Research paper

Employers’ views on the quality of graduates from the faculty of science engineering and technology (FSET) at Walter Sisulu University (WSU), South Africa.

Abstract

This article reports on a study that sought employers’ views on the quality of WSU graduates from the Faculty of Science, Engineering and Technology (FSET). The study aimed to establish the extent of employer satisfaction and dissatisfaction with the skills of WSU graduates entering the labour market. The study also attempted to find a way to enable employers to assess the content and relevance of the course offerings completed by the students of the FSET at WSU. The final objective was to use the outcomes of the study as input for the (further) development and improvement of the curriculum for the national diplomas in mechanical engineering, electrical engineering, civil engineering and information technology. Participants were selected from a database of employers who had previously hosted WSU students for work-integrated learning (WIL) purposes. The questionnaire used to collect data was first piloted and then distributed to employers of WSU Engineering (mechanical, electrical and civil) and information technology students. Care was taken to have all categories of employers represented in the sample.

In terms of the overall job performance 73.6% of respondents rated WSU graduates as good or better than good; namely good (39.1%), very good (28.2%) or excellent (6.3%). Only within the civil engineering category were there significant responses indicating unsatisfactory performance.
**Introduction**

This study being reported here sought employers’ views on the quality of WSU graduates from the Faculty of Science, Engineering and Technology (FSET). This research aimed to assess the content of course offerings completed by WSU students from the FSET and to evaluate its relevance to employers. It was argued that analysing employer needs would provide input for curriculum reform. This was a pilot study that targeted four academic programmes: the national diplomas in mechanical engineering, electrical engineering, civil engineering and information technology. It was hoped that this study would later on be rolled out to other faculties within WSU.

**Background to the study**

The current research was part of the Netherlands University Foundation for International Cooperation (NUFFIC) project driven by the Centre for Learning and Teaching Development (CLTD) at Walter Sisulu University (WSU). The major goal of the NUFFIC project was to strengthen the capacity of staff and the management of CLTD and FSET to develop and offer responsive academic programmes. In order for WSU to be responsive to the needs of the employers the institution needs to understand the expertise that employers expect WSU graduates to have. In an attempt to understand the needs of employers who hire WSU graduates, CLTD tasked the Centre for Community and International Partnerships (CCIP) to undertake this research. The CCIP was chosen to carry out this research because of its established relationships with employers.

**Aims and objectives of the study**

The following were the objectives of the employer study:

To establish the extent of employer satisfaction with the skills of WSU graduates
entering the labour market and areas of dissatisfaction.

To enable employers to assess the content and relevance of the course offerings completed by the students of the Faculty of Science, Engineering and Technology (FSET) at WSU and thus assist FSET to identify quantitative and qualitative discrepancies between the required and offered skills in the labour market.

To use the outcomes of the employer survey study as input for the (further) development and improvement of the curriculum of WSU/FSET; and

To develop a WSU model of employer study.

**Literature review**

There is a paucity of research on the needs of employers in South Africa while there is a considerable body of work in this area internationally. A lot of work has been done on employer perceptions in the area of WIL in South Africa. A study on employer perspectives on graduate attributes was therefore conducted recently by Higher Education South Africa (HESA) in conjunction with the South African Qualifications Authority (SAQA). This study focused on two main issues: what employers expect and their evaluation of what they currently get. Employers in the main rated what they get as less than what they expect (HESA and SAQA, 2009:16). The biggest gap relates to the ability of graduates to find and access information. This attribute is also rated as the most important grouped with written communication skills and the ability to use information.

Another study conducted by Overmeyer and Morris (2008) focused on key employability skills in civil and mechanical engineering as perceived by employers and students. It should be noted that the focus of their study was on students doing WIL and specifically
on employability skills. Comments from the employers clarified their needs and provided additional skills options. Some employers however had difficulty differentiating between vitally important and less important skills. Employers ranked social skills (defined as the ability to adapt to one’s surroundings and to adapt one’s behaviour to what is acceptable in the given situation in the research instrument) as one of the vitally important key employability skills, placing it higher than leadership, which was ranked 15th out of the 19 skills (Overmeyer and Morris, 2008:412).

A research study entitled “Views of industry and higher education on cooperative education in the Gauteng Province of South Africa” conducted by Wessels and Jacobsz (2010) concentrated on cooperative education. There are some commonalities between Wessels and Jacobsz’s work and the present survey because both considered the views of employers even though the contexts were different. Wessels and Jacobzs (2010) looked at different disciplines but the present study was sector-specific (It focused on Engineering and IT at WSU only).

**Methodology**

The present survey employed questionnaires for its data collection, with such questionnaires administered by a team of eight (8) WSU academics during personal contact sessions.

