the social and economic needs of the 21st century.

In 1995 the Department of Education released the First White Paper on Education and Training (Blumfield, 2008). The aim of this White Paper was to address the inequality of education in South Africa and lay forth the new plan for education in this country. The First White Paper stated that at the time (1995) 1 in 5 Black students chose Physical Science and Mathematics in Standard 8 (Grade 10). This was as a result of poor teacher preparation, inadequate facilities and materials and inadequate preparation for students for examinations and entry to higher education (South Africa. Department of Education, 1995).

The First White Paper and subsequent Second White Paper (1996) led to the development of the National Education Policy Act of 1996 and this defined the roles and duties of national and provincial education authorities.

The Education White Paper 3: A Programme for the Transformation of Higher Education (1997) was released and its main purpose was to look at transforming any of the past inequalities in terms of skills and social order in higher education and to meet the "moral, political, social and economic demands" (South Africa. Department of Education, 1997) and opportunities of a democratic South Africa.

Based on the needs and challenges, the Education White Paper 3 lists several principles that should guide transformation in higher education. These are equity and redress, democratisastion, development, effectiveness and efficiency, academic freedom, institutional autonomy, public accountability and quality. (South Africa. Department of Education, 1997).With reference to quality, the White Paper 3 spoke to "maintaining and applying academic and educational standards" and a constant desire to achieve excellence.

In a report to the minister of Higher Education and Training, the CHE stated clearly that all the challenges of the higher education system cannot be solved by individual higher education institutions but will have to be approached in a systematic way. The CHE identified certain challenges facing higher education:

• To increase the number of graduates and diplomats to meet the high-level skills shortage, especially in the Science, Engineering and Technology (SET) field;
• To reduce repeat, drop-out and failure rates of students. This is seen as a challenge to refine quality measures at an institutional and system level and an improved information communication technology (ICT) system to collect and process data is a challenge; and
• To increase the race, gender and social distribution of students in all fields of study (CHE, 2000).

In order to meet the responsibility of quality assurance in higher education, the CHE established a permanent committee, The Higher Education Quality Committee (HEQC) in 2001. This was at the same time as the publication of the National Plan for Higher Education.

The National Plan for Higher Education was released in 2001 by the then Minister of Education, Professor Kader Asmal. The National Plan for Higher Education is a strategic plan that attempts to realise the policy goals of the Education White Paper 3 and the recommendations made by the CHE.
One of the goals of the National Plan for Higher Education was the opening up for enrolment at all higher education institutions for all races. Another goal was the retention of registered students at higher education institutions. The number of students who initially enrolled for a course did not match the number of students who progressed to the next year of study. It was suggested that the possible cause for this could be due to financial and/or academic exclusions or students simply not remaining in the higher education system to graduate or move on to postgraduate studies due to an inability to cope academically.
Several benchmarks were put in place to meet the goals mentioned above. The table below outlines these benchmarks as stated in the National Plan for Higher Education.

Table 1: Benchmarks for Graduation Rates (South Africa, Ministry of Education, 2001)

Qualification-type	***Graduation rate***	
	Contact	***Distance***
Up to 3-years: Undergraduate	*25%*	*15%*
4 years or more: Undergraduate	*20%*	*10%*
Postgraduate: up to honours	*60%*	*30%*
Masters	*33%*	*25%*
Doctoral	*20%*	*20%*

In addition to benchmarking the number of graduates per institution, the Ministry had also established "national student planning targets" which specify the expected graduate outputs per field of study. Several fields were identified: Natural and Mathematical Sciences, Engineering and other Applied Sciences, Health Sciences, Business/Commerce, Education, Social Sciences and Applied Humanities and finally Humanities (South Africa, Ministry of Education, 2001).
With the number of under-prepared students entering higher education in mind, funding was made available for development programmes in the form of extended programmes to assist in addressing the educational

disadvantage that many students enter higher education with. An example of an Academic Development Programme is the Extended Curriculum Programme (ECP) where the length of the mainstream course is extended by 6 months to 1 year to allow for additional assistance in individual subjects and the offering of courses/programmes to assist students with basic life skills in adapting to the higher education environment.

