



## The Evaluation Between Importance of Educational Needs and Satisfaction about it as Perceived by Engineering Students at Dire Dawa University Ethiopia

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### KEY WORDS

Educational needs  
Engineering student  
Dire Dawa University  
EESI

**Abstract:** This study aimed to examine the perception of Engineering students about importance of educational needs and satisfaction about it. A descriptive correlational design was used for this study. The present study was conducted at engineering faculties in Dire Dawa University. The present study included a total coverage sample includes all four academic years engineering students during academic year (2021). Total number of students was (n = 727). The study tool consisted of Engineering Education Satisfaction Instrument (EESI) consist of two questions (question one about importance of educational needs and question 2 about satisfaction with the educational needs) contained the same items, the five sub-scales related to the five levels. This study revealed that, there was a highly statistical significant differences among the four academic years engineering students as all 5th year engineering students had reported that the educational needs is very important and a highly statistical significant differences among the students of the 4 academic years in which the second year and 3rd year students had the highest mean scores according to perception of the engineering students about satisfaction with the educational needs. There was a highly statistically significant positive relationship between perceptions of the engineering students in the four academic years about the importance of educational needs. Also, observed that there was a highly statistically significant negative relationship between perceptions of the engineering students in the four academic years about the satisfaction of educational needs. Ask authoritative persons to improve educational environment through providing more space and educational resources for conducting teaching learning process.

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### INTRODUCTION

Engineering education is the activity of teaching knowledge and principles to the professional practice of

engineering. It includes an initial education (bachelor's and/or master's degree) and any advanced education and specializations that follow<sup>[1-4]</sup>. Engineering education

is typically accompanied by additional postgraduate examinations and supervised training as the requirements for a professional engineering license. The length of education and training to qualify as a basic professional engineer, is typically 8-12 years with 15-20 years for an engineer who takes responsibility for major projects<sup>[5]</sup>.

Science, Technology, Engineering and Mathematics (STEM) education in primary and secondary schools often serves as the foundation for engineering education at the university level<sup>[6]</sup>. In the United States, engineering education is a part of the STEM initiative in public schools<sup>[7]</sup>. Service-learning in engineering education is gaining popularity within the variety of disciplinary focuses within engineering education including chemical engineering, civil engineering, mechanical engineering, industrial engineering, computer engineering, electrical engineering, architectural engineering and other engineering education.

A student is primarily a person enrolled in a school or other educational institution and who is under learning with goals of acquiring knowledge, developing professions and achieving employment at desired field<sup>[7, 8]</sup>. In the broader sense, a student is anyone who applies themselves to the intensive intellectual engagement with some matter necessary to master it as part of some practical affair in which such mastery is basic or decisive.

**Aim of the study:** The current study aimed to examine the perception of engineering students about importance of educational needs and satisfaction about it.

**Justification of the study:** From experience of working at faculty of engineering for all academic years, the researcher observed that there are a weak relationship between students and faculty staff members & their assistance and also interaction between students is not good. There is also inappropriate class room, insecure environment and limited application of new technology such as smart board. All these issues may affect the educational process at faculty of engineering negatively. So that, the investigation about student's perceptions of educational needs and satisfaction is vital to the engineering profession. The outcomes of this study will provide insights into the educational needs identified by engineering students that are essential to the learning experience and satisfaction of those needs which may contribute to student's academic success and perception of self-actualization.

This study may assist engineering educational programs in laying a stronger foundation of knowledge,

competence and confidence among its future engineers by identifying student's needs, addressing those needs and providing resources for student's success. Student's perceptions of the educational experience will contribute to a comprehensive evaluation of the engineering educational environment.

## **MATERIALS AND METHODS**

**Research design:** A descriptive correlational research design was utilized in the present study.

**Setting:** The present study was conducted at engineering faculties in Dire Dawa University.

**Subject:** Subject of the present study included a total coverage sample includes all four academic years engineering students at different Faculties of Engineering in Dire Dawa University during academic years (2021). Total number of students was (727). The distributions of the 4 academic years were: 2nd year (167), 3rd year (203), 4th year (215) and 5th year (142).

### **Tools of the study**

**The study tool consisted of:** Engineering Education Satisfaction Instrument (EESI) used to measure study subjects perception toward importance of educational needs and satisfaction about it. Classify into two parts (part one about importance of educational needs and part 2 about satisfaction with the educational needs) contained the same items, the five sub-scales related to the 5 levels.

