Student perceptions of quality education in the faculty of engineering at Sana'a University

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Abstract:

There is a growing interest in improving the quality of higher education in Yemen. This is evident from the adoption of curriculum reviews by various universities, conferences centring around the quality of education, as well as the various institutions focusing on the quality of education. The drive has focused mainly on the perspective of the teaching profession. Little research has focused on the perspective of the students. This is viewed by the authors as a missing link since the students are the beneficiaries of the education they receive. Thereby, it is viewed as a fundamental perspective which should be incorporated in the overall drive for enhancing the quality of higher education in Yemen. This research attempts to bring the perspective of the students at the final year at the various departments in the Faculty of Engineering at Sana'a University. It is important for the various departments to know what students perceive as important and to evaluate their performance in the various factors in order to focus their efforts on the important factors where their performance is found to need attention. The research uses a quantitative approach using surveys to provide the student perspective on the weights of various factors that affect the quality of their education as well as the performance of the department on each of the factors.

Keywords: Quality of Higher Education, importance-performance analysis, student perspective, Faculty of Engineering, Sana'a University, Yemen.

Introduction:

Education is necessary for society to develop and prosper. As Sivakumar and Sarvaliingam (2010, p. 20) state, "Education is one of the basic needs for human development and to escape from poverty". Brennan and Teichler (2008) add that higher education is important for social and economic impacts in society. Thereby, it is important for societies in general to have sufficient outflow of students from higher education (Akareem & Hossain, 2016). Yemen is no exception.

This highlights the importance of higher education and the need to continuously improve the quality of higher education. Private universities that have opened up in Yemen in recent years have played a major role in providing competition to the public universities and highlighting the need for quality assurance and improvement in the higher education sector. Despite the role of the Ministry of Higher Education and the National Higher Education Accreditation Board, quality remains viewed from the perspective of the providers of the education service.

There are various stakeholders of higher educational institutions, both internal and external. Stakeholders include parents, employers, society, students among others. The satisfaction of all the stakeholders is dependent on the satisfaction of the students. The input, process and output of quality are applied on the students (Ahmed et al., 2010; Sefer et al., 2017; Khan et al., 2011). Therefore, studying what students view as important in the quality of their education and gauging performance against that from the student perspective is of prime importance. Yet students are not considered the prime stakeholders in the current system for quality in higher education in Yemen.

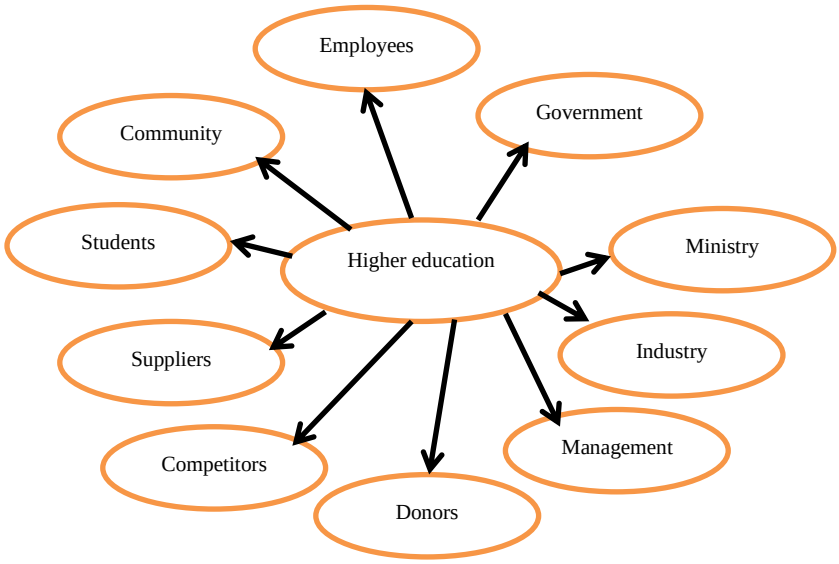

Figure 1. Stakeholders of higher education [redrawn from Sefer Ada et al. (2017)]

This paper attempts to address this gap. A survey was used to measure the student perception of what is important in the quality of education received as well as their perception of the performance of the various departments in the Faculty of Engineering at Sana'a University. The objective was to establish and rank the factors that students perceive as important in their education at the final year of their undergraduate studies at the various programs offered. The survey was also designed to allow students to rate the performance of each of the factors in the Faculty of Engineering in the various departments. The performance-importance matrix provides a simple and good assessment of where efforts need to be applied to enhance the quality of education at the various departments. The survey was analysed to determine if there are any differences in student perceptions regarding the weighting of importance as well as performance by program.

Sana'a University was established in 1970 as the first university in the then Yemen Arab Republic. The first faculties were Law and Education. The Faculty of

Engineering was added in 1983 with the Civil Engineering Department. Sana'a University has since expanded to 17 faculties and the Faculty of Engineering has expanded to become 5 departments: Civil, Architectural, Electrical, Mechanical and Mechatronics. The Faculty of Engineering is the first in Yemen and boasts about 4,000 students and is one of the highest quality conscious faculties. For this reason, it was chosen to perform this research.

The results of this research will shed some light on the needs of the students and their perspective on the quality of higher education received. This may then be used by the Department of Engineering as well as the Ministry of Higher Education and the National Accreditation Board to enhance the quality of education in the Faculty of Engineering at Sana'a University.

Literature Review:

Much of the literature provides varying views on the issue of quality of education as well as the factors that determine quality (Ashraf, et al., 2009). Various criteria for quality of education are provided in the literature. However, a very limited amount of research has been performed on quality of higher education in Yemen, and particularly at the undergraduate level in the engineering programs.

Universities have recognized that their ranking depends on the quality of their services (Aly & Akpovi, 2001). Services provided by the education sector are largely intangible and hard to measure. The outcome of education is engrained in the individuals whether that is knowledge, characteristics or behaviour (Michael, 1998).

Quality lacks a clear definition (Sefer, et al., 2017) since it may be regarded as an outcome, property or process. Furthermore, conceptions of quality are relative to the stakeholder. Ashraf et al. (2009) state that quality in education is difficult to define and

measure and it may be important to establish what is understood by “quality”. Different professionals such as educators, researchers and politicians have different perceptions of quality of education (Ashraf, et al., 2009). Furthermore, there is no universally accepted definition of quality applying specifically to higher education (Michael, 1998). Accreditation agencies operating in each country have evaluated and accredited degrees and educational work offered as an attempt to assess the quality offered by the institutions (Tsinidou, et al., 2010). Despite the lack of a clear definition of quality, the importance of service quality is recognized (Tan & Simpson, 2008), and research on service quality in higher education has increased over the last two decades (Legcevic, 2010).

