

A Study of Stakeholder Perception Regarding Quality of Education in Civil and Environmental Engineering at The University of the West Indies

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Abstract: This study evaluated the quality of the undergraduate programmes in the Department of Civil and Environmental Engineering at The University of the West Indies. The research utilised questionnaires which were administered to undergraduate and recently graduated students as well as to five companies that employed graduates of the programmes. The results showed that the majority of undergraduates and graduates are generally appreciative of the programmes but also have some major concerns especially regarding the lack of practical content in the course material and the high work load due to the condensed length of the programmes. The majority of the employers agreed that although graduates had a positive work ethic, they were found to be lacking critical workplace skills and, to a lesser extent, technical skills. The findings indicate that efforts must be made to strengthen the link between theory and practice in the curriculum and serious consideration be given to the extension of the programme to a 4-year period.

Keywords: Engineering education; education quality; programme evaluation; student feedback; employer feedback

1. Introduction

The concept of quality is one which is often difficult to explain; therefore, when evaluating quality, stakeholders should define the criteria as clearly as possible. Harvey and Green (1993) describe five interrelated ways of thinking about quality: as exceptional (excellence in achievement of standards); as perfection (product is provided exactly to specification and consistently free of defects); as fitness for purpose (meeting the needs of the customer); as value for money (direct relation to cost); and as transformative (causing a fundamental change of form). In education, quality can be viewed in two ways, firstly, as achieving fitness for purpose and secondly as being transformative. Most educational institutions are systems that involve students receiving a 'packaged' education for which the students are required to pay. It is justified, therefore, to think of quality in education as being both an issue of meeting customer needs as well as ensuring that participants evolve to become effective graduates.

For the majority of the 20th century, the quality in engineering programmes in the United States was measured by the success of its students in passing undergraduate courses in engineering, mathematics and science (Schachterle, Demetry and Orr 2009). However, in the late 1990s, many engineering professionals and faculty became concerned with the increasing complexity and narrower focus of the courses necessary to satisfy accreditation demands, as well as the

increasing pace with which course content became outdated when compared to industry trends. This led to a reform in the accreditation protocol that evaluated the methods used to prepare engineering graduates for their profession (Schachterle, Demetry and Orr 2009).

Two common methods for evaluating quality in higher education include: firstly, the planning, validation and review of courses and secondly, the use of student feedback on the perception of teaching quality (Ellis 1993; Leckey and Neill 2001). Student feedback is increasingly acknowledged as playing a major role in developing quality in higher education. Indeed the evaluation of teaching performance, course effectiveness and the overall student experience through the completion of evaluation questionnaires has become a common practice throughout higher education institutions (Leckey and Neill 2001). It must be noted, however, that higher education institutions also rely on other methods of evaluating the quality of their programmes. Indeed Levy (2000) lists a number of groups as key sources of evidence of the quality of education being promoted within a given institution. These include past and present students and employers as well as staff members, external examiners, external advisers, subject peers, and accreditation bodies.

Feutz and Zinser (2010) highlight four (4) key stakeholders in the educational institution who all play a part in ensuring that the education programmes being implemented are indeed relevant. For instance, lecturers

want to know that their teaching is effective and meaningful, whereas students want the education to prepare them for the world of work. Sponsors want to ensure that their funding is justified. Employers also demand qualified and competent employees. Employers are especially affected by the level of quality in an education system both as graduate 'consumers' and as collaborators in research activities (Harvey and Green 1993). Taking this into consideration, the study focussed on the perspectives of two stakeholders that are affected by the educational process: students and employers.

Educational institutions can adopt different approaches in their quest to obtain quality. However, the three main methods identified and defined by Woodhouse (1999) are: assessment, audit and accreditation. Assessment involves evaluation that results in graded judgment on quality, while auditing aims to check how well an institution is fulfilling its own objectives. Both of these processes are commonly conducted internally as the criteria are set by the institution itself. Accreditation, the most widely used of the three, is an evaluation of an institution or programme by an external and independent agency to determine whether it meets the set standard and thereby qualifies for a certain status.

The University of the West Indies, St. Augustine, Trinidad & Tobago, has employed all of the above approaches. However, this study focuses on the internal quality systems. Therefore, emphasis is placed on the mandate for the development and implementation of a full system of quality audit and quality assurance at the University. A consequence of this is the implementation of a quality assurance review for the University's Department of Civil & Environmental Engineering (hereinafter referred to as the Department) in February 2016. This study assesses the current quality of education provided in the Department from the students' and employers' perspective. This study determined whether the quality of education in the Department is effective in meeting the educational needs of the students and effective in producing qualified graduates for employment. Therefore, the information gleaned from this study can inform the upcoming review process and accreditation visit.

This paper begins with a review of related literature on education quality followed by a description of the methodology used to collect and analyse the data. This is followed by a presentation and discussion of the results. The paper concludes with recommendations that could be implemented by the Department.

2. Literature Review

2.1 Role of student feedback in quality assurance

Feedback can be obtained using formal methods such as questionnaires and staff-student committees, or informal methods such as casual conversations or comments. The advantages of formal methods, especially the

questionnaire, are that they provide an opportunity to obtain individual feedback from a large population and can document the learning experiences of the student population in a relatively systematic manner (Richardson 2005). Harvey (2003) defines student feedback as the expressed opinion of students about the service they receive. In a higher educational institution, feedback can be given on a wide variety of components inclusive of perceptions about learning and teaching, learning support facilities (e.g. libraries and available technology), learning environment (e.g. laboratories and lecture rooms), and other support facilities (e.g. health facilities and student services).

Much of the available literature on this topic (Leckey and Neil 2001; Harvey 1997; Harvey 2003; Harvey 2011; Williams 2011) focuses on student feedback on the quality of teaching as this is one of, if not the most, essential aspect of a student's academic experience. Although achieving quality assurance in an institution consists of more than students' evaluations of teaching effectiveness, such evaluations are still important for various reasons. They can be used as feedback to improve teaching strategies; to measure teaching effectiveness for use in administrative decisions; to assist prospective students in the selection of a course or programme; and as a source of data for research in teaching and the educational environment (Leckey and Neill 2001).

The concept of student feedback involves more than just the compilation of results. It also includes ensuring that students are informed of what actions have been taken to improve the unsatisfactory areas (Harvey 2003). Richardson (2005) asserts that students and staff need to feel a sense of ownership of the feedback data and be involved in and informed about its analysis to be more likely to act on its findings and to be willing to participate in further evaluations in the future. The collection and analysis of the findings by an external party, as suggested by Harvey (2003), would serve to disengage the two main stakeholders that will be affected by the results.