It consists of 53 items divided into 5 main categories are: Basic learning Needs (BLN) 10 items, Safety and Security Needs (SSN) 11 items, Belonging to the Engineering Community Needs (BECN) 10 items, Self-Confidence Needs (SCN) 11 items and Self Actualization Needs (SAN) 11 items.

### **Scoring system**

**Component of Engineering Education Satisfaction Instrument (NESI) included of**

**Part 1; Importance of educational needs:** This part was rated on a 4-point Likert scale from not at all necessary (Scored 1), somewhat necessary (Scored 2), moderately necessary (Scored 3) and very necessary (Scored 4). The subject's response to each of the 53 items was summed to yield total importance scores which could range from 53-212.

The student who obtain score from 1-53 will be considered (not at all necessary), the student who obtain score from 54-105 will be considered (somewhat necessary), the student who obtain score from 106-158

will be considered (moderately necessary) and the student who obtain score from 159-212 will be considered (very necessary).

**Part 2; Satisfaction with the educational needs:** This part was rated on a 4-point Likert scale from not at all agreed (Scored 1), somewhat agreed (Scored 2), moderately agreed (Scored 3) and very agreed (Scored 4). The subject's response to each of the 53 items was summed to yield total satisfaction scores which ranged from 53-212.

The student who obtain score from 1-53 will be considered (not at all agreed), the student who obtain score from 54-105 will be considered (somewhat agreed), the student who obtain score from 106-158 will be considered (moderately agreed) and the student who obtain score from 159-212 will be considered (very agreed).

**Pilot study:** A pilot study was conducted for 10% of the total samples from different faculties of engineering students at Dire Dawa University. Hence, as no changes in the study sheet or obstacles in understanding the question, the pilot study included in the main study sample. Reliability of engineering education satisfaction instrument is measured by a Cronbach's alpha statistical method. Reliabilities about importance of educational needs were (95.38) and satisfaction with the educational needs were (93.75).

**Statistical analysis:** Data were analyzed using the Statistical Package for Social Science (SPSS) version (17), numerical data were expressed as (numbers and

percentages, mean and SD), ANOVA test and Chi-square test were also used. Significant is considered at ( $p < 0.05$ ).

**RESULTS AND DISCUSSION**

Table 1 showed that there was a highly statistical significant differences among the 4 academic years engineering students as all 5th year engineering students had reported that the educational needs is very important ( $p = 0.0001$ ).

Table 2 revealed that there was a highly statistical significant differences among the students of the 4 academic years according to perception of the engineering students about importance of educational needs ( $p = 0.0001$ ). In addition, the same table showed that the 5th year engineering students had the highest mean score ( $210.41 \pm 2.11$ ).

Table 3 clarified that there was a highly statistical significant differences among the students of the four academic years in related to perception of the engineering students about importance of educational needs ( $p = 0.0001$ ). Also, in the same table indicated that the 5th year students had the highest mean scores, for the following all main elements, "basic learning needs with mean score ( $39.55 \pm 0.95$ ), safety and security needs with mean score ( $43.69 \pm 0.69$ ), belonging to the engineering community and love needs with mean score ( $39.70 \pm 0.84$ ), self-confidence needs with mean score ( $43.56 \pm 1.20$ ) and self-actualization needs with mean score ( $43.92 \pm 0.49$ ) according to perception of the engineering students about importance of educational needs.

Table 4 revealed that there was a highly statistical significant differences among the 4 academic years

Table 1: Frequency distribution of importance of educational needs as perceived by the undergraduate engineering students among the 4 academic years

Academic years Importance of educational needs	2nd year		3rd year		4th year		5th year		Total		$\chi^2$ 69.7	p-values 0.0001
	N	%	N	%	N	%	N	%	N	%		
Moderately necessary (106-158)	26	16	73	36	50	23	0	0	149	20		
Very necessary (159-212)	140	84	130	64	165	77	142	100	577	80		
Total	167	100	203	100	215	100	142	100	727	100		

N.B (1): Not at all necessary (1-53), somewhat necessary (54-105); N.B (2): None of students reported that the not at all important of educational needs and only one student reported that somewhat important from the 2nd year

Table 2: Mean scores of perception of the engineering students about importance of educational needs according to academic years