Some researchers are of the view that quality of education should not be measured solely on dimensions of student learning achievements relating to traditional curriculum and standards. Quality should be measured as to the relevance of what is taught and learned as well as the fit to the present and future needs of the students (Ashraf, et al., 2009) citing (Coombs, 1985). Furthermore, Ashraf et al. (2009) citing the World Bank state that they put forth the following concept: An adequate definition must include student outcomes (The World Bank, 1995, p. 46). They add that most education professionals would also include the learning environment in the definition.

Khan et al. (2011) state that out of the many external and internal stakeholders of educational institutions, students are considered to be one of the most important. They add that all the process of quality implications are applied on them and they bridge the relationship between institutions and other stakeholders (parents, employers and society) and student satisfaction leads to other stakeholder satisfaction. Ahmed et al. (2010) state that the higher the level of student satisfaction the greater the quality of students.

Sefer et al. (2017) state that higher education institutions should establish their needs and demands focusing on students as they are stakeholders and customers whose satisfaction is attached to service quality. (Khan, et al., 2011) state that students are the basic customers of educational institutions and as such should centre service and education on students. (Emery, et al., 2001) add that students should be assessed and analysed as the product of educational institutions. Khan et al. (2011) citing Low (2000) add that educational institutions are placing emphasis on increasing the satisfaction level of students with the quality of service and are regularly judged on level of satisfaction.

(Athiyaman, 1997) defines service quality as "Perceived service quality is defined an overall evaluation of the goodness or badness of a product or service". An important determinant of satisfaction is the quality of service (Shemwell, et al., 1998); (Cronin Jr & Taylor, 1992)). Therefore, it is important for universities to focus on the quality of service to increase the satisfaction level of students (Helgesen & Nesset, 2007).

If the students are satisfied with the institution that reflects that students have a positive perception regarding the service quality of academic institution (Gruber, et al., 2010). With increasing competition, providing better quality services is the main tool used by academic institutions (Donaldson & Runciman, 1995). Positive perception about the quality of service offered leaves a positive image in the mind of students which finally leads them towards higher level of satisfaction (Alves & Raposo 2010; (Ahmed, et al., 2010)). Perceptions and expectations of customers regarding service quality are the basis of customer satisfaction (Christou & Sigala, 2002).

The measure of customer satisfaction in higher education is a rather new phenomenon. It is even newer in Yemen. A measure of customer satisfaction created by

(Martilla & James, 1977) that was used in marketing research is the Importance–Performance Analysis (IPA). IPA is simple and practical method to use, and thereby, has gained popularity as a measure of customer satisfaction in various research areas (Silva & Fernandes, 2010; Djeri et al., 2018; Ormanovic et al., 2017). IPA has been used in measuring student perceptions in higher education as to the importance and performance of various attributes (e.g. Silva & Fernandes, 2010; (Andersen, et al., 2016).

The IPA matrix consists of four quadrants where customers evaluate the importance and performance of the attributes of the service under evaluation for an organization. The y-axis represents the Importance of the attribute while the x-axis represents the Performance of the attribute. Figure 2 shows the four quadrants dividing the Importance-Performance Indicators where each quadrant is explained in the following Table 1:

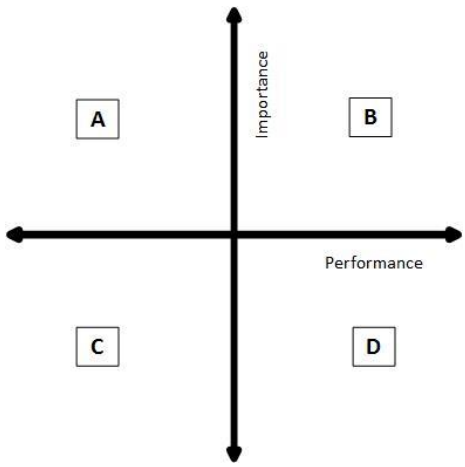

Figure 2. IPA quadrants (redrawn from Silva & Fernandes, 2010)

Table 1. IPA quadrants and meaning

Quadrant	Importance Rating	Performance Rating	Meaning	Comments
A	High	Low	Is a main weakness and requires immediate attention to enhance performance	This research will concentrate on this quadrant
B	High	High	Are strengths and should be maintained	
C	Low	Low	Weaknesses not requiring additional attention	
D	Low	High	Resources committed here should be used elsewhere	

Methodology:

This study focused on the students in the Department of Engineering at Sana'a University regarding their perceptions of the importance of factors affecting the quality of their education and rating the performance of the department on the same factors. The questionnaire was divided into two sections. The first section was demographic information which included department in the Faculty of Engineering, gender, age, and whether they were admitted as a general non-paying student or a paying student as shown in Table 1. No names or IDs were requested in order to maintain confidentiality and allow students to be more comfortable in responding.

It is important at this junction to describe the difference between paying and non-paying students. Paying and non-paying students is a particular situation to Sana'a University since it is a public university and was established to be free of charge to accepted students. However, as government funding dwindled to almost nothing, the university had no choice but to find another source of income to maintain itself. It was then decided to maintain the capacity for free of charge students at about 150 students at the Faculty of Engineering. These are the students with the highest grades in the acceptance test and high school grade. Those who passed the acceptance test but whose grades were less than the accepted 150 could enter the Faculty of Engineering but would have to pay for their education. These paying students (about 150) became the source of income for the various faculties at the university including the Faculty of Engineering.

Table 2. Demographic information

Survey	
STUDENT PERCEPTIONS OF SERVICE QUALITY AT the Faculty of Engineering at SANA'A UNIVERSITY	
	Date:
INSTRUCTIONS	
SECTION A: Please fill in your demographic information.	

SECTION B: Please rate each service quality characteristic based on your perception of its importance and your perception on the university's performance for the specified characteristic.			
SECTION C: Please answer each of the discussion questions.			
SECTION A: DEMOGRAPHIC INFORMATION			
	Gender:		Age:
Department:	Paying or Non-Paying		Year of Study:

The second section of the survey questionnaire was developed from a literature review regarding the factors that affect student perception of service quality (Beaumont, 2012; Tsinidou et al., 2010; Akareem et al., 2016; Dumitriu, 2018; Butt & ur Rehman, 2010; Clewes, 2003; Abdullah, 2005; LeBlanc & Nguyen, 1997; Solinas et al., 2012; Nadiri et al., 2009). The factors were found to be grouped together under several headings: Teaching; Academic staff; Course structure; Academic facilities; Administrative staff; Personal development; Career prospects; and, Other factors. Lists of factors were grouped under each of the headings totalling 79 factors. These were grouped under eight main groups as shown in the following Table 3.

The questionnaire used a 10-point scale from 1-10 where 1 is very poor and 10 very good for both the importance and performance measures. A total of 449 surveys were distributed to the students of the 5 departments in the Faculty of Engineering. The total number of returned surveys was 273 (79 % return rate) and of those only 217 were complete as 56 incomplete surveys were rejected (21 % of the total). The analysis was performed using SPSS (2009) software.