Many institutions put considerable effort into collecting student feedback without having an established system of analysis for the data collected and having no approach as to how to remedy the issues raised in the findings (Harvey 1997). Students are less likely to be enthusiastic about continuing to give feedback if there is no evidence of any action being taken in response to their opinions. This makes it difficult to get students to actively participate in further evaluations for quality assurance (Leckey and Neill 2001; Harvey 2003; Harvey 2011).

2.2 Role of Lecturers in Quality Assurance

In the context of considering students as customers in the process of education, both lecturers and administrators represent service providers. Most studies (Sander et al.

2000; Hill, Lomas and MacGregor 2003; Voss and Gruber 2006) agreed that students desired lecturers who were knowledgeable, enthusiastic and approachable. Another study (Greimel-Fuhrmann and Geyer 2003) listed qualities such as the ability to give clear explanations; creativity in teaching; willingness to understand students' problems; fairness; and a sense of humour as being important to students as well. However, the study also found that students perceived the lecturers' ability to give clear explanations, solid examples and feedback on their learning progress to be more valuable than friendliness, patience or overall classroom management.

In order to achieve quality as perceived by students, lecturers would do well to heed student needs and expectations and, where possible, to use that information in their teaching methods and programme design (Voss and Gruber 2006). However, it is important to note that the lecturer's role consists of more than satisfying the students' expectations – the qualities highlighted are tools with which lecturers can equip themselves for achieving the ultimate goal of assisting the students' growth in knowledge, skill and passion within their various fields.

2.3 The attitude of staff towards student feedback

It should be noted that staff members are more than likely the persons who will have to respond in some way to the changes called for in the students' evaluations. However, staff members tend to be sceptical about the effectiveness of student evaluations. There are various reasons for this.

Firstly, students are not equipped to make accurate assessments on effective teaching, yet often times their responses (usually anonymous) are unchallenged. This breeds contempt for students among staff members. Secondly, if the student feedback method is one that is imposed on the staff, there will be no sense of personal engagement in seeing the process through and staff morale will suffer as a result. Moreover, it is often the case that student feedback conveying poor performance leads to some administrative action while good performance is not recognised (Leckey and Neill 2001). This does not encourage lecturers to improve their teaching performances. Instead it may instill apprehension when teaching for fear of not meeting student expectations.

2.4 Role of employers in higher education quality

Employers' expectations are becoming increasingly relevant as employability is now being considered a relevant quality indicator in higher education. Therefore, employers' perspective is one that also deserves attention in the context of enhancing quality (Romenti et al. 2012). In the design of an educational programme, the quality of the degree is related to achieving the right balance between developing a theoretically sound

programme and incorporating the core competencies to become a professional (Harvey 2004; Kalanova 2008). To achieve such a balance, there must be constant communication between educators and professionals to combine their perspectives in developing educational objectives. As a result, students are trained to face professional challenges in the 'real' world (Romenti et al. 2012).

2.5 Graduate employability and its effect on higher education quality

One of the main methods that can be used to measure a higher educational institution's effectiveness is the success of the graduates that it produces. Teichler (2009) states that graduate employment and work became key indicators of quality in the 1990s and since then universities have been more attuned to the requirements of the industry with respect to ensuring that the education provided does indeed equip students with the tools to succeed in the working world. According to Yorke (2004), the term 'employability' embodies the skills, understandings and personal attributes that make graduates more likely to gain employment and to be successful in their jobs. For many professions, graduates gain most of these skills and knowledge in higher educational institutions.

The questions that follow such a statement are: What are these skills and attributes that make one a successful employee? And, who determines what they are? The second question is more easily answered – employers determine which attributes an employee should possess based on profession and position in the organisation. The findings of a study conducted in the United Kingdom entitled "Employers' perceptions of the employability skills of new graduates" stated that employers expected graduates to have technical and discipline competencies from their degrees as well as a range of broader skills and attributes inclusive of communication, team-work, critical thinking, problem solving and management skills (Lowden, et al. 2011). The study also highlighted that in cases where partnerships between higher educational institutions and employers were implemented, employers could contribute positively towards course design making courses more attuned to fostering employability attributes (Lowden, et al. 2011).

3. Methodology

3.1 Setting of Hypotheses

The focus of this study was on the assessment of education quality in the Department from the students' as well as the employers' perspectives. A number of hypotheses were formulated based on these two sample groups and were tested in the study.

The hypotheses from the undergraduate students and recent graduates' perspectives were:

1. The Department is providing undergraduate programmes of good quality.
2. The Department has adequate academic resources to support the delivery of undergraduate programmes.
3. The Department provides a rewarding learning experience for students in the undergraduate programmes.

The hypothesis from the employers' perspective is expressed by the following:

4. The Department is producing employable graduates from its undergraduate programmes.

3.2 Population and Sample

The target population for the survey consisted of:

- Civil and Environmental Engineering graduates of The University of the West Indies, graduating within the period of 2012 to 2014
- Current undergraduate students from levels 1 to 3 in the Civil & Environmental Engineering Department of The University of the West Indies
- Employers of Civil & Environmental Engineering graduates from The University of the West Indies

Each undergraduate is estimated to have cohort of 40 students. The overall average response rate ranged between 70% and 83% which indicates a good representative sample. In the case of the graduates, an average of 35 students is estimated to graduate each year (UWI 2016). Questionnaires were sent to all the graduates for each of the three years (2012, 2013, 2014) but only a 20% response rate was achieved. Reminders were sent to those who did not respond, however, minimal improvement was noticed.

The questionnaire format of the survey has some disadvantages such as misinterpretation of questions by the respondents and untruthful responses which can affect the overall accuracy of the results. However, the structure of the survey questions was simplified to mitigate these possibilities. Rowley (1995) points out that there is the possibility of receiving inaccurate information, another limitation, as questionnaires are usually administered at the end of an activity or

experience, any improvements made as a result of the survey's findings will usually not benefit the persons from whom the feedback was taken. It can, however, still be used to improve the experience for future participants.

3.3 Design of Data Collecting Instruments

The administered survey consisted of three sets of questionnaires, one for each respondent group: undergraduate students, recent graduates, and employers. These were distributed to the respective respondents in hard and soft copy form where necessary over a period of about three months and were completed anonymously.