Importance of educational needs	Academic years	N	Means±SD	F-value	p-value
	2nd	167	179.17±22.75	119.62	0.0001
	3d	203	170.89±26.13		
	4th	215	172.76±21.09		
	5th	142	210.41±2.11		
	Total	727	181.07±25.67		

Table 3: Mean scores of perception of the engineering students to the 5e main elements about importance of educational needs according to academic years

Importance of educational needs	Academic years	N	Means±SD	F-values	p-value
Basic learning needs	2nd	167	30.87±6.84	77.4	0.0001
	3rd	203	29.34±7.57		
	4th	215	31.87±6.96		
	Fifth	142	39.55±0.95		
	Total	727	32.44±7.37		
Safety and security needs	2nd	167	38.05±6.66	43.14	0.0001
	3rd	203	37.24±5.80		
	4th	215	36.76±7.71		
	5th	142	43.69±0.69		
	Total	727	38.54±6.62		
Belonging to the engineering community and love needs	2nd	167	33.56±6.43	68.89	0.0001
	3rd	203	31.97±6.24		
	4th	215	31.62±6.26		
	5th	142	39.70±0.84		
	Total	727	33.74±6.41		
Self-confidence needs	2nd	167	38.34±6.09	47.28	0.0001
	3rd	203	36.56±7.79		
	4th	215	36.72±5.81		
	5th	142	43.56±1.20		
	Total	727	38.39±6.53		
Self-actualization needs	2nd	167	38.35±6.06	66.05	0.0001
	3rd	203	35.78±7.39		
	4th	215	35.79±6.30		
	5th	142	43.92±0.49		
	Total	727	37.96±6.71		

Table 4: Frequency distribution of satisfaction with the educational needs as perceived by the undergraduate engineering students among the 4 academic years

Academic years Satisfaction with the educational needs	2nd year		3rd year		4th year		5th year		Total		χ <sup>2</sup> 163.3	p-value 0.0001
	N	%	N	%	N	%	N	%	N	%		
Somewhat agreed (54-105)	51	30.5	67	33	183	85	85	62	386	53		
Moderately agreed (106-158)	109	65.5	125	62	32	15	53	37	319	44		
Very agreed (159-212)	7	4	11	5	0	0	1	1	19	3		
Total	167	100	203	100	215	100	142	100	727	100		

N.B (1): Not at all agreed (1-53); N.B (2): three students reported that the not at all agreed of educational need

Table 5: Mean scores of perception of the engineering students about satisfaction with the educational needs according to academic years

Satisfaction with the educational needs	Academic years	N	Means±SD	F-value	p-value
	2nd	167	118.92±24.28	98.52	0.0001
	3rd	203	121.83±22.43		
	4th	215	91.70±14.61		
	5th	142	100.85±19.90		
	Total	727	108.15±24.17		

engineering students in which non of students from the 4th year and only one student from fifth year had very agreed as regards of their perception about satisfaction with the educational needs (p = 0.0001).

Table 5 showed that there was a highly statistical significant differences among the students of the four academic years according to perception of the engineering students about satisfaction with the educational needs (p = 0.0001). In addition, the same table indicated that the 2nd year and 3rd year students

had the highest mean scores. Table 6 indicated that there was a highly statistical significant differences among the students of the 4 academic years in relation to perception of the engineering students about satisfaction with the educational needs (p = 0.0001). Also, the same table showed that the 2nd year and 3rd year engineering students had the highest mean scores, for the following main elements, “basic learning needs with mean scores (21.73±5.14) and (19.21±5.56), safety and security needs with mean scores (25.72±5.92) and (24.70±6.09),

Table 6: Mean scores of perception of the engineering students to the 5 main elements about satisfaction with the educational needs according to academic years

Satisfaction with the educational needs	Academic years	N	Means± SD	F-values	p-values
Basic learning needs	2nd	167	19.21±5.56	18.32	0.0001
	3rd	203	21.73±5.14		
	4th	215	18.40±4.01		
	5th	142	19.15±4.53		
	Total	727	19.66±4.99		
Safety and security needs	2nd	167	24.70±6.09	80.76	0.0001
	3rd	203	25.72±5.92		
	4th	215	18.78±4.15		
	5th	142	20.06±4.68		
	Total	727	22.33±6.07		
Belonging to the engineering community and love needs	2nd	167	22.75±6.27	23.14	0.0001
	3rd	203	23.15±5.89		
	4th	215	18.97±6.64		
	5th	142	19.56±5.52		
	Total	727	21.12±6.41		
Self-confidence needs	2nd	167	25.94±7.55	127.53	0.0001
	3rd	203	25.17±5.70		
	4th	215	16.00±4.12		
	5th	142	20.46±5.48		
	Total	727	21.71±7.09		
Self-actualization needs	2nd	167	26.32±7.70	46.50	0.0001
	3rd	203	26.06±6.89		
	4th	215	19.56±5.98		
	5th	142	21.62±6.77		
	Total	727	23.33±7.42		