Table 3. Groups and Factors of Service Quality

Factor number	Group Title	Factor of service quality	Factor number	Group Title	Factor of service quality
1	Teaching	Quality of lectures	32	Academic Facilities and Access	Adequate classes and laboratories
2		Quality of seminars	33		Quality of academic facilities and learning resources
3		Range of teaching methods	34		Access to academic facilities and learning resources
4		Relevance of course material	35		Accommodation
5	Academic Staff	Academic qualifications	36		Catering services
6		Knowledge and experience of academic staff about subject	37		Sport facilities
7		Professional experience and skills	38		Medical facilities
8		Communication and presentation skills	39		Access to administration
9		Class preparation skills	40		Cultural events
10		Teaching methods	41		Accessibility to location of facilities
11		Availability of academic staff	42		Library textbooks and journals
12		Guidance and counselling by academic staff	43		Ease of borrowing library materials
13		Willingness to provide individual attention	44		Friendliness of and assistance of library staff
14		Prompt and efficient feedback on work	45		Library working hours
15		Faculty relationship with students	46		Electronic library
16		Faculty's evaluation system (of students)	47	Administrative Services	Knowledge of administrative staff
17		Business links	48		Availability of administrative staff
18		Research activity	49		Staff ability to understand student needs
19		Flexibility of grading system by academic staff	50		Staff ability to deal with queries promptly and efficiently
20	Curriculum and Course Structure	Curriculum design and planning with up-to-date information	51		Friendliness of staff
21		Course content and book	52		Information material
22		Educational material	53		Support, guidance, counselling and advice
23		Structure of courses	54		IT support
24		Course structure information	55		Internet
25		Elective courses	56		Working hours
26		Laboratories	57	Personal Development	Social opportunities
27		Weekly timetable	58		Careers service
28		Organization and management of course	59		Student welfare
29			60		Provision of other facilities and services
		Course flexibility	61	Career	Employment opportunities
30		Flexible class and exam schedule	62		Postgraduate programs
31		Faculty training (from university authority)	63		Studies abroad
32		Adequate classes and laboratories	64		Business links
33	Academic Facilities and Access	Quality of academic facilities and learning resources	65	Other	Campus location and layout
34		Access to academic facilities and learning resources	66		Physical appearance of the university
35		Accommodation	67		The reputation of the university
36		Catering services	68		Internal student feedback systems
37		Sport facilities	69		Admission procedure
38		Medical facilities	70		Previous results of students
39		Access to administration	71		Institutional status (ranking)
40		Cultural events	72		Environmental influences (political and others)
41		Accessibility to location of facilities	73		Smaller student-faculty ratios
42		Library textbooks and journals	74		Higher tuition and other fees
43		Ease of borrowing library materials	75		Promotional activities (through media and others)
44		Friendliness of and assistance of library staff	76		Extra-curricular activities by students
45		Library working hours	77		Student participation in graduation projects
46		Electronic library	78		Parent's education level of students
			79		Parent's economic status (low-medium-high income level) of students

Result:

The following Table 4 summarizes the results of the student survey with the entire student body and each department separately. The student responses of High Importance and Low Performance are in bold in the same table.

Table 4. Summary of student importance-performance responses to various factors

Group Title	Factor	All students		Architecture students		Civil students		Electrical students		Mechanical students		Mechatronics students	
		Imp	Perf	Imp	Perf	Imp	Perf	Imp	Perf	Imp	Perf	Imp	Perf
Teaching	1	8.69	4.73	8	5.22	8.29	3.93	9.29	4.47	9.75	5.1	8.78	6.33
	2	8.72	3.42	***8.67***	***3***	8.34	3.41	***9.35***	***2.94***	***9.5***	***2.6***	8.48	4.63
	3	8.93	4.44	8.56	5.06	8.93	4.07	9.26	3.97	9.4	4.6	8.56	5.37
	4	8.96	4.78	8.5	5.61	9	4.17	9	4.44	9.5	5	8.93	5.93
Academic Staff	5	9.15	5.91	8.72	5.61	9.05	5.75	9.47	5.65	9.2	6.5	9.22	6.59
	6	9.19	5.80	8.44	6.44	9.17	5.47	9.32	5.15	9.7	6.9	9.37	6.52
	7	8.64	4.92	7.61	6.28	8.56	4.61	9.03	4.18	9.1	5.1	8.81	5.54
	8	9.04	4.78	8.61	6.11	8.95	4.29	9.21	3.88	9.4	6	9.19	5.67
	9	8.55	4.85	7.78	5.17	8.49	4.27	8.59	4.41	9.3	6.7	8.89	5.76
	10	8.74	4.39	7.78	4.44	8.59	4.19	9.15	3.41	9.4	6.8	8.96	5.15
	11	9.05	6.83	9.17	6.17	8.71	7.47	9.41	5.79	9.8	8	9	6.72
	12	8.60	4.95	8.11	4.78	8.53	5.56	8.88	3.26	9.1	5.3	8.56	5.7
	13	8.38	3.22	***8.67***	***3.72***	8.44	3.19	8.29	2.41	7.6	4.3	8.44	3.56
	14	8.83	3.72	8.89	4.28	***9.1***	***3.37***	8.82	2.74	8.7	4.7	8.26	4.96
	15	8.56	3.88	8.67	4.33	8.8	3.46	8.76	3.21	7.3	4.2	8.19	5.22
	16	8.61	3.76	8	3.44	***8.97***	***3.93***	8.44	3.12	7.7	3.1	8.81	4.67
	17	7.89	4.11	7.11	4	7.95	4.15	8.18	3.29	8.2	5.6	7.78	4.59
	18	8.43	4.14	9.11	4.83	7.93	3.93	8.47	3.35	8.5	4	8.96	5.19
	19	***8.93***	***3.18***	8.22	3.28	8.8	2.88	***9.41***	***3***	***9.3***	***2.7***	***8.93***	***4.15***
Curriculum & Course Structure	20	***9.53***	***3.73***	***9.17***	***3.89***	***9.71***	***3.36***	***9.59***	***2.65***	9.3	4	9.41	5.7
	21	9.43	5.16	8.83	5.67	9.64	4.8	9.56	4.41	9.7	6.1	9.07	6.22
	22	9.40	5.32	8.94	6.39	9.56	4.98	9.41	4.35	9.5	5.8	9.3	6.37
	23	8.89	4.57	8.44	5.44	8.9	4.71	***9.18***	***2.82***	8.7	5.5	8.89	5.52
	24	8.79	4.21	8.22	4.17	8.88	4.47	9	2.91	8	3.9	9	5.41
	25	7.42	3.16	6.39	2.72	7.54	3.14	8.32	2.79	6.7	2.7	6.96	4.11
	26	9.44	4.93	***8.89***	***3.78***	9.69	6.02	9.53	3.82	***9***	***3***	9.3	5.44
	27	8.99	5.74	8.83	5.56	8.73	6.1	9.21	5.18	9.3	4.1	9.26	6.41
	28	9.05	4.61	9	5.22	8.9	4.61	9.21	3.62	9.8	4.5	8.96	5.52
	29	9.24	4.32	9.06	4.44	9.32	4.47	9.32	3.56	***9.9***	***3.8***	8.81	5.07
	30	9.22	5.20	9.22	5.44	9.27	4.86	9.29	4.59	8.9	5.6	9.15	6.37
	31	***9.13***	***3.03***	8.44	4.06	***9.25***	***2.93***	***9.59***	***3***	***9.90***	***3.1***	8.41	2.59
Academic Facilities & Access	32	9.68	5.12	9.67	4.44	9.73	5.86	9.65	4.09	***9.65***	***2.5***	9.52	6.22
	33	9.32	4.52	***9.11***	***3.61***	9.25	5.02	9.59	3.71	***9.80***	***3.7***	9.04	5.37
	34	9.28	4.10	***9.17***	***3.67***	9.27	4.34	***9.56***	***3.26***	***9.2***	***3.4***	9.04	5.19
	35	8.89	3.62	7.72	2.89	8.85	4.22	9.29	3.56	***9.4***	***2.1***	***9.07***	***3.44***
	36	8.82	1.86	8.22	1.61	8.86	1.78	9.12	1.97	***9.4***	2	8.56	2
	37	8.22	1.63	8.56	1.83	8.34	1.61	8.29	1.71	8.8	1.5	7.44	1.48
	38	8.84	1.52	***9.11***	***1.56***	***8.95***	***1.47***	***9.18***	***1.62***	8.7	1.6	8.07	1.44
	39	8.82	2.20	8.44	2.06	8.86	2.54	***9.18***	***1.68***	8.8	1.8	8.52	2.37