The structure of the student feedback questionnaire was the same for both undergraduate and graduate students except for a few questions. Questions 1 to 5 sought general information about the student which included year level, gender, student status (full time/part time), GPA, and specialisation/major. Graduate students were also asked if and where they were employed in order to determine some of the organisations to which the employer questionnaires could be distributed.

Question 6 tested hypotheses 1 and 2 and consisted of a total of 18 items that were divided into 3 sections whose content is described in Table 1. The sections consisted of a programme component scale which comprised 10 items, a resource component scale which comprised 7 items and a potential for employability scale. Cronbach's alphas for the 10 programme items and 7 resource items were found to be $\alpha = 0.87$ and $\alpha = 0.73$ respectively – indicating the scales' high reliability. Some of the items evaluated included: teaching and assessment methods, pace of learning, quality of computer and library resources and laboratory equipment. These were measured using a 5-point Likert scale consisting of the following response choices: Excellent, Very good, Good, Fair and Poor.

Question 7 sought the students' rating of their overall learning experience in order to test Hypothesis 3. It was also measured using a 5-point scale consisting of the following responses: Excellent, Good, Satisfactory, Mediocre and Poor/Disappointing.

Table 1. Description of scales used to measure student academic experience

| Scale | No. of items | Description | Sample item |
|------------------------------------|--------------|--|--|
| Programme | 10 | Measures student perception of overall effectiveness of academic programme | General course content |
| Resources | 7 | Measures student perception of study support and resources available | Online resources |
| Potential for employability | 1 | Measures undergraduate student perception of degree enabling them to find work/ whether graduate student has found work in his/her chosen field of study | My degree has allowed me to find work in my chosen field |

Questions 8 and 9 were open-ended questions which sought to determine what students valued and disliked most about the programme respectively and Question 10, also an open-ended question, focused on how students thought the programme could be improved.

The structure of the employers' perception questionnaire consisted of three sections A, B and C. Section A comprised general questions about the name and type of the company or organisation to which the employer is affiliated, as well as the employer's contact

information. Section B was designed to test hypothesis 4 and comprised 19 statements which evaluated the on-the-job performance of the Department’s recent graduates. These were scored by the employer using the 5-point Likert scale consisting of five responses, each with a different weighting for statistical analysis purposes: Strongly agree (SA) = 5, Agree (A) = 4, Undecided (U) = 3, Disagree (D) = 2, Strongly disagree (SD) = 1. Cronbach’s alpha for the 19 items was found to be 0.83 – indicating high reliability. Some examples of the statements to be evaluated by the employers included:

- Graduates are technically competent for the demands of the job
- Graduates display the ability to evaluate issues critically and analytically
- Graduates have difficulty applying theoretical concepts to practical situations
- Graduates display initiative

In Section C, the employer was given the opportunity to offer any other comments he/she believed would help in evaluating the performance of graduates.

3.4 Statistical Analysis

Statistical analysis of the data was performed using the IBM SPSS software package, specifically using the One Sample t-test. The t-test was used to analyse Question 6 to 8 in the student feedback survey, as well as Section B in the employer survey whose responses were in the form of the 5-point Likert scales. In each of the scales used, the most positive response (Excellent, Strongly Agree) was assigned a test value of 5, while the most negative response (Poor/Disappointing/Strongly Disagree) was assigned a test value of 1. The scale items

in the student feedback survey each focused on an aspect of the quality of education offered and in the employer survey, they assessed employers’ perception of various skills possessed by graduates. These were collectively used to determine whether to accept or reject the hypotheses.

The t-test compared the responses obtained to the hypothesis test value, depending on the item, in order to determine whether there is a significant difference between the responses obtained from the test groups and the expected hypothesis response. For the first three hypotheses, a test value of 3 was used which represents the “good” and “satisfactory” responses. For the fourth hypothesis based on the employers’ perspective, a test value of 3 which represents the “Undecided” response is used. This is a two-tailed test which analyses whether responses skewed to the left or right of the test value – a negative t-value would indicate a poor job/experience while a positive t-value would indicate an excellent job/experience.

Further analysis was conducted using the responses to the open-ended questions posed in both the student and employer surveys. The responses were examined to see whether they support a rejection of the proposed hypotheses.

4. Results and Analysis

4.1 General Data

There were 93 responses from the undergraduate group, 19 responses from the graduate group and 5 responses from employers. The background information acquired from each of these three (3) groups is summarised in the Tables 2, 4 and 4. The results from the study will be presented by addressing each hypothesis.

Table 2. General data from Undergraduate population sample

| Undergraduates | | | | | | |
|----------------|------------------|------|--------|-----------|-----------|-----------|
| # of Responses | No. of Full-time | Male | Female | 1st -Year | 2nd -Year | 3rd -Year |
| 93 | 93 | 58 | 35 | 32 | 33 | 28 |

Table 3. General data from Graduate population sample

| Graduate | | | | | | | | | |
|----------------|------|--------|----------------|------|------|------------|------------|------------|-------------|
| # of Responses | Male | Female | Year Graduated | | | GPA Scores | | | |
| | | | 2012 | 2013 | 2014 | 0 - 1.99 | 2.0 - 2.99 | 3.0 - 3.59 | 3.60 - 4.30 |
| 19 | 11 | 8 | 7 | 7 | 5 | 1 | 9 | 8 | 1 |

Table 4. General data from Employer population sample

| Employers | |
|--|-----|
| Type of Company | No. |
| Consultant Companies | 2 |
| Contractor companies | 2 |
| Government operated Consultant and Project Management Organisation | 1 |

Hypothesis 1: The Department is providing undergraduate programmes of good quality

In both Tables 5 and 6, the test value of 3 represents a “good” rating, with any rating more than the test score indicating a positive response (very good or excellent) and any rating less than the test score indicating a negative one (mediocre or poor).

Table 5 shows the results of the one sample t-test conducted to determine whether the quality of the undergraduate programmes was “good” from the views of students. The mean response (M= 2.60, SD= 1.02) was lower than the test value of 3. The results indicated an overall statistically significant difference between means ($P < 0.05$) and, therefore, we can reject the null hypothesis.

An analysis of the individual components, however, shows that the respondents viewed the general course content of the programme to be of good quality, $t(92) =$

5.34, $p = 0.00$. In the case of quality of teaching, although it was rated as fair, the mean score of 2.89 was not significantly different from the test value ($P < 0.05$). On the other hand, for all other components, the respondents’ ratings were significantly different from the test value, with negative t-values indicating ratings of fair or poor. Students especially highlighted the following as major areas in which the programme was lacking: opportunities for internship ($t(87) = -10.973$, $p = 0.00$), perception that they would obtain employment with ease, ($t(88) = -6.732$, $p = 0.00$), and feedback on performance/concerns, ($t(92) = -5.301$, $p = 0.00$).