Quality Management in Higher Education

Higher education prepares citizens of a country for becoming distinguished contributors to their country's well-being. Higher education is not just a process of gaining academic knowledge in a chosen field but it is meant to be a transformation of a person into one who has grown both socially and intellectually.

Several teaching and learning models have been written about but can generally be placed within three models, namely: Transmission Model, Generative Model and

Transformative Model. These are the models of teaching and learning as best described by Wink (2005) in which she states that teaching and learning styles have had to change over time to meet the needs of a changing society.

The transmission model of teaching and learning relies on the educator imparting knowledge to the learners. The learners are seen as the vessels in need of the knowledge and the educator clearly plays a role of authority in the learning environment. In the generative model of teaching and learning the communication flow between teacher and student is two-way. The student is allowed more opportunity for asking questions to gain clarity. Limitations to this method however is still the fact that although there is real-world application of knowledge through for example, case-studies, there is very little actual exposure to real world experiences and the student could still have an unrealistic visualization of the knowledge (Wink, 2005).

As a more modern approach to teaching and learning, the transformative model allows for students to learn through participating in real-world activities. Communication flows freely from learner to learner and the lecturer is a partner in the learning process (Wink, 2005). The lecturer plays the role of facilitator and ensures that opportunities are made available for learning, but the actual learning and discovering is done by the learner. This is seen as a more lasting way of learning than the learner listening to the lecturer and trying to write down as much information as possible where the information does not necessarily mean anything to the learner.

Many researchers have termed transformative learning as "life-long learning" as the retention of knowledge becomes the responsibility of the learner. When learners take responsibility for their learning, the knowledge gained is not only relevant but also stays with the learner as he or she participates in the working world.

Harvey and Knight (1996: 21) describe transformation in education as a "process of transmutation of one form into another". They go on to describe the transformation where the learner develops independence, commits to continued learning through the process of reflection, uses all his or her frames of references to empower and develops critical, dialectical thinking. And as stated above, Harvey and Knight (1996) identify transformation as one of their 5 approaches to quality in higher education.

Deming (1993:98) states that "a service or a product possesses quality if it helps somebody". Good quality education must therefore be a process where the students can be seen as the inputs, good teaching and learning practices can be seen as the transformation that produces good outputs who in this case are the graduates who are able to make a valuable contribution to the country's economy and to society as a whole.

Methodology Applied in the Study

After much consideration on what aspects of the ECP to focus on in order to determine if the programme is meeting the original objective of its initiation, it was decided that graduation output, employability of graduates and an analysis of classroom practices were what could be used as markers for the success of the programme.
Primary information for this research was gathered using mixed methods which are both quantitative and qualitative methods. It was decided to focus the research on the Department of Mechanical Engineering at the University of Technology. The motivation for choosing the Department of Mechanical Engineering was the fact that statistics on student success indicate a definite shortage of skills in the Science, Engineering and Technology field (SET) as pointed out by the CHE
(2000) in its recommendation to the Minister of Education in 2000. The Department of Mechanical Engineering would therefore be used as a sample of a course that would contribute to addressing some of the skills shortages in the SET field.
The quantitative research component in this study was conducted by collecting and analyzing historical data on the 2007 intake of first-time students (both in ECP and Mainstream studies) in the Department of Mechanical Engineering at a University of Technology. The 2007 cohort was specifically chosen for several reasons. The first reason is that students in both ECP and mainstream would by the end of 2013 have had 1½ times the regulation time to complete their National Diploma. Regulation time refers to the minimum required time to complete the qualification. In the case of the Extended Curriculum Programme, regulation time for the National Diploma is four years and regulation time for the Mainstream is three years. The second reason is that the data would reflect how many students have gone on to further studies i.e. B-Tech or M-Tech. The final reason is the fact that students who have entered the workplace would have had some time to establish themselves in their chosen field.