Group Title	Factor	All students		Architecture students		Civil students		Electrical students		Mechanical students		Mechatronics students	
		Imp	Perf	Imp	Perf	Imp	Perf	Imp	Perf	Imp	Perf	Imp	Perf
	40	7.68	2.58	8.22	2.33	7.88	2.88	7.62	2.24	7.7	1.3	6.96	3
	41	8.26	3.57	8.61	3.83	8.32	4.08	8.35	2.85	7.2	2.5	8.15	3.56
	42	9.11	5.24	8.5	4.83	9.27	5.95	9.62	5.41	9.3	4.2	8.48	4.15
	43	9.13	6.39	8.78	5.5	9.25	7	9.35	6.18	9.2	5.7	8.78	6.19
	44	9.04	5.99	8.78	5.44	9.08	6.51	9.29	6.35	8.5	3.7	9	5.59
	45	9.01	5.14	***9.28***	***3.44***	9.2	6.14	9.09	4.88	8.7	3.2	8.44	5.15
	46	*9.24*	*1.94*	***8.94***	***1.39***	***9.51***	***1.66***	***9.53***	***2.35***	***9***	***1.9***	8.56	2.41
Administrative Services	**47**	*9.22*	*3.74*	***9.39***	***3.78***	***9.31***	***3.73***	9.38	4.12	***9***	***2.2***	***8.81***	***3.85***
	48	9.31	4.19	***9.5***	***3.61***	9.34	4.69	9.59	3.91	8.6	3.8	***9.04***	***3.96***
	49	*9.49*	*2.74*	***9.17***	***3.06***	***9.71***	***2.61***	***9.74***	***2.59***	***9***	***2.8***	***9.07***	***2.96***
	50	*9.43*	*3.04*	***9.56***	***3.17***	***9.42***	***2.75***	***9.76***	***2.79***	8.6	3.7	***9.22***	***3.67***
	51	*9.29*	*2.93*	***9.39***	***2.61***	***9.44***	***3.08***	***9.59***	***2.5***	7.8	4	***9.07***	***2.93***
	52	*9.15*	*3.86*	***8.89***	***3.5***	9.12	4.34	***9.35***	***3.18***	8.7	4.4	***9.3***	***3.7***
	53	*9.09*	*2.66*	***9.17***	***3.33***	***9.22***	***2.34***	***9.26***	***2.47***	8.8	3	8.67	3
	54	*9.10*	*2.52*	8.56	3.06	***9.19***	***2.37***	***9.59***	***2.21***	***9.1***	***1.8***	8.67	3.15
	55	*9.21*	*1.51*	***8.94***	***1.61***	***9.46***	***1.22***	***9.56***	***1.44***	***9.2***	***2.1***	8.41	1.93
	56	9.08	4.39	***8.72***	***3.44***	9.32	5.08	9.32	4.03	8	4.4	***8.89***	***3.96***
Personal Development	**57**	8.61	3.83	8.56	5.44	8.66	3.68	8.65	2.74	9.3	4	8.26	4.41
	58	8.91	2.39	8.28	2.89	8.69	2.32	***9.71***	***1.85***	***9.4***	***2.8***	8.63	2.74
	59	***9.18***	***2.28***	***9***	***2.61***	***9.19***	***2.22***	***9.65***	***1.68***	***9.5***	***3***	8.56	2.7
	60	***9.20***	***2.71***	***9.17***	***3.11***	***9.08***	***2.88***	***9.76***	***1.91***	***9.8***	***3***	8.56	2.96
Career Prospects	**61**	***9.52***	***2.28***	***9.44***	***2.11***	***9.51***	***2.27***	***9.85***	***1.88***	***9.2***	***3.2***	***9.3***	***2.59***
	62	***9.41***	***2.36***	***9.11***	***3.44***	***9.41***	***2.42***	***9.71***	***1.47***	***9.4***	***3.2***	***9.26***	***2.33***
	63	***9.34***	***2.43***	***9.5***	***2.11***	***9.24***	***2.76***	***9.53***	***1.91***	***9.4***	***2.9***	***9.19***	***2.37***
	64	***9.59***	***2.45***	***9.83***	***2.33***	***9.64***	***2.64***	***9.62***	***2.03***	***9.85***	***2.6***	***9.15***	***2.59***
Other	**65**	9.23	6.86	9.61	7.67	9.03	7.07	9.47	6.26	9.5	5.5	9	7.11
	66	9.14	6.62	9.56	7.39	9	6.37	9.35	6.47	9.10	6.4	8.56	6.93
	67	9.65	6.04	9.33	6.94	9.76	6.14	9.74	5.38	9.5	4.9	9.56	6.48
	68	***9.20***	***2.19***	***9.06***	***2.89***	***9.17***	***1.76***	***9.24***	***2.03***	***9.3***	***2.3***	***9.26***	***2.81***
	69	9.20	4.83	9.11	4.28	9.15	5.05	9.47	4.32	***9***	***3.9***	9.11	5.7
	70	9.07	4.14	9	4.44	***9.15***	***4***	9.18	3.88	8.8	3.6	8.93	4.78
	71	9.70	5.46	9.67	7	9.69	5.81	9.82	3.74	9.4	5.4	9.7	5.85
	72	7.34	5.20	6.89	6.83	7.17	4.69	7.62	4.35	8.3	7.1	7.33	5.56
	73	8.53	5.10	8.44	5.11	8.85	5.24	8.5	4.44	7.7	4.9	8.22	5.7
	74	8.07	4.80	7.28	5.22	7.75	4.44	8.5	4.74	7.2	3.3	9.11	5.93
	75	7.50	2.70	6.56	2.44	7.63	2.75	8.12	2.24	6.2	2.2	7.56	3.52
	76	8.50	2.53	8.5	2.33	8.47	3	8.74	1.79	7.9	2.1	8.48	2.7
	77	9.37	5.22	8.56	6.94	9.41	5.29	9.76	4.18	9.2	4.4	9.41	5.52
	78	8.09	5.51	7.83	7.56	8.25	5.34	8.65	5.71	8.7	5.8	7	4.19
	79	8.16	4.64	7.33	5.56	8.27	4.1	8.26	4.68	8.8	3.6	8.11	5.52
	Mean	8.92	4.04	8.66	4.24	8.94	4.08	9.17	3.51	8.91	3.96	8.73	4.54