Table 6 shows the results of the one sample t-test conducted to determine whether the quality of the undergraduate programmes was “good” from the views of recent graduates. The mean response (M= 2.75, SD= 0.90) was lower than the test value of 3.

Table 5. One-sample t-test results for undergraduate evaluation of programme quality

| Programme Components | N | M | SD | t | df | P* |
|---|----|------|------|--------|----|-------------|
| General course content | 93 | 3.53 | 0.95 | 5.34 | 92 | 0.00 |
| Quality of teaching | 93 | 2.89 | 1.06 | -0.98 | 92 | 0.33 |
| Teaching methods | 93 | 2.66 | 1.05 | -3.17 | 92 | 0.00 |
| Tutorials | 85 | 2.52 | 1.02 | -4.36 | 84 | 0.00 |
| Required pace of learning | 91 | 2.63 | 1.09 | -3.26 | 90 | 0.00 |
| Assessment methods | 91 | 2.70 | 0.97 | -2.91 | 90 | 0.00 |
| Feedback on your performance/concerns | 93 | 2.41 | 1.08 | -5.30 | 92 | 0.00 |
| Opportunities for internship | 88 | 1.89 | 0.95 | -10.97 | 87 | 0.00 |
| Perceived ease of obtaining employment after graduation | 89 | 2.31 | 0.96 | -6.73 | 88 | 0.00 |
| Link between theory and practice | 90 | 2.49 | 1.08 | -4.48 | 89 | 0.00 |
| Test Value = 3 | 91 | 2.60 | 1.02 | | | |

*Significant at 0.05 level

Table 6. One-sample t-test results for graduate evaluation of programme quality

| Programme Components | N | M | SD | t | df | P* |
|---|----|------|------|-------|----|-------------|
| General course content | 19 | 3.58 | 0.69 | 3.64 | 18 | 0.00 |
| Quality of teaching | 19 | 3.16 | 0.69 | 1.00 | 18 | 0.33 |
| Teaching methods | 19 | 2.68 | 0.82 | -1.68 | 18 | 0.11 |
| Tutorials | 18 | 2.67 | 1.14 | -1.24 | 17 | 0.23 |
| Required pace of learning | 19 | 2.74 | 0.56 | -2.04 | 18 | 0.06 |
| Assessment methods | 19 | 2.53 | 0.70 | -2.96 | 18 | 0.01 |
| Feedback on your performance/concerns | 19 | 2.42 | 1.07 | -2.36 | 18 | 0.03 |
| Opportunities for internship | 19 | 2.11 | 1.10 | -3.54 | 18 | 0.00 |
| Perceived ease of obtaining employment after graduation | 19 | 3.00 | 1.20 | 0.00 | 18 | 1.00 |
| Link between theory and practice | 19 | 2.63 | 1.07 | -1.51 | 18 | 0.15 |
| Test Value = 3 | 19 | 2.75 | 0.90 | | | |

*Significant at 0.05 level

Statistically, the hypothesis is also to be rejected if any of the components fail to meet the required test value of 3 (“good”). According to the results, there are components for which this condition prevails, e.g. assessment methods, $t(18) = -2.96$, $p = 0.01$. Therefore, according to the graduate group, Hypothesis 1 is to be rejected.

An analysis of the individual components highlights a few areas which the graduate respondents viewed as good. Similar to the undergraduate group, the graduates indicated that the general course content of the programmes was significantly better (M=3.58, SD= 0.69) than good, $t(18) = 3.64$, $p = 0.00$. The graduates also rated the following areas as good: quality of

teaching, $t(18) = 1.00$, $p = 0.33$, and perceived ease of obtaining employment after graduation, $t(18) = 0.00$, $p = 1.00$. Conversely, of the components which were rated below the test value, only a few differed significantly from the test value. These included: Assessment methods ($t(19) = -2.53$, $p = 0.01$), Feedback on performance ($t(18) = -2.36$, $p = 0.03$) and opportunities for internship, $t(18) = -3.54$, $p = 0.00$.

Hypothesis 2: The Department has “adequate” academic resources to support the delivery of undergraduate programmes.

In both Tables 7 and 8, the test value of 3 represents a “good” rating, with any rating more than the test score indicating a positive response (very good or excellent) and any rating less than the test score indicating a negative one (mediocre or poor).

Table 7 shows the results of the one sample t-test analysis performed to determine whether according to

the undergraduate respondents, Hypothesis 2 is to be rejected. Statistically, the hypothesis – if taken to represent an overall evaluation of the programmes’ resource quality by the respondents – is to be rejected if the rating for any of the components fails to meet the test value of 3 – indicating a “good” rating. The results show that this is the case for the second component: textbook availability and accessibility – $t(92) = -2.75$, $p = 0.01$. Therefore, according to the undergraduate group, Hypothesis 1 is to be rejected.

In analysing the components individually, results indicate that except in the area of textbook availability and accessibility, where $t(91) = -2.75$, $p = 0.01$, the ratings for all other components are above the test score. However, this result is only statistically significant in the case of the evaluation of library resources, $t(92) = 2.59$, $p < 0.01$. In all other cases, the lack of statistical significance ($p > 0.05$) indicates that the respondents’ ratings differed only slightly from the test value of 3.

Table 7. One-sample t-test results for undergraduate evaluation of resource quality

| Resource Components | N | M | SD | t | df | P |
|--|----|------|------|-------|----|------|
| Support from lecturers outside of classroom time | 92 | 3.07 | 0.97 | 0.64 | 91 | 0.52 |
| Textbooks (availability and accessibility) | 92 | 2.68 | 1.10 | -2.75 | 91 | 0.01 |
| Online resources | 93 | 3.19 | 1.05 | 1.79 | 92 | 0.08 |
| Library | 93 | 3.27 | 1.00 | 2.59 | 92 | 0.01 |
| Computers | 92 | 3.05 | 1.05 | 0.50 | 91 | 0.62 |
| Lab and Lab equipment | 91 | 3.04 | 1.02 | 0.41 | 90 | 0.68 |
| Test Value = 3 | 19 | 3.30 | | | | |
| <i>*Significant at .05 level</i> | | | | | | |