The qualitative research component in this study was conducted by doing a survey with a sample of the 2007 ECP cohort who had graduated with a National Diploma in Mechanical Engineering from the University of Technology and who had now entered the world of work. The survey was aimed at determining the employment prospects for students who had graduated through doing the ECP course in Mechanical Engineering and the kinds of positions they hold in industry.

Another qualitative component of the research was interviews conducted with staff members who teach on the ECP at the Department of Mechanical Engineering at the University of Technology. The aim of the interviews was to gauge the extent to which quality management practices are in place in the Department of Mechanical Engineering and to determine how this is related to success in the ECP.

Findings and Discussion on Quality Management Practices at the University of Technology

44 students had enrolled for the ECP in 2007 and 77 first-time entering students had enrolled for the Mainstream in the Department of Mechanical Engineering.
Scott, Yeld and Hendry (2007) report that of all the first-time entering students of the 2000 intake cohort at higher education institutions in South Africa only 30% graduated within 5 years (i.e. 2005), 14% are still registered after 5 years and 56% leave without graduating. With specific reference to technikons (now universities of technology), 32% graduates within 5 years, 10% are still registered after 5 years and 58% leave the system (Scott, Yeld and Hendry, 2007).
With an even more narrowed down look at the specific Classification of Education Subject Matter (CESM) categories i.e. Business/Management, Computer Science, Engineering, and Social Services/Public

Administration at technikons, Scott, Yeld and Hendry (2007) report that only 17% of first time entering students in Engineering graduate within 5 years and 14% are still registered after 5 years.
The graph below is the graduation rate for ECP and Mainstream of the Department of Mechanical Engineering students of the 2007 cohort of the Department of Mechanical Engineering at a University of Technology.