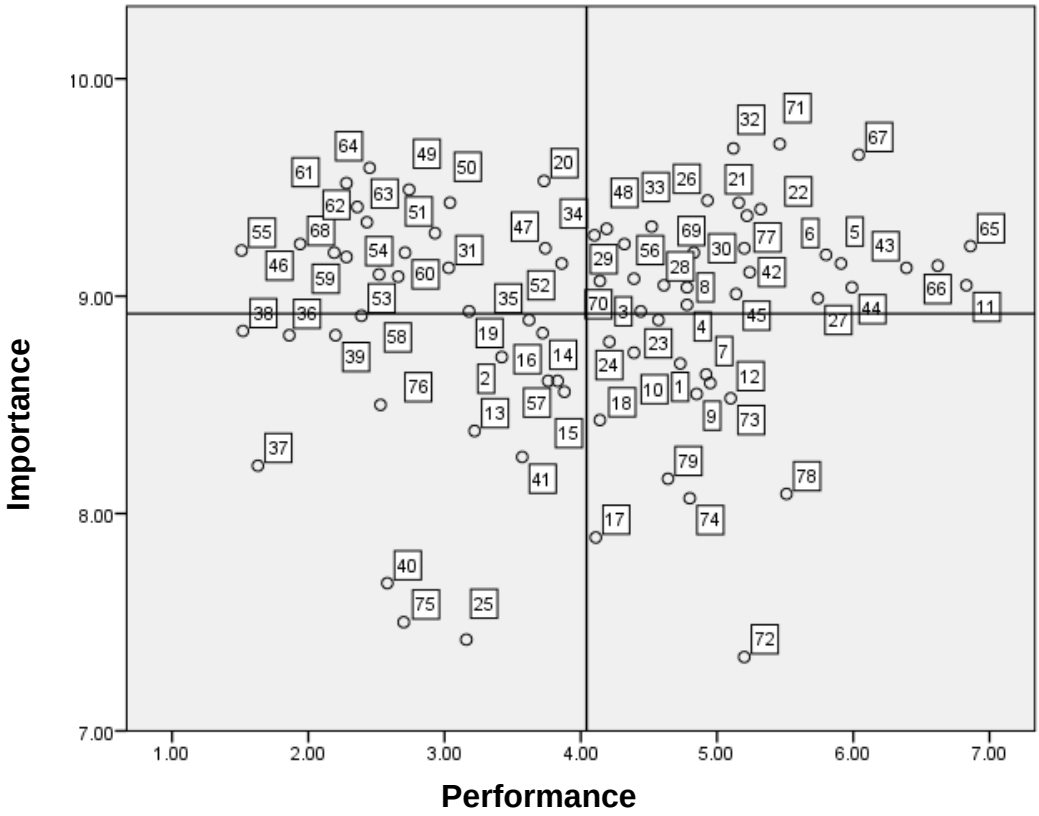

Figure 4. Importance -Performance Relationship for all students

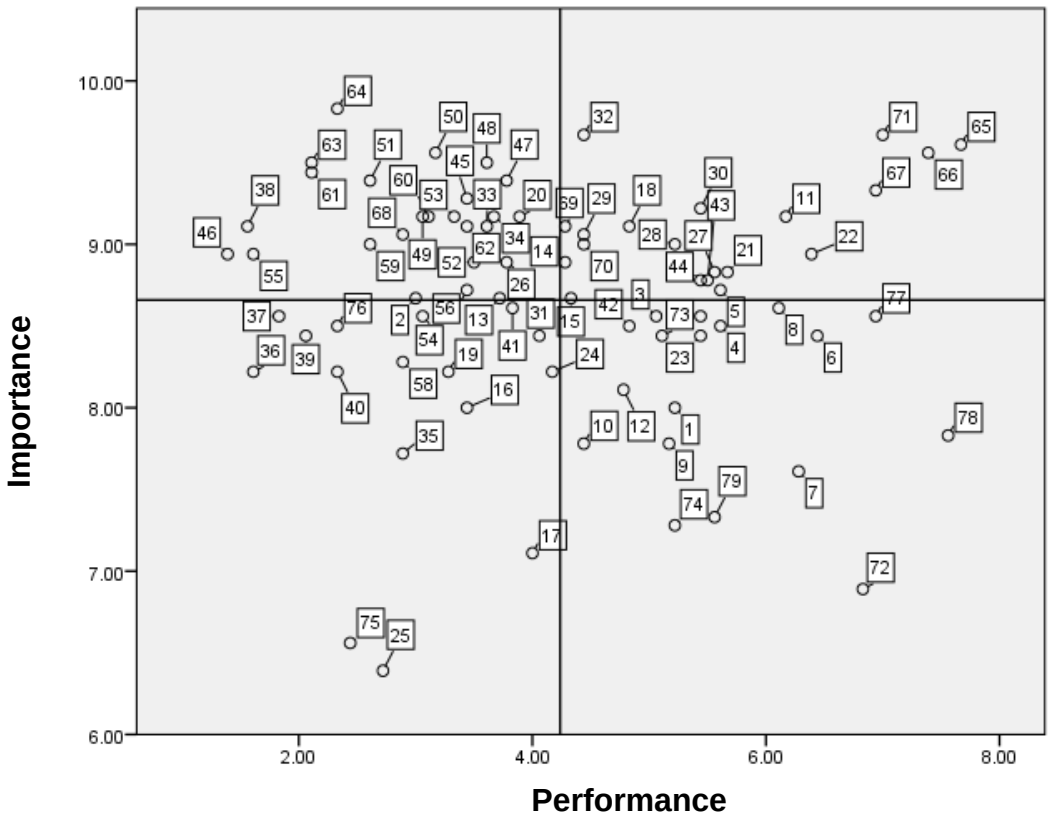

Figure 5. Importance-Performance Relationship for Architecture students

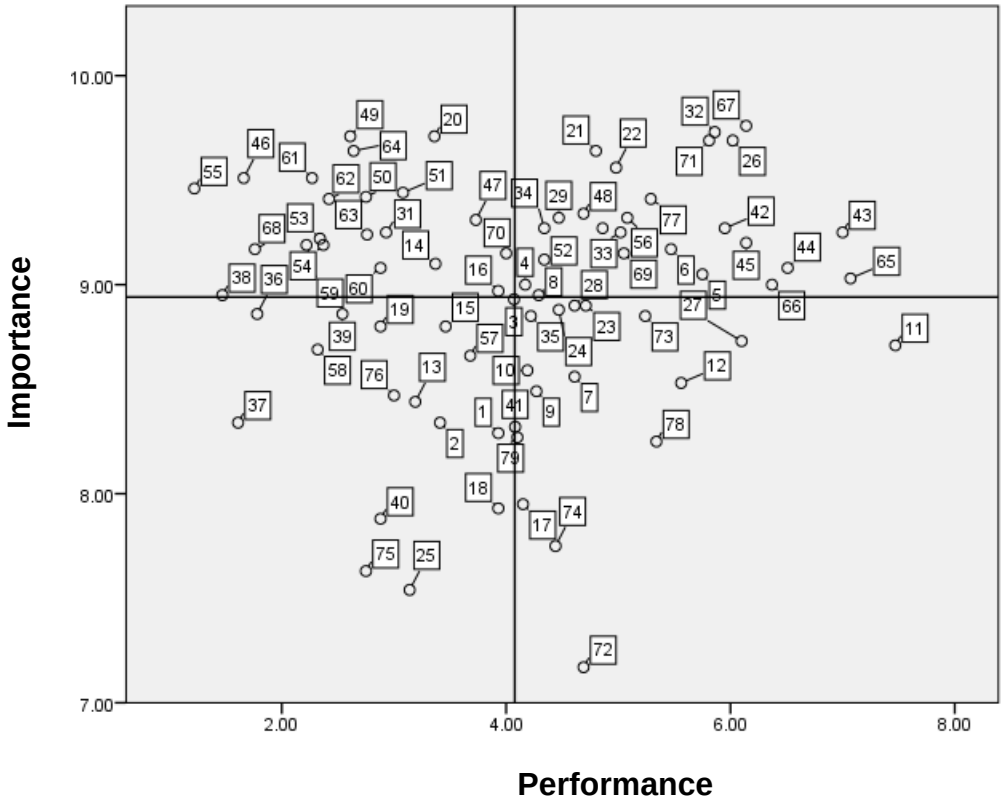

Figure 6. Importance-Performance Relationship for Civil Students

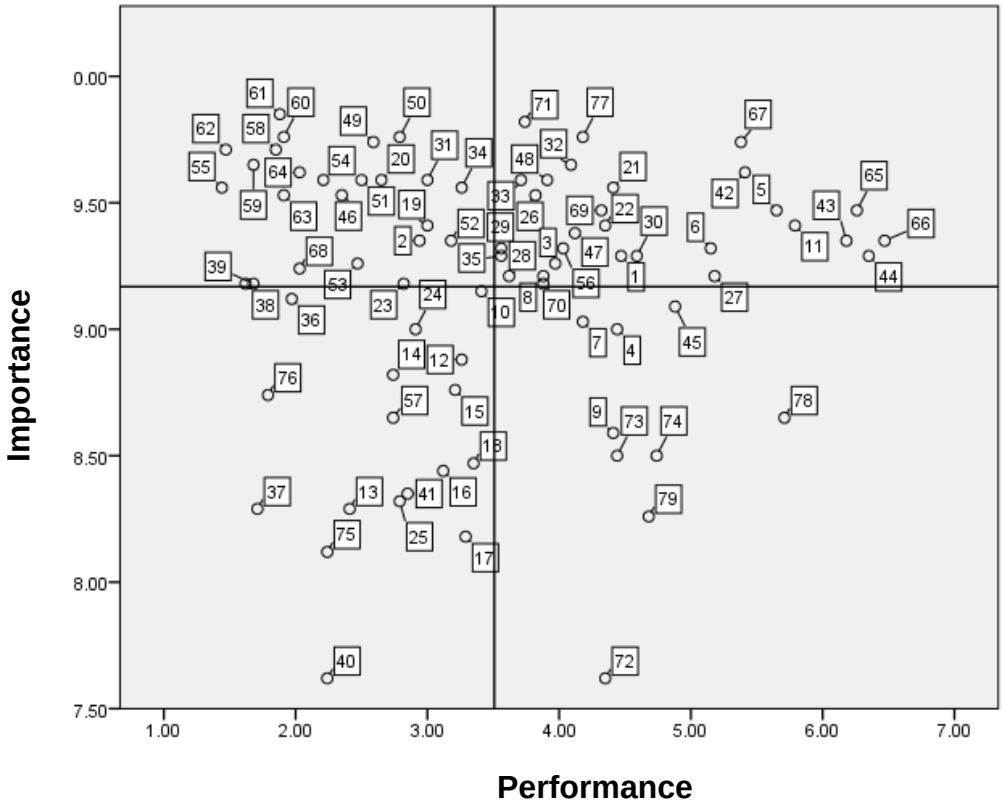

Figure 7. Importance-Performance Relationship for Electrical students

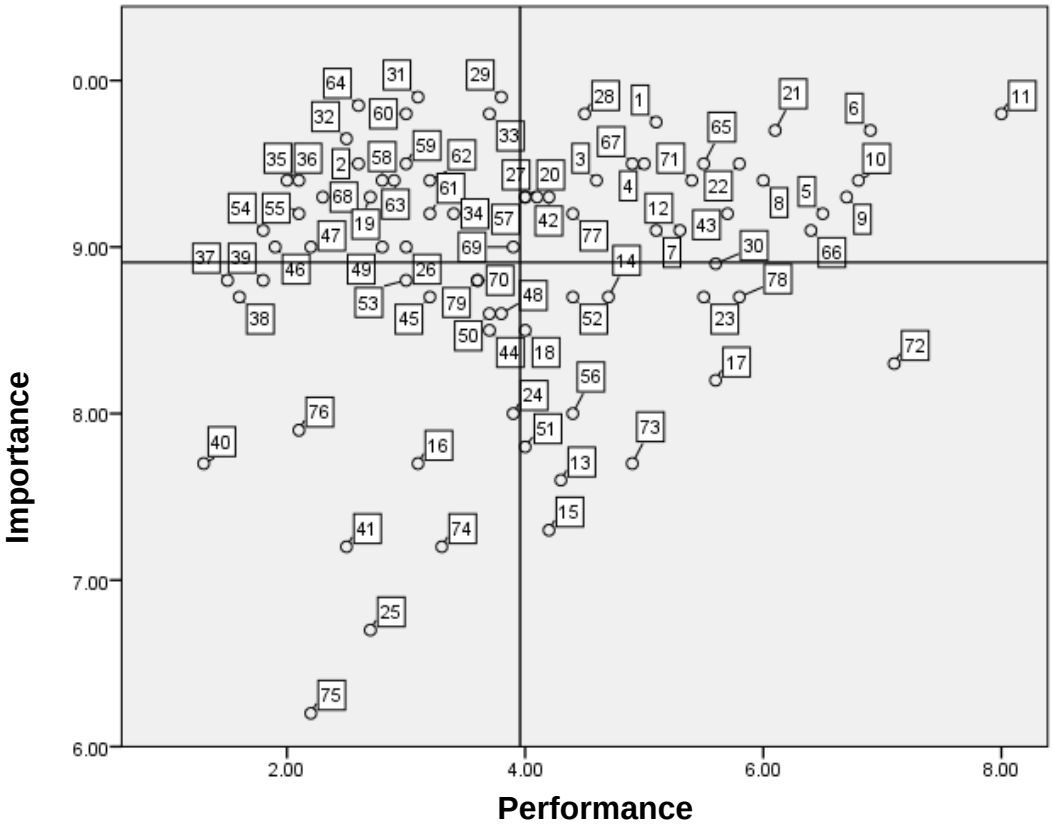

Figure 8. Importance-Performance Relationship for Mechanical students

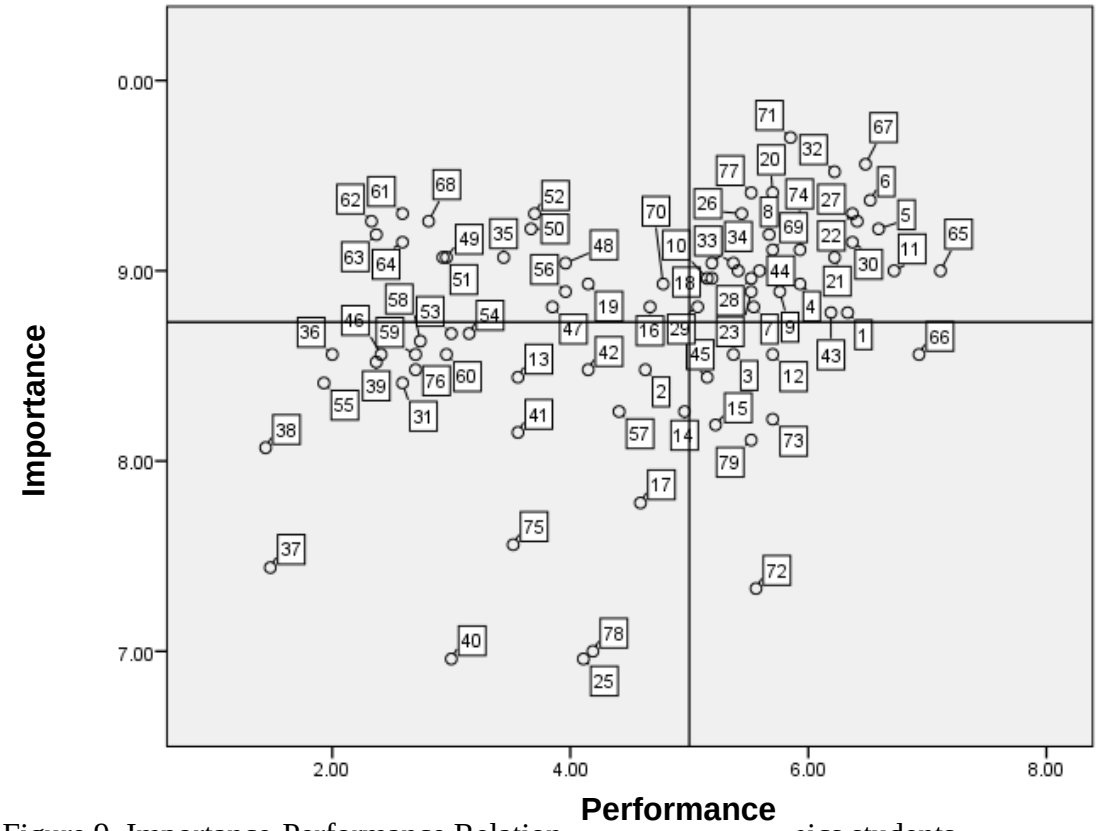

Figure 9. Importance-Performance Relationship for Mechatronics students

Analysis:

From Table 2 above, it is seen that the highest performance ratings came from the mechatronics department students followed by architectural followed by civil students. All the means are higher than the average student body. The mechanical and electrical students rated performance lower than the average of the student body showing dissatisfaction of the students.

Figure 4 to Figure 9 provide a diagrammatical presentation of the results of the entire student body and for each department. The performance-importance graphs are a simple and effective way to assess