Table 8. One-sample t-test results for graduate evaluation of resource quality

| Resource Components | N | M | SD | t | df | P |
|--|----|------|------|------|----|-------------|
| Support from lecturers outside of classroom time | 19 | 3.21 | 1.08 | 0.85 | 18 | 0.41 |
| Textbooks (availability and accessibility) | 19 | 3.21 | 0.92 | 1.00 | 18 | 0.33 |
| Online resources | 19 | 3.32 | 0.82 | 1.68 | 18 | 0.11 |
| Library | 19 | 3.53 | 0.77 | 2.97 | 18 | 0.01 |
| Computers | 19 | 3.16 | 0.69 | 1.00 | 18 | 0.33 |
| Lab and Lab equipment | 19 | 3.37 | 0.68 | 2.35 | 18 | 0.03 |
| Test Value = 3 | 19 | 3.30 | | | | |
| <i>*Significant at .05 level</i> | | | | | | |

The results of the one sample t-test analysis performed to test whether, according to the graduate group, Hypothesis 2 is to be rejected is shown in Table 8 above. Statistically, the hypothesis is to be rejected if any of the components’ ratings falls below the test value of 3. The results show that this is not the case and therefore according to the graduate group, Hypothesis 2 cannot be rejected.

Analysis of the components at an individual level showed statistically significant differences from the test value in the evaluation of library resources ($p = 0.01$) and evaluation of lab and lab equipment quality ($p = 0.03$). In both cases, the mean scores were higher than the test value (although not reaching a value of 4), thereby indicating that graduates found these resources

to be “good”. For all other outlined resource components, however, although their mean scores were above the test value, there was no significant difference between the scores and the test value. This indicates that very few respondents’ ratings differed from the actual test value, notably on the more positive side.

Hypothesis 3: The Department provides a sufficient learning experience for students in the undergraduate programmes.

In both Tables 9 and 10, the test value of 3 represents a “satisfactory” rating, with any rating more than the test score indicating a positive response (good or excellent) and any rating less than the test score indicating a negative one (mediocre or disappointing).

The one sample t-test was used to determine whether, according to the undergraduates, Hypothesis 3 is to be rejected. The results show that in the opinion of undergraduate students, the learning experience provided

is above “satisfactory” level with a highly statistically significant mean score of 3.35, $t(90) = 3.78$, $p = .00$ (i.e. $p < 0.005$). This indicates that the hypothesis cannot be rejected.

Table 9. One-sample t-test results for undergraduates’ rating of overall learning experience

| | N | M | SD | t | df | P* |
|----------------------------------|----|------|------|-------|----|------|
| Overall Experience Rating | 91 | 3.35 | 0.89 | 3.784 | 90 | 0.00 |
| Test Value = 3 | | | | | | |
| <i>*Significant at .05 level</i> | | | | | | |

Table 10. One-sample t-test results for graduates' rating of overall learning experience

| | N | M | SD | t | df | P |
|---------------------------|----|------|------|-------|----|-------|
| Overall Experience Rating | 19 | 3.58 | 0.84 | 3.012 | 18 | 0.007 |
| Test Value = 3 | | | | | | |

The results of the one sample t-test used to evaluate Hypothesis 3 from the graduates’ perspective are shown in Table 10. The analysis shows that graduates’ rating of their overall learning experience is greater than the test value 3 with a statistically significant mean score of 3.58, $t(18) = 3.01$, $p = 0.007$. This indicates that graduates do find the quality of their learning experience to be at least above “satisfactory” level thereby indicating that the hypothesis cannot be rejected.

Hypothesis 4: The Department is producing employable graduates from its undergraduate programmes.

The scales displayed in Tables 11 and 12 show the results of the one sample t-test analysis performed to evaluate hypothesis 4. Employers were to evaluate each statement using the following responses with assigned test values: Strongly Disagree (1), Disagree (2), Undecided (3), Agree (4) and Strongly Agree (5). The test value of 3 which represents the “undecided” response was used in order to determine whether the employers’ responses for each statement swung to the left (agree) – indicated by a positive t-value or to the

right (disagree) – indicated by a negative t-value. A t-value of 0 indicates that the mean response concurred with the test value of 3.

Tables 11 and 12 show employers’ views on several qualities and attributes which graduates may or may not have displayed in their time as employees. Out of the 14 components there were seven (7) for which employers gave a mean response that concurred with the test value 3 = “undecided”. These components therefore can have no bearing on the outcome of the hypothesis test. Statistically, the hypothesis is to be rejected if any of the components’ mean scores fell below the test value of 3. Therefore, in analysing the other 7 components for which the mean score was not the test value, the results show more than one area in which the criteria is not met. Therefore, on this basis, according to the employers, the hypothesis is to be rejected.

An analysis of the components individually showed firstly that employers were clearly undecided on several of the components, e.g. graduates showing leadership qualities, graduates having difficulty applying theoretical concepts, among others.

Table 11. One-sample t-test results for employer evaluation of graduates' job performance - part (i)

| Performance | N | M | SD | t | df | P* |
|---|---|------|------|-------|----|-------------|
| Graduates display a positive work ethic | 5 | 4.00 | 0.71 | 3.16 | 4 | 0.03 |
| Graduates are technically competent for the demands of the job | 5 | 3.20 | 0.84 | 0.53 | 4 | 0.62 |
| Graduates show leadership qualities in the way they undertake various tasks | 5 | 3.00 | 1.00 | 0.00 | 4 | 1.00 |
| The computer skills of graduates are satisfactory | 5 | 4.40 | 0.55 | 5.72 | 4 | 0.00 |
| The majority of graduates display a laid-back attitude to their work | 5 | 1.80 | 0.45 | -6.00 | 4 | 0.00 |
| Graduates are familiar with the most current trends in their field | 5 | 2.40 | 0.55 | -2.45 | 4 | 0.07 |
| Graduates are receptive to new ideas and changes within the department/organisation | 5 | 4.00 | 0.71 | 3.16 | 4 | 0.03 |
| Graduates take responsibility for their own learning and development at the workplace | 5 | 2.60 | 1.34 | -0.67 | 4 | 0.54 |
| Graduates are able to organise and manage their priorities in a timely manner | 5 | 2.60 | 0.89 | -1.00 | 4 | 0.37 |
| Graduates display the ability to evaluate issues critically and analytically | 5 | 2.60 | 0.89 | -1.00 | 4 | 0.37 |
| Test Value = 3 | | | | | | |
| <i>*Significant at .05 level</i> | | | | | | |