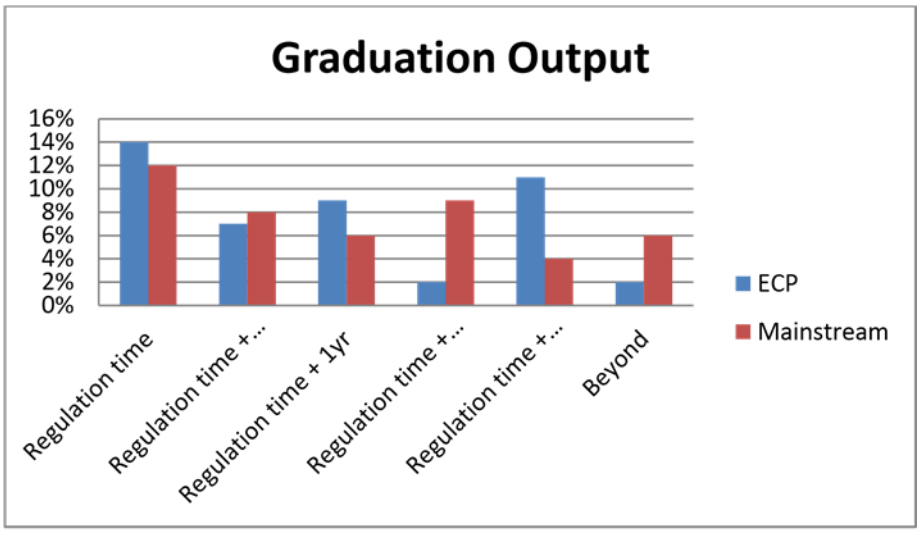

Figure 1: Graduation output for 2007 cohort

13% of ECP students graduated within regulation time (4 years) and 12% of Mainstream students graduated in regulation time. Graduation rate after 7 years is 45% for both ECP and Mainstream. With consideration for the reasons for the implementation of the ECP, students in ECP have done better under the circumstances under which they were recruited into the programme. Students in ECP in 2007 were recruited with less than the minimum entrance requirements for a National Diploma in Mechanical Engineering. But with effective interventions to bridge the gap, students were able to bring their academic performance to the same level as mainstream.
The number of graduates in the ECP 2007 cohort at the end of 2013 was 20 students. 8 students of the 2007 ECP cohort had registered for B-Tech in Mechanical Engineering studies. This could be represented as 18% of the cohort or more significantly it represents 40% of those who have graduated thus far.
How soon graduates find employment in their field of study can also be seen as an indication of the relevance and effectiveness of the programme offered. 12 recipients of the questionnaire (ECP Graduates of 2007 cohort) had responded. The majority of the students (62%) were able to secure employment immediately after graduating but 30% however were unemployed for six months or more. The pie chart below illustrates the unemployment statistics for the 2007 ECP cohort in the Department of Mechanical Engineering.

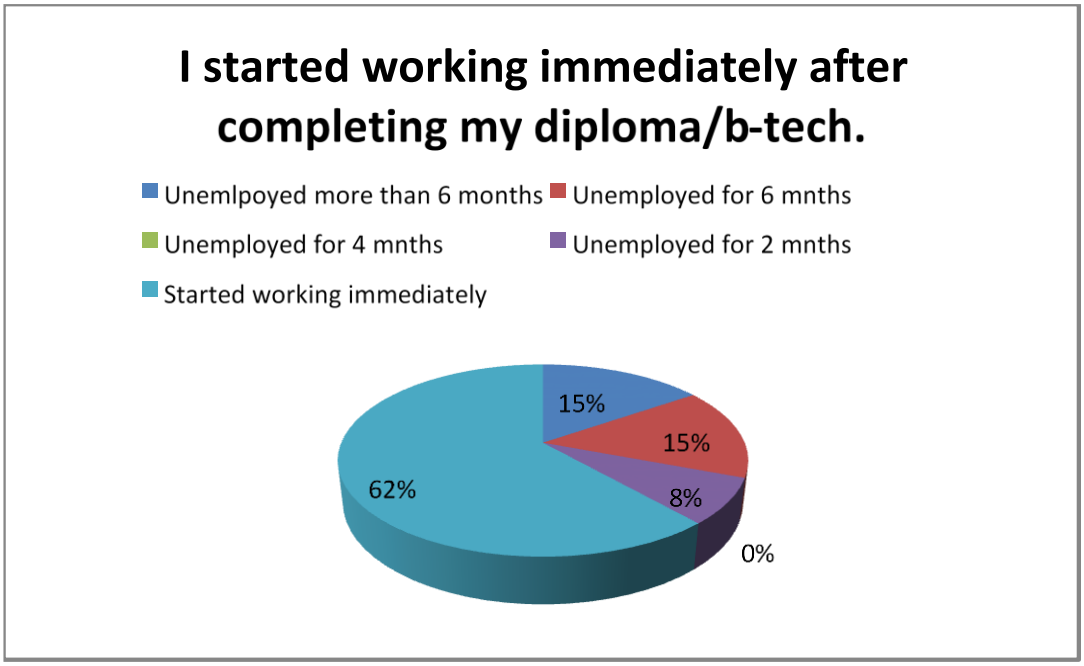

Figure 2: Employment after graduating

The above results are in contrast to the City Press (2012) that states that a study by Dr Haroon Bhorat from the Development Policy Research Unit indicate that those with diplomas and not degrees only have a 50% chance of finding employment compared to 17% for those with degrees. The Centre for Development and Enterprise (2013) however report that research done by Professor Servaas van der Berg and Hendrik van Broekhuizen does not agree with the City Press. It was found that the unemployment rate for degree holders was just under 5%. They do however distinguish between degree holders and other non-degree tertiary qualifications and state that the unemployment rate for non-degree tertiary qualification holders was 16%. The low unemployment rate is attributed to the need for skilled labour in the country and the demand for universities to produce such graduates.
Tied in with the employability of graduates, Bennet (2002) speaks about the importance of a course of study to not only teach discipline specific skills but also generic skills and refers to these generic skills as "transferable skills" and go on to describe them as the skills *which enable people to participate in a flexible and adaptive workforce. They include personal skills such as the ability to work well with others, the ability to organise, self-motivation, communication skills, initiative, creativity, the capacity to solve problems and leadership* (Bennet, 2002: 457).
Respondents were asked three questions regarding generic transferrable skills parted to them in the ECP. The three questions looked at the skill of critical analysis and solving problems, interpersonal skills, and communication skills. The graph below represents the results as elicited by the thirteen graduates.