**The research population**

Employers of WSU Engineering and Information Technology (IT) graduates were identified and research access negotiated. Participants were selected from a database of employers who had previously hosted engineering students (mechanical, electrical and
civil) for work-integrated learning (WIL) and/or who had employed WSU graduates in these disciplines as well as in IT. As WSU FSET students and graduates are placed in companies and government departments throughout South Africa, respondents were not confined to any specific geographical area. Altogether 145 such employers were identified with 64 completed responses received. Subsequent to this a further four (4) responses were received and their findings were incorporated in this report. However it should be noted that in isolated cases the updated figures were not part of the statistical procedures run.

The questionnaires

A questionnaire with open and closed-ended questions was developed. Included were several items which required responses on a 5-point Likert scale where respondents were asked to rate their (employers) levels of agreement or importance relative to various issues being investigated.

Qualitative answers were also sought in order to qualify responses and to provide deeper and richer meaning. Initially the instrument was piloted using advisory board members from the four academic programmes. The questionnaire was modified to accommodate suggestions from the pilot testing. As a result of this pilot study, the original strategy of utilising a single instrument across all employers was revised in favour of developing sector-specific instruments. Eight (8) junior academics were employed to collect the data. They were first given orientation on the questionnaire and data collection emphasising ethical issues. Permission to conduct research was obtained from employers prior to the visits by data collectors.
The questionnaires covered the following themes:

- The overall job performance of WSU graduates
- Skill deficiencies on the part of WSU graduates
- The strengths and weaknesses of graduates.
- The level of satisfaction of employers with graduates
- Degree of WSU graduates’ preparedness for the workplace

Data analysis was conducted using SPSS version 16.

Findings

The main aim of this study was to determine the views of employers regarding the quality of WSU graduates within the FSET. This section reports on the findings of the study.

Organisation profiles

Size: Organisations surveyed ranged from micro (fewer than six (6) employees) to large (more than 200 employees).

Type of organisation: The majority of respondents represented activity in the private sector with almost twice as many responses as the next prevalent sector, the public sector.

Performance of WSU graduates

Section C of the respective questionnaires contained items which focused on respondent ratings of the overall job performance of WSU graduates.

General proficiency

In terms of overall job performance, 73.6% of respondents rated WSU graduates as good or better than good; i.e. good (39.1%), very good (28.2%) or excellent (6.3%). Only within the civil category were there significant responses (18.8%-12%) indicating unsatisfactory performance.
Among responses noted were the following:

**Mechanical** - Most could not easily relate their studies to the workplace.

**Civil** - It’s unfair to say that they are deficient. They know what’s needed to be done but they lack experience, hence they need for the employer to teach them. There’s nothing wrong with WSU. Students should be given more exposure to practical work than staying in the classroom.

**Electrical** - Graduates are not prepared for the work environment, but improve with time.

**IT** - Hard working, focused and willing to learn, knowledgeable and process-driven. Adaptable and understands IT fundamentals.

Such a relatively favourable view of WSU graduates was continued in the responses in respect of the comparison of WSU graduates with those from other institutions with 65.7% of respondents finding the WSU graduates ‘about equal’ (50%) or ‘above equal’ (14.1%). Only one respondent was prepared to offer an opinion of ‘far above’ in such a comparison. When asked whether WSU graduates who applied for positions in their organisations, were considered deficient in any skills 61.8% of the respondents (32 out of 55) answered in the affirmative. Altogether, 36.3% provided a ‘no’ response to this item.

When it came to an understanding on the part of WSU graduates in respect of the fundamentals of their particular engineering or IT field, just over 73% considered WSU graduates ‘prepared’ or ‘well prepared’. Disturbingly, 16 respondents (26.3%) rated WSU employees as ‘not prepared’ or ‘slightly prepared’.

**Electrical** - Lack the grasp of basic engineering principles and require a higher level of guidance before they can perform at the required level.
A further consideration was that of the application by WSU graduates of their knowledge in their field in practice. Of the respondents, 63.1% considered WSU products ‘prepared’ (47.7%) or ‘well prepared’ (15.4%). As with the responses in respect of discipline fundamentals (above), 30.9% responded that WSU graduates were either ‘slightly prepared’ (21.5%) or ‘not prepared’ (9.4%).

Mechanical - general lack of basic understanding and a difficulty in relating learned skills into practice

Civil - Very good in theory but slightly know-how (sic)of the industry
Graduates struggle to blend theory into practice.

Electrical – Academically they do perform and the problem is usually in practice.

Communication abilities

A number of the questionnaire items related to the communication abilities of WSU graduates. In all instances, whether in relation to oral communication or written communication, responses indicated that WSU products left much to be desired. In the oral communication category, positive responses (i.e. ‘prepared’ or ‘well prepared’) comprised 62.5%. In respect of formal business writing, the percentage of positive responses dropped to 49.3%, while for technical report writing it was 43.1%. Weakest performances were those of the civil and mechanical sectors with over 50% of these respondents finding WSU graduates only ‘slightly prepared’ or ‘not prepared’.