Table 12. One-sample t-test results for employer evaluation of graduates' job performance - part (ii)

| Performance | N | M | SD | t | df | P* |
|--|---|------|------|-------|----|------|
| Graduates demonstrate the ability to balance theoretical knowledge with technical competence | 5 | 2.60 | 0.55 | -1.63 | 4 | 0.18 |
| Graduates are innovative in their approach to solving problems | 5 | 3.00 | 1.22 | 0.00 | 4 | 1.00 |
| Graduates understand the core principles of their discipline | 5 | 3.20 | 1.30 | 0.34 | 4 | 0.75 |
| Graduates have difficulty applying theoretical concepts to practical situations | 5 | 3.00 | 1.58 | 0.00 | 4 | 1.00 |
| Graduates use their creativity when faced with work-related challenges | 5 | 3.00 | 1.22 | 0.00 | 4 | 1.00 |
| Graduates display initiative | 5 | 3.00 | 1.22 | 0.00 | 4 | 1.00 |
| The areas of specialisation that graduates bring to the workplace are too narrow in scope | 5 | 3.00 | 1.41 | 0.00 | 4 | 1.00 |
| When necessary, graduates exhibit supervisory skills in managing staff | 5 | 3.00 | 1.00 | 0.00 | 4 | 1.00 |
| Test Value = 3 | 5 | 2.98 | | | | |
| <i>*Significant at .05 level</i> | | | | | | |

Secondly, there were some statements whose mean responses were not significantly different from the test value (i.e. $p > 0.05$) indicating that a very small portion of the respondents gave a score that varied from the test value. Some of these statements included: graduates being technically competent for the demands of the job and understanding the core principles of their discipline, graduates being familiar with the most current trends in their field, and graduates taking responsibility for their own development.

Notably, given all of the statements, only 4 had statistically significant different responses ($p < 0.05$) from the test value and all four indicated something positive about the graduates attributes. Three of the four statements showed that the employers agreed that graduates displayed a positive work ethic, $t(4) = 3.16$, $p = 0.03$, that their computer skills were satisfactory, $t(4) = 5.72$, $p = 0.00$, and that graduates were receptive to new ideas and changes within the organisation, $t(4) = 3.16$, $p = 0.03$.

The remaining statement indicated that employers did not agree that the majority of graduates employed by their organisation displayed a laid back attitude towards their work, $t(4) = -6.00$, $p = 0.00$.

5. Discussion of findings

5.1 Quality of undergraduate programmes

In evaluating the quality of the programme, the undergraduate and graduate respondents were in agreement that the department was lacking in many of the components identified. Firstly, on a positive note, both groups were in agreement that the general course content of the programme was good. However, they agreed that the department needed to improve on the following areas:

- Assessment methods
- Feedback on performance/concerns
- Link between theory and practice
- Opportunities for internship
- Required pace of learning

- Teaching methods
- Tutorials

This assessment by the undergraduates and graduates suggests a serious need for review by the Department. Lecky and Neill (2001) identify student evaluation of teaching quality as an important method of measuring its effectiveness. It seems that although students find that the content of the curriculum is sound, the way in which it is delivered to the students and assessed is not as effective. This implies that the Department may have changed its methods of teaching and the types of assessments used to test students' understanding of the curriculum. Lecturers would also have to formulate means of efficiently providing feedback on coursework and other concerns.

The lack of internship opportunities within the department is one which, if improved, can affect other areas positively as well. The exposure of students to work experience in the industry would help to address the issue of strengthening the link between theory and practice. The very practical nature of the industry requires the need for interaction between students and the workplace to allow them to fully grasp not only the application of the theory, but the magnitude of the consequences that would follow lack of understanding.

The two respondent groups disagreed on two areas: the quality of teaching in the programme as well as the perceived ease of obtaining employment. The graduates felt that both of these areas were good while the undergraduates did not. Firstly, it should be noted that all of the graduate respondents were employed in the civil engineering field. It is possible that for this group of graduates, finding employment was not too difficult. On the other hand, many of the undergraduates may not have any prior working experience and would base their perception on other factors. Some of these factors may include the requirement for experience for many of the positions available or too few employment opportunities. Additionally, exposure to internship opportunities would also give undergraduate students a more realistic view of the likelihood of obtaining employment after graduation.

The difference in responses between the undergraduate and graduate respondents on the quality of teaching may be due to a difference in perspective. That is, graduates performed the evaluation from a more reflective viewpoint. All graduates indicated that they were currently employed and may therefore have experienced situations that helped them have a better appreciation for their experience within the programmes upon meeting the demands of industry. Contrastingly, it may be that the undergraduates are unfamiliar with the expectations of industry, which promotes self-learning in comparison to their previous experience at the secondary level. It is important to note however, that there is an expected difference in view between the graduate and undergraduate group based on time and experience. Such a difference, even between year levels would make achieving quality somewhat challenging for the Department, as the needs of the different year groups may vary and make it difficult to satisfy everyone. A third stakeholder is therefore needed to further define the quality to be attained, which is where employer feedback becomes relevant.

5.2 Resources supporting the delivery of undergraduate programmes

The results, according to the undergraduate group, imply that the resources provided by the Department are adequate except in the availability and accessibility of textbooks. The issue of textbook availability may be due to factors such as an increase in student intake so that resources have to be shared among a larger group. In this case, the Department must either ensure that the study material is enough for the current student enrollment or only accept numbers for which it can comfortably provide. It may also be possible that the undergraduate students are simply not seeking out the material, even though it has been made available to them. These statements can be applied to all resources, not just textbooks. The mean scores awarded by the graduate group in this category indicate that they were also pleased with the quality of the resources provided by the department. The university library has a vast resource of electronic books, providing the students with sufficient material to engage in the necessary learning. However, additional marketing of these resources could be improved to remind the students of their availability.

The results demonstrate that the Department's challenges rest mainly with its programme components. This can be viewed either positively or negatively. On the one hand, the issues lie mainly with only one element of the Department, on the other, it is the element that poses more difficulty to implement changes. Improving programme components involves the difficult task of changing the culture of how things are done which can be quite challenging. This may require additional training of staff in current teaching and learning methods.

The overall higher scores awarded by the graduate group may be accounted for by the fact that the quality of material resources such as lab equipment, books and computers decreases with time. Therefore, there is the possibility that what may have been working well during the time in which the current graduates were enrolled would not be as adequate for the undergraduate class. In such a case, it is more a matter of the Department implementing maintenance procedures to ensure continued quality of their facilities and acquiring new resources when necessary.