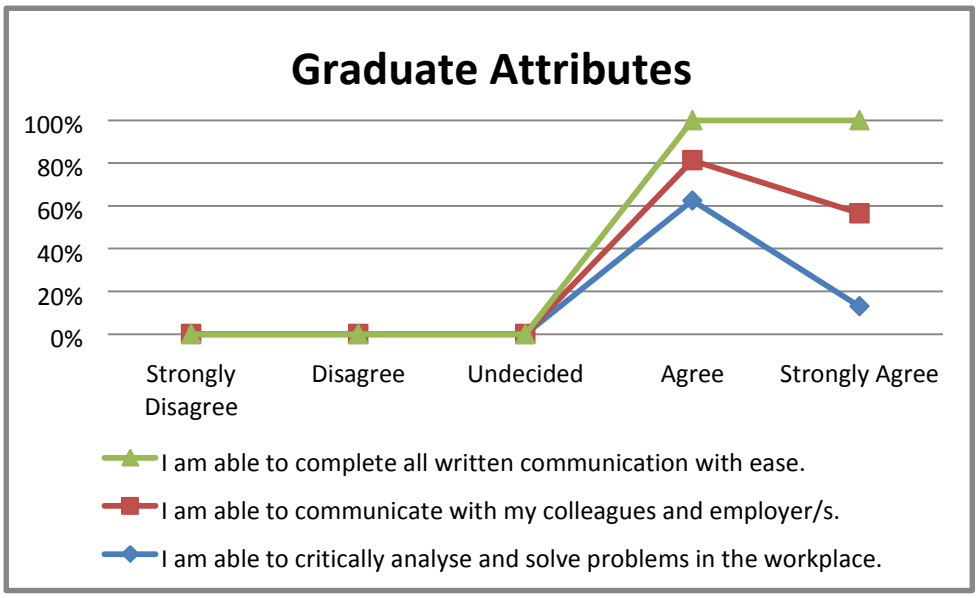

Figure 3: Generic Skills acquired

It was found that the ECP in the Department of Mechanical Engineering ran integrated projects twice a year. The integrated project is a task that requires students to work in groups to solve an engineering related problem. Students are required to go through the whole process from conceptualisation to drawing to manufacturing, testing and communicating both orally and in written form. Projects are an effective teaching method to integrate generic skills with professional skills. The two kinds of skills are sometimes referred to as context dependent skills (professional skills) and context independent skills (generic skills).

Finally, interviews were conducted on a one-on-one basis with four lecturers who teach on the ECP and the length of the interview was approximately 30 minutes each. Some significant findings with regard to quality management practices were made. All the lecturers interviewed mentioned the fact that the ECP allowed for different classroom practices than mainstream in that lecturers had more time to give the students examples to work through and move around the class. Lecturers saw this as invaluable as it gave them an opportunity to draw out students who were struggling and work with them individually or design an activity or another lecture if most of the class was struggling.

Other practices involved extensive monitoring of attendance, punctuality and progress marks. Two lecturers mentioned that this was effective if students were given regular feedback on their progress, attendance and punctuality and the matter was dealt with before it became too difficult to repair.

Interviewees were asked to comment on practices that were in place for the programme as a whole, over and above individual classroom practices. Regular progress reports are distributed to students so that they can be aware of their progress at all times. Lecturers also have regular marks discussions to look at students who are at-risk of failing some subjects and discuss ways of dealing with this.