Amongst comments recorded were the following:

Mechanical – In terms of communication skills they need to spend more time.
Civil – Lack of skill with record keeping, struggling with report writing.

Communication skills not good.

Electrical – Lack communication skills.

IT - Generally lack writing skills when it comes to report writing. Deficient in technical writing and general communication skills. Need to be strengthened in communication skills, especially to record and report what they are doing.

**Workplace abilities**

The next group of items focused on a range of workplace abilities. On commencement of employment, WSU graduates were evaluated as follows:

(Note: In table 1 each of the following ‘P’ represents a positive response [‘prepared’ or ‘well prepared] with N representing a negative evaluation)

**Table 1**

<table>
<thead>
<tr>
<th>NO</th>
<th>COMPETENCY</th>
<th>P</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ability to function in multi-disciplinary teams</td>
<td>75.0%</td>
<td>20.4%</td>
</tr>
<tr>
<td>2</td>
<td>Ability to identify, formulate and solve problems specific to their discipline</td>
<td>58.6%</td>
<td>38.4%</td>
</tr>
<tr>
<td>3</td>
<td>Ability to design and conduct experiments</td>
<td>55.0%</td>
<td>30.7%</td>
</tr>
<tr>
<td>4</td>
<td>Ability to acquire, analyse and interpret data</td>
<td>61.9%</td>
<td>34.9%</td>
</tr>
<tr>
<td>5</td>
<td>Ability to design system components or process to meet a desired need</td>
<td>49.3%</td>
<td>41.2%</td>
</tr>
<tr>
<td>6</td>
<td>Ability to apply modern techniques, skills and tools to entry-level discipline practice</td>
<td>72.4%</td>
<td>26.1%</td>
</tr>
<tr>
<td>7</td>
<td>Ability to recognize the need for, engage in, life-long learning</td>
<td>76.3%</td>
<td>22.1%</td>
</tr>
</tbody>
</table>
(In respect of competency number 2 (two) a number of responses pinpointed a lack of problem solving skills e.g.

Civil – Need intensive training on analysis and solving general engineering problems.

Mechanical – Project management skills/thinking for themselves when it comes to problem solving.)

The above suggests considerable room for improvement on the part of the various departments at WSU in preparing their students in these competencies. Problem solving, and fundamentals to engineering disciplines, areas that would appear to require serious attention. A civil respondent remarked, *WSU is focusing on surface learning. The syllabus is too shallow.* Perhaps departments need to take cognizance of the perceived shortcoming in this area together with a need certainly to improve in virtually all the other competencies listed above. The fact that in most cases 30% to 40% of respondents found WSU graduates deficient suggests that in those fields where these competencies are integral to the activities within the various offerings, the curriculum requires a targeting of such competencies. One respondent (electrical) suggested that perhaps, *the infrastructure of WSU is a challenge, which you can see when they get to the workplace.*

**Personal academic and desirable business skills**

A number of items related to employee ratings of personal academic and desirable business skills. In terms of time management, 65.6% of respondents considered WSU graduates ‘prepared’ (42.2%), or ‘well prepared’ (23.4%). However, just over 34% found this not to be the case.
On the item relating to the understanding of business processes, responses indicate cause for concern with only 46.7% of respondents considering WSU graduates ‘well prepared’ or ‘prepared’. More that 53% rated WSU products as only ‘slightly prepared’ (38.1%) or ‘not prepared’ (15.2%). In this respect a civil respondent commented:

No one is perfect but those graduates were having a problem in finance and computer skills.

Accounting skills or dealing with a money project they battle.

**Levels of employer satisfaction with WSU graduates**

The next set of items in the questionnaire sought to measure levels of satisfaction on the part of respondents with various workplace competencies of WSU graduates.

The scale employed sought responses ranging from ‘very dissatisfied’ through ‘dissatisfied’ and ‘neutral’ to ‘satisfied’ and ‘very satisfied’. The outcome to these items was as follows:

(Note in table 2 which follows ‘S’ represents a satisfactory response, ‘U’ represents an unsatisfactory evaluation, and ‘N’ represents a neutral response)