5.3 Learning experience in undergraduate programmes

Despite the issues identified in previous paragraphs, it appears that the undergraduate group still thought the overall experience was generally satisfactory. Therefore, it could be inferred that the Department's programme and resource components, despite students' dissatisfaction in some areas, are still able to provide students with an adequate educational experience. If, however students are the customers of the educational system as alluded to by Harvey and Green (1993), then is the aim of the Department to provide merely satisfactory service or to strive to achieve the highest standards of quality? It can be argued that the provision of a quality education can be costly – involving the investment in better facilities, perhaps more staff and the spending of valuable time to design programmes of excellence. Moreover, it is highly difficult to develop educational programmes that will please all stakeholders. Taking these into consideration, the undergraduates rating of the department as more than satisfactory can be considered an achievement, especially in light of the fact that there are still areas to improve.

One can also argue that the fact that the student responses are negative for many of the components, while claiming to have a satisfactory experience does not add up. Perhaps, for a significant number of the sample group, their capacity to judge the quality of the education is not yet developed. Lecky and Neill (2001) suggest that this is one reason for staff scepticism toward student evaluations of education quality. Many of them may not have experienced working in the industry and so would not know whether the perceived hardships of their programmes could in fact be a norm in industry. Their lack of experiences would render them more likely to evaluate based on how they feel. This is not to say that there is no truth to their indications, but rather to suggest the chance of misjudgement.

In the case of the graduates, there was no contradiction between the evaluation of the programme and resource components and the rating of overall experience. The graduates' perspective, no doubt influenced by experience and hindsight, also deemed the learning experience provided by the Department as satisfactory. It can be argued that the graduates'

perspective is more reliable because of their interaction with industry conditions and more than likely, greater maturity. However, this can be countered by the fact that there was a much smaller number of respondents from the graduate group than the undergraduate, and so their responses may not be a statistically realistic representation of the graduates' views.

5.4 Employability of graduates from undergraduate programmes

The results for this hypothesis were statistically inconclusive. However, it is important to note that since there were only five employers evaluating the statements, even small deviations from the test value could be considered significant. Whilst the sample size in this group was small, it should be noted that the respondents are the main employers for graduates of the Department. Therefore, for the purpose of discussion, a review of some of the responses that deviated from the test value, without regarding significance, is noteworthy. Firstly, some of the employers agreed with the following statements:

- Graduates display a positive work ethic
- Graduates are technically competent for the demands of the job
- The computer skills of graduates are satisfactory
- Graduates are receptive to new ideas and changes within the organisation
- Graduates understand the core principles of their discipline

Moreover, it can be said that some of the employers disagreed with the following statements:

- The majority of graduates display a laid-back attitude to their work
- Graduates are familiar with the most current trends in their field
- Graduates take responsibility for their own learning and development at the workplace
- Graduates are able to organise and manage their priorities in a timely manner
- Graduates display the ability to evaluate issues critically and analytically
- Graduates demonstrate the ability to balance theoretical knowledge with technical competence

Studies conducted by Feutz and Zinser (2010) and Harvey and Green (1993) acknowledged that within the education system, besides students, employers are one of the most important stakeholders as they receive the finished 'product' of the educational process – the graduates. Therefore, their opinion should weigh heavily in determining whether university programmes equip graduates with the skills to be useful in industry. Concerning the quality of graduates produced by the Department, the representative sample of employers indicated some areas of concern, some of which concur with those of the graduate and undergraduate groups.

One such area concerns the relation of theory to practice. Although employers were undecided in whether graduates had difficulty applying theoretical concepts to practical applications, it can be said that some agreed that graduates did not demonstrate the ability to balance theoretical knowledge with technical competence. Recall that both the graduate and undergraduate group indicated that one of the issues they encountered within the programme was a weak link between theory and practice. This indicates that the Department must include more practical components within its programme - a venture in which the professional community can participate. One of the suggestions made by students was that they be given the opportunity to interact with industry professionals on a more frequent basis. This will enable them to keep abreast of industry trends, as well as to attain a deeper appreciation of the practical applications of concepts learned in their courses.

It can be argued that some of the employers indicated that the graduates possessed some positive attributes as well. These include: having a positive work ethic, being receptive to new ideas and changes, having satisfactory computer skills and not displaying a 'laid-back' attitude on the job. Moreover, some also indicated that graduates seemed to understand the core principles of their discipline. Some of these attributes such as knowledge of the core principles can be directly improved by the Department's programmes. Those addressing attitude and ethics, are more complex. The Department can attempt to impart the importance of possessing these attributes to its students, perhaps through an ethics course or allowing students to select electives offered on industry preparedness.

Other areas in which some employers expressed concern included:

- Graduates not taking responsibility for their own learning and development at the workplace
- Graduates not being able to organise and manage their priorities in a timely manner
- Graduates not displaying the ability to evaluate issues critically and analytically

The last statement is of great concern, as one of the goals of higher education that is to develop critical and analytical thinking among students. Such skills are vital in the engineering profession and should be constantly nurtured in all engineering programmes. This implies that the Department must find ways in which to challenge students to assess problems, not just through final year projects but throughout the progression of the programme. It must be mentioned that this can also be developed through work experience which can be facilitated through summer internships or a co-operative programme.

Graduates taking responsibility for their own learning and development and managing their priorities efficiently are attitudes that should be constantly cultivated. Again, the Department can arrange for

students' interaction with persons from industry who may help in this regard. Some employers also suggested the implementation of reasonable but strict time constraints as it pertains to handing in of assignments and projects to encourage proper time management.

6. Further Views

As mentioned earlier, the latter section of the questionnaires consisted of open-ended questions that aimed at determining what undergraduate and graduate students valued and disliked about the programmes as well as their recommendations. Employers were also asked to give any recommendations they believed to be helpful in evaluating graduates of the Department.

6.1 Undergraduates

When asked what they valued most about being a student in the programme, some of the main responses from the undergraduates were that the programme provided relevant theoretical and practical knowledge about the civil engineering from lecturers who are regionally well known in their fields and have a vast wealth of experience. Secondly, students appreciated the dedication and approachability of some of the lecturers – qualities which were indicated to be of value to students in various studies (Voss and Gruber 2006; Hill et al. 2003; Sander et al. 2000). Thirdly, they also valued the opportunity of getting to work with other students from various backgrounds all attempting to grasp the concepts taught.