student satisfaction in the listed factors. In general, there are four quarters low to high performance and low to high importance. The quarter of interest is the high importance with low performance as this indicates what factors to pay attention to correcting. The following paragraphs present the analysis of the findings according to the whole student body as well as each department singly for each group of factors.

The analysis found the demographic factors were not a factor in the responses of the students in terms of age, gender or paying or non-paying. However, there were differences in responses depending on the department. The following tables provide a summary of the results of factors for each group which students found of high importance with low performance.

The first basic group was the Teaching group with four factors with the results as shown in Table 3. The second factor (quality of seminars) was found to be unimportant and the performance was rated as low. The exception was provided by the architectural, electrical and mechanical students. This reflects the student need in these departments for more individual attention and hands on experience to be provided through seminars.

The second group of factors, Academic Staff, included factors such as academic staff qualifications, experience knowledge and communication skills. The general student body, especially electrical, mechanical and mechatronics viewed factor 19 (flexibility in the grading system) as important but performance was rated low. The grading system in the Faculty of Engineering is pre-set based on whether the course is theoretical or practical (i.e. has a practical side such as labs). The university would need to review their grading system to allow for flexibility. Architectural student's responses found that factor 13 (willingness to provide individual attention) was important and performance was rated low where these students needed academic staff to be more willing to provide individual attention. Civil engineering students viewed factor 14 (prompt and efficient feedback on work) and factor 16 (faculty evaluation system) as important and was rated low. Civil students need more prompt and efficient feedback on their work as well as more flexibility on evaluation of students. The civil engineering student body constitutes about half of all students in the Faculty of Engineering, and thereby, the staff is slower in providing feedback and less able to evaluate their students.