**Table 2**

<table>
<thead>
<tr>
<th>NO</th>
<th>COMPETENCY</th>
<th>S</th>
<th>U</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Technical skills</td>
<td>62.5%</td>
<td>17.1%</td>
<td>20.4%</td>
</tr>
<tr>
<td>2</td>
<td>Practical knowledge</td>
<td>61.7%</td>
<td>26.0%</td>
<td>12.3%</td>
</tr>
<tr>
<td>3</td>
<td>General communication skills</td>
<td>50.0%</td>
<td>20.3%</td>
<td>29.7%</td>
</tr>
<tr>
<td>4</td>
<td>Customer-handling skills</td>
<td>58.6%</td>
<td>6.9%</td>
<td>34.5%</td>
</tr>
<tr>
<td>5</td>
<td>Team working skills</td>
<td>82.3%</td>
<td>6.4%</td>
<td>11.3%</td>
</tr>
<tr>
<td>6</td>
<td>Problem-solving skills</td>
<td>48.5%</td>
<td>15.5%</td>
<td>36.0%</td>
</tr>
<tr>
<td>7</td>
<td>Self-management skills</td>
<td>63.1%</td>
<td>7.6%</td>
<td>29.3%</td>
</tr>
<tr>
<td></td>
<td>Competency</td>
<td>Positive</td>
<td>Neutral</td>
<td>Negative</td>
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<tr>
<td>8</td>
<td>Personal initiative and enterprise</td>
<td>44.4%</td>
<td>17.5%</td>
<td>38.1%</td>
</tr>
<tr>
<td>9</td>
<td>Life-long learning</td>
<td>62.3%</td>
<td>13.1%</td>
<td>24.6%</td>
</tr>
<tr>
<td>10</td>
<td>Numeracy skills</td>
<td>82.9%</td>
<td>4.6%</td>
<td>12.5%</td>
</tr>
<tr>
<td>11</td>
<td>General management skills</td>
<td>40.4%</td>
<td>17.7%</td>
<td>41.9%</td>
</tr>
<tr>
<td>12</td>
<td>Office and administration skills</td>
<td>60.7%</td>
<td>4.8%</td>
<td>34.5%</td>
</tr>
<tr>
<td>13</td>
<td>General discipline-related Skills</td>
<td>62.4%</td>
<td>6.3%</td>
<td>31.3%</td>
</tr>
<tr>
<td>14</td>
<td>General professional skills</td>
<td>50.8%</td>
<td>22.0%</td>
<td>27.2%</td>
</tr>
<tr>
<td>15</td>
<td>General occupational skills</td>
<td>53.1%</td>
<td>4.5%</td>
<td>42.4%</td>
</tr>
<tr>
<td>16</td>
<td>Critical thinking skills</td>
<td>46.9%</td>
<td>20.3%</td>
<td>32.8%</td>
</tr>
<tr>
<td>17</td>
<td>General professional and ethical Conduct</td>
<td>73.9%</td>
<td>6.1%</td>
<td>20.0%</td>
</tr>
</tbody>
</table>

The above findings would suggest that the departments should carefully consider the role that most of the competencies play in each of the offerings on the curriculum. It is clear that the departments will have to set as one of their objectives the lowering of such negative responses in a range of competencies.

**Conclusion and recommendations**

The role of universities in preparing graduates for the workforce is a longstanding and controversial issue. In the business world, employers are increasingly interested in what their employees can do and less interested in what they know. On virtually all items, respondents indicated a measure of dissatisfaction with the various competencies brought into the workplace by WSU graduates. In view of this it would be incumbent upon the three engineering departments, as well as the Information Technology Department to
study those items that reveal discrepancies between what the employers desire in their employees, both in terms of course or discipline preparedness and as personal abilities and what the WSU graduates bring into the workplace.

The findings of this study concur with Brimble et al.,’ contention that the emerging gap between graduate attributes and what industry requires not only refers to the lack of employment readiness of students but also their generic skills. They further suggest a professional development program, which could be developed to address this concern. This would also apply in the case of Walter Sisulu University’s Faculty of Science Engineering and Technology.

For the higher education sector to achieve acceptable levels of competitiveness and to ensure relevance, higher education institutions(HEIs) should remain in touch and be watchful regarding the business of education, namely its product, the student of the university Dunn (1999:1). In the same breadth greater collaboration needs to take place between WSU and industry in order to achieve a seamless movement from student to employee. Actually the study being reported here should serve as a platform for further engagement between WSU and industry.

In every case where a finding of ‘under-prepared’ or ‘dissatisfied’ was recorded, such can be regarded as an indictment against the department concerned and every effort should be made to rectify such shortcomings through re-examination of curriculum content and classroom activity and revisiting collaboration between this academic
institution and employer partners. What is very surprising is the finding that WSU graduates struggle to blend theory with practice. All of these students spend 12 months of their study time in the industry undertaking WIL. WIL experience is regarded as providing unique opportunities for students to integrate theory and practice through the solving of real-world problems.

In summary universities, employers and graduates have different contributions to make to the development of graduate skills. For this to be successful all three players need to accept their responsibilities and cooperate.

**Further research**

It is important for WSU FSET to also consider the views of graduates from these disciplines (i.e. electrical engineering, civil engineering, mechanical engineering, and information technology) to see if they have different views from those of employers regarding these graduates’ quality. This can be done through a tracer study.
References