When asked what they disliked most about being in the programme, one frequent response was the lack of “student-friendly” teaching methods/approaches used by some of the lecturers – the course material is explained in a manner which students found difficult to understand. Notably, one study (Greimel-Fuhrmann and Geyer 2003) found that students highly valued lecturers' ability to provide clear explanations and examples, more than even friendliness and patience. Many of the students indicated that their main dislike was the heavy work load in the programme's limited time period. Students explained that they found it difficult to fully grasp course material and even enjoy learning as they were under constant pressure with limited time to produce quality assignments, review course material and attend classes.

The students were also asked to suggest ways in which they think the programmes should be improved. Some of the responses included different teaching approaches by lecturers which should incorporate more practical exercises and better explanation of course material; the introduction of more tutorials and interactive classroom sessions; the provision of internship opportunities; as well as the opportunity to select electives, perhaps from other faculties. The major call for improvement, however, concerned the length of the programme itself – many students felt that extending

the programme to a 4-year period would allow students to grasp course material much more effectively.

The fact that students appreciate the knowledge and experience of the Department's lecturers is a good indicator that the lecturers themselves are not a part of the identified problems. In fact, the 3-year programme length may very well be a hindrance to lecturers as well and increased contact time in a 4 –year programme may allow for the lecturers to deliver course material in more detail; and the freedom to incorporate more practical components. Furthermore, the implementation of internship opportunities and electives can only be possible if more time is allotted to the programme.

6.2 Graduates

When asked what they valued most about having been a student, many of the graduates appreciated that lecturers were very approachable and available to offer support. Another recurring response was that students appreciated the laboratory sessions incorporated into the programme as they involved practical work that helped them to better understand the theoretical concepts.

When asked what they disliked about being a student in the programme, some of the recurring points were:

- (i) Students found it difficult to relate the theoretical concepts of the course material to their practical applications.
- (ii) Many students felt that there was too much course content to be covered each semester and not enough time available. This resulted in them merely cramming information for the purpose of passing assignments and exams instead of actually understanding the course material.
- (iii) There was often little to no feedback on assignments, projects and exams from some lecturers which left students in the dark about their progress.

It is important to note that, once again, the approachability and dedication of (some) lecturers have been highlighted. This is a great achievement that the Department would do well to recognise, reward and encourage. It is an attribute which can be a deciding factor in getting students to enrol in programmes. This emphasises the relevance of student feedback not only as a means of identifying areas needing improvement but areas in which the Department excels.

Some recommendations suggested by the recent graduates can be summarised in a few main points. Firstly, similar to the undergraduate students, many of the graduates thought the programme should be extended to a 4 year period to encourage actual learning as students' main goal rather than just the passing of exams. Moreover, graduates highlighted that the extension of the programme may help alleviate the pressure that many students experience and it would also make the programme more accommodating to differences in

learning pace among students. In fact, previous studies conducted within the Department have shown that on average, students take 3.6 years to complete their degree due to failing prerequisite courses. The Department's programmes already make provisions for students who take more than 3 years to graduate – it is possible that this can be extended to its entire student body. The extension of the programme may first of all, reduce failure rate as students would have less courses to focus on per semester as well as allow for students to re-take courses and still graduate with their cohort.

Many students advocated for the implementation of course content and delivery methods which were more related to practice such as case studies, field trips and interaction with industry professionals as well as the inclusion of more tutorial sessions. However, as indicated by Romenti et al (2012), the implementation of such methods would require the forging of relationships between educators and professionals in order to create opportunities for each party to involve the other in relevant activities.

6.3 Employers

Some of the employers held further opinions regarding the performance of graduates as employees. One of the employers implied that the performance of the graduates is based on attitudes developed at home and not necessarily at the university and therefore, it is not a problem to which the Department can provide a solution. Employers suggested that certain skills such as ethical conduct and time management be emphasised within the Department's programmes to better prepare students for the work environment. Another suggestion is that undergraduates be given more opportunities to visit construction sites in order to see the implementation of what they learn first-hand. This presents another opportunity for collaboration between industry and academia.

One of the employers indicated that most graduates still need a lot of on-the-job training and therefore they should be expected to be lacking in some areas. However, the real issue is that of application and attitude to improvement in their work as many graduates seem to lack understanding of basic concepts as well as initiative and leadership qualities. This opens the door to a whole other research area in relation to whether it is the responsibility of the Department to provide its students with the means of obtaining so called 'soft' or non-technical skills such as leadership, managerial abilities, communication and teamwork. In their study, Lowden et al. (2011) pointed out that employers expect graduates to possess these skills and attributes and therefore it suggests that the Department must accommodate the learning of such skills within its programmes. This can be more efficiently achieved by partnering with employers in the industry to assist in including components in the curriculum that foster these skills.

7. Conclusion

Students are considered to be important stakeholders in the quality assessment process. Therefore, an effort must be made to continually obtain their views. However, the collection of their opinions is not the end of the process. The gathered data must be properly analysed, clearly reported and actions need to be taken in the areas that need improvement and change. Furthermore, students must be informed of the results and actions to make them feel more involved in the institution's pursuit of quality (Harvey 2003). Additionally, employers are also key stakeholders and the design of programmes must take employers' perspectives into consideration to ensure that the academic objectives are in alignment with the requirements of the professional world (Kalanova 2008).

Before outlining the overall findings of the study, it is important to note that there are a few limitations in this study that may have had the potential to cause imprecise or misleading results. The statements or phrases in the scale sections of the questionnaire were open to interpretation, as is often the case with that method of surveying. This could have affected the accuracy of the results, although, in the case of the undergraduate group, the large sample number would have reduced the effects. For the employer and graduate group however, it is a different case. The low response rate from both graduates and employers can also be viewed as another limitation. The small sample number may have a significant effect on results as it may not provide an accurate representation of the views of the entire population of graduates and employers.

This study sought to determine whether the quality of the programmes provided by the Department was good according to the key stakeholders—undergraduates, graduates and employers. The findings showed that all groups had positive and negative assessments of the programmes. The undergraduates felt that although the resources were adequate, areas such as performance feedback and provision of internship opportunities needed improvement. Graduates on the other hand, indicated that overall, both the programme and resources were good. Employers identified some positive attributes which graduates possessed such as good work ethic and computer skills.

However, they highlighted other areas in which graduates were not as prepared. The findings suggest that although the Department is providing an educational experience of some quality, there is still much room for improvement.

One of the main suggestions was the need for the extension of the degree to four years in order to facilitate more effective learning and to allow for increased opportunities for students such as co-op learning and electives. The research suggests that it would be fruitful for the Department to explore how they may address the deficits identified by stakeholders. The process would be a long and challenging one, but the promised benefits to

students and lecturers of the Department alike are worth the attempt.

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