The Department of Mechanical Engineering usually runs a 3-day orientation programme with new students where students are shown around campus and made aware of the facilities available to them. Over and above this, the ECP continue to draw students' attention to what is on offer at the institution by taking them on a more detailed tour of the library and regular talks on empowerment to give the students a sense of belonging.

Site visits are organised either in the programme or in specific subjects. This allows students to see qualified mechanical engineers at work and brings what happens in the classroom a lot closer to home.

The ECP makes use of the Step-Up programme run by the Faculty of Engineering. This is a two-day course that students attend where they are taken through the understanding of why and how one learns and then are required

to set goals for their performance in that year. These goals are then closely monitored by the students and their lecturers to determine if they are on track.
The above findings are indicative of a learning programme that has put some measures in place to ensure quality delivery of an education that speaks to the development of the whole being.

Conclusions

The reality of the situation in South Africa is the fact that the education sector is still recovering from the inequalities of the Apartheid system and the long lasting effects that Apartheid has had on the delivery of quality education that will prepare its citizens for the 21st century.
It can be concluded that the ECP has contributed to increasing the graduation output of the Department of Mechanical Engineering and doing so in regulation time. This is an indication of their commitment to "getting it right the first time".
It can also be concluded that ECP's have given many students from disadvantaged educational backgrounds the opportunity to have access to higher education and have resources available to them to succeed in higher education. It can therefore be concluded that ECP's are there to "meet customer requirements".
Finally it can be concluded that the ECP at the University of Technology has aligned itself with the institution's mission and vision and has so proved itself to be "fit for purpose".

References

Bennet, R. 2002. Employers' Demands for Personal Transferable Skills in Graduates: A Content Analysis of 1000 Job Advertisements and an Associated Empirical Study. *Journal of Vocational Education and Training*, 54(4) : 457-476.
Blumfield, B. 2008. *A Timeline of South African Events in Education in the Twentieth Century: 1900-199.* http://sahistoryofeducation.webs.com/SA%20timeline.pdf
[16 May 2013].
Centre for Development and Enterprise. 2013. Graduate Unemployment in South Africa. A much exaggerated problem. *CDE Enterprise*, April.
CHE. 2000. *Towards a New Higher Education Landscape: Meeting the Equity, Quality and Social Development Imperatives of South Africa in the 21st Century.*
<http://www.che.ac.za/documents/d000009/New_HE_Landscape.pdf> [28 May 2013].
City Press. 2012. Young, Jobless and desperate – Degrees with no guarantee. 16 June, Johannesburg.
Crosby, P B. 1984. *Quality Without Tears. The Art of Hassle-Free Management.* New York: McGraw Hill Inc.
Deming, WE. 1993. *The New Economics for Industry, Government, Education.* Cambridge, MA: Massachusetts Institute for Technology, Centre for Advanced Engineering Study.
Harvey, L. and Knight, P. 1996. *Transforming Higher Education*. Buckingham: SRHE and Open University Press.
Juran, J & Godfrey, A B. 1999. *Juran's Quality Handbook*. USA: McGraw-Hill Companies Inc.
McKay, J and Kember, D. 1999. Quality Assurance Systems and Educational Development: Part1- The Limitations of Quality Control. *Quality Assurance in Education*, 7(1): 25-29.
Scott,I., Yeld, N and Hendry,J. 2007. A Case for Improving Teaching and Learning in South African Higher Education. *Higher Education Monitor No.6: Council on Higher Education,* October.

South Africa. Department of Education. 1995. *White Paper on Education and Training.* Cape Town: Government Printer.
South Africa. Department of Education. 1997. *Education White Paper 3. A Programme for the Transformation of Higher Education. Notice 1196 of 1997.* Pretoria: Government Printer.
South Africa. Ministry of Education. 2001. *National Plan for Higher Education*. Pretoria: Government Printer.
Wink, J. 2005. *Critical Pedagogy: Notes From the Real World.*
http://www.joanwink.com/cp3/3perspectives.php
[11 September 2013].