The third group of factors was grouped under Curriculum and Course Structure. Factors under this group heading included curriculum design, course content and book, structure of courses, laboratories and course flexibility and evaluation and faculty training by the university. The general body of students found that there is a need to pay attention to the curriculum design and planning (factor 20) with up-to-date information as they viewed this factor as important and rated it low. There is a need to update the course curriculum and plan. A similar conclusion was found for faculty training by the university authority (factor 31) with the exception of architectural and mechatronics students who viewed this factor as unimportant. There is a need to develop a training program for faculty staff by the university. The structure of courses (factor 23) was rated important where

performance was low only by electrical students showing a need to pay attention to the structure of courses. The electrical department shall need to review the structure of their courses. Architectural and mechanical students viewed the laboratory curriculum (factor 26) as important but rating performance low. The laboratory curriculum requires a review and updating the courses and laboratories themselves. Factor 29 (course flexibility) was rated important with low performance by mechanical students only viewing the need for attention to course flexibility. There is a need to review the course grading system in place now.

The fourth group of factors was grouped under Academic Facilities and Access. There were 14 factors under this group. The general student body found that the electronic library (factor 46) was important but rated the performance low with the exception of mechatronics students who viewed this as unimportant. Generally, there is a need to provide an electronic library where at the time of the survey there was no electronic library. Adequate classes and laboratories (factor 32) were viewed as important with low performance only by the mechanical students. There is a need to upgrade the class and laboratory facilities. Factor 33 (quality of academic facilities and learning resources) was rated important with low performance only by architectural and mechanical students showing the need to pay attention to the quality of academic facilities and learning resources. Factor 34 (access to academic facilities and learning resources) was rated important with low performance only by architectural, electrical and mechanical students showing the need to pay attention to the access to academic facilities and learning resources as well as enhancing the facilities. The various departmental students voiced the need for attention to student accommodation (factor 35), catering services (factor 36), medical facilities (factor 38), the difficulty of access to administration (factor 39) and library working hours (factor 45) rating the importance

as high with low performance. Accommodation, catering services, medical facilities need to be provided for the students. Furthermore, access to administration needs to be easier and systemized and library working hours needs to be extended.

The fifth group of factors was grouped under Administrative Services. There were 10 factors regarding administrative staff, IT support, internet and working hours (factors 47 to 56). There was a general agreement of the student body that this group of factors was rated highly important with poor performance, with the exception of factor 48 (availability of administrative staff) and factor 56 working hours which were rated as unimportant. Administrative services require urgent attention by establishing a new administrative system and train the staff on new administrative procedures.

The sixth group of factors was grouped under Personal Development. The four factors in this group were; social opportunities (factor 57), careers service (factor 58), student welfare (factor 59) and provision of other facilities and services (factor 60). Electrical and mechanical students viewed careers services as important with low performance, thereby, attention is required to be paid to careers services to link with industry to provide job opportunities for the new graduates. The general student body viewed a need to pay attention to student welfare and provision of other facilities and services with the exception of mechatronics students who viewed these factors as unimportant. The Faculty of Engineering should review its policies such that student welfare is a priority and should also plan for the development of facilities and services to suit the needs of the students.

The seventh group of factors was grouped under Career Prospects. There were four factors included in this group. They are employment opportunities (factor 61), postgraduate programs (factor 62), studies abroad (factor 63) and business links (factor 64). The general student body viewed these factors as important with low performance

signalling that all factors in this group required attention. The Faculty of Engineering needs to establish links with the industry to provide employment opportunities to graduates as well as provide guidance in the required postgraduate curriculum for further study.

The eighth and last group of factors was grouped under 'Other'. There were 15 factors in this group where the student body without exception found this factor important with low performance voicing the need to pay attention to the internal student feedback systems (factor 68). Mechanical students voiced the need to pay attention to admissions procedures (factor 69)and civil students voiced the need to pay attention to providing previous results faster (factor 70). The student feedback system needs to be upgraded as well as admissions procedures. There is also a need to provide results faster. An electronic system may assist in this regard.

Conclusions:

Teaching

It is important not to rely on the classical lectures and teaching methods. There is a need to provide additional learning methods such as and seminars to add to the subject matter. This would provide students with a more thorough understanding of the subjects.

Academic Staff

The grading system is pre-set at Sana'a University in general. This does not allow academic staff any flexibility in the grading system. This needs to be corrected to allow academic staff a reasonable amount of flexibility. Furthermore, there are subjects deemed as 'theoretical' and are graded based on classwork and final exam. In reality

there are classes that include projects and research which are not incorporated in the grading system such as the 'Project Management' course.

The academic staff need to provide more individual attention to their students, particularly in departments which work on that basis such as architecture. The number of civil engineering students is large in comparison to the other departments. The grading and evaluation of the students consume time and individual evaluation of students becomes difficult. A method must be devised to speed up the grading and provide better evaluation of students.

Curriculum and Course Structure

The curriculum and course structures generally need to be re-evaluated and improved. This is particularly true for such departments as the electrical department where advances in the industry require the course structure and contents to be updated more regularly. Courses need to be designed and planned with course flexibility in mind. Additionally, new academic staff should be provided training by the university regarding teaching skills and methods in order to teach courses in a proper manner.

Academic Facilities and Access

The academic facilities at the Faculty of Engineering need upgrading as the students responded. The students viewed that there is a need for an electronic library. (An electronic library was being implemented at the time and should be of use by the coming year). Other students at various departments found the need to the quality of, and ease of access to, academic facilities and learning resources including the adequacy of classrooms and laboratories. Generally, attention needs to be paid to student accommodation, catering services and medical facilities. There is a need to extend library working hours to accommodate student schedules.

Administrative Services

It is evident from the student survey that there is a major problem regarding administration and the services they provide. The only factor found to be appropriate in this group was the working hours. There are issues with IT support and internet (which is not available on campus) as well as required information to be provided such as procedures.

Personal Development

The Faculty of Engineering has generally not played a role in the personal development of the students. This was clear in the responses where the entire student body thought that student welfare and provision of other facilities were important and where attention was lacking. Students in two departments added career services as needing attention.

Career Prospects

Career prospects for the general student body were important but where attention needs to be provided. This includes all the factors in the group without exception and was voiced by all departments. The Faculty of Engineering has made attempts at connecting students with the industry but these have been lacking a coordinated effort making it ineffective.

Other

The students find it important to have in place a feedback system that is fast and effective. This is an area where the various departments' performance is not good. The need to submit results in a timely manner is needed for grading and admissions procedures need to be shortened. The Faculty of Engineering has been working on these

issues and has succeeded in reducing the admissions procedures to two days. However, the grading system still needs to be worked on.

Limitations and further research:

This study was performed for satisfaction from the perspective of the student and in one faculty at Sana'a University. Further research should be performed to get the perspectives of other stakeholders such as teachers and parents. It would be viable to perform such surveys regularly to gauge student satisfaction on the same factors in light of improvements being made. Further research may be performed across institutions to compare policies and procedures.

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