Table 7: Relationship between perception of the nursing students in the 4 academic years about the importance of educational needs and their satisfaction level (n = 727)

Relationship	Variables	Academic years
Importance of educational needs	r	0.351
	p	0.0001
Satisfaction of educational needs	r	-0.403
	p	0.0001

belonging to the engineering community and love needs with mean scores (23.15±5.89) and (22.75±6.27), self-confidence needs with mean scores (25.94±7.55) and (25.17±5.70) and self-actualization needs with mean scores (26.32±7.70) and (26.06±6.89) in relation to perception of the engineering students about satisfaction with the educational needs”.

As observed from Table 7 that, there was a highly statistically significant positive relationship between perception of the engineering students in the 4 academic years about the importance of educational needs. Also, the same table indicated that there was a highly statistically significant negative relationship between perception of the engineering students in the 4 academic years about the satisfaction of educational needs.

Education is a basic right of all people and the basis for a peaceful, healthy and stable world. Also, encourages the development of an individual's total personality, traditional norms and values and promoting understanding and development of modern science,

technology and environment conservation. Education perpetuates social, economic and cultural prosperity of human beings and creates an infrastructure for international cooperation through the promotion of mutual understanding and tolerance, thereby enabling the achievement of self-reliant development.

Engineering faculties are continually challenged to prepare students to fulfill the role and critical competencies for professional engineering practice and establish ways by which the achievement of these goals can be evaluated and refined to promote the integrity of the institution and advance the engineering profession. Therefore, this study aimed to examine the perception of engineering students about importance of educational needs and satisfaction about it. Findings of the present study revealed the following:

In the current study, the four academic years engineering students from urban area more than engineering students from rural area. This result might be due to increase cost and low socioeconomic level, so, they held economic view of engineering profession because it provides immediate opportunities for employment after graduation and sometimes during study which in turn lead to positive attitude of engineering students toward their future profession.

The present study, revealed that the 5th year engineering students had the highest mean scores according to perception of the engineering students

about importance of educational needs (Table 1-3). This result might be due to the 5th year engineering students become mature enough to be able to know what they needs and which things may benefit them, the 5th year engineering students able to know basic learning needs such as effective and ineffective classroom strategies, safety and security needs such as safe and insecure of educational environment, love needs such as interaction and collaboration between faculty and students or communicate effectively with others according to their priority and their needs easily, esteem needs such as respect between faculty and student and self-actualization needs such as clinical sites provide learning opportunities.

As regard to the present study, revealed that the second and third years engineering students had the highest mean scores to perception of the engineering students about satisfaction with the educational needs (Table 5, 6). This result might be due to the engineering students take a lot of guidance from the demonstrators and faculty staff member which help them to more understanding.

In the current study, clarified that there was a highly statistically significant positive relationship between perception of the engineering students in the four academic years about the importance of educational needs. Also, observed that there was a highly statistically significant negative relationship between perception of the engineering students in the four academic years about the satisfaction of educational needs (Table 7).

## **CONCLUSION**

**In the light of the present findings it was concluded that:** There was a highly statistically significant positive relationship between perceptions of the engineering students in the 4 academic years about the importance of educational needs. Also, observed that there was a highly statistically significant negative relationship between perceptions of the engineering students in the 4 academic years about the satisfaction of educational needs.

## **RECOMMENDATIONS**

**Based on important findings of the present study, the following recommendations were suggested:** Ask authoritative persons to improve educational environment through providing more space and

educational resources for conducting teaching learning process. Apply law and rules for faculty members travelling to meet educational process and to increase number of faculty staff members and their assistance to meet student's needs. Provide training for the faculty staff members and their assistance about using of educational technology and innovative teaching strategy. Recommend the faculty staff members at the faculties of engineering to broaden the technical setting to provide learning opportunities of engineering students.

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