

Engineering Graduates' Needs for Developing Their Employability Skills and Employers' Comments on Their Internships Performance

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Abstract

The study looked at how learners in engineering should improve their employability skills and how it relates to how their internship performance was judged by the manager of the business. The research utilized an expressive research plan with 125 recent technical (engineering) learners from an Indian educational institute. The outcomes of the investigation showed that engineering learners received great rankings for their internship outcomes in terms of mindset, character, expertise, and abilities. They conducted an examination of employability abilities, along with cognitive skills and social skills, and found that the system thought talent has a very high development demand.

They also thought about their existing work ethics and managerial skills, as well as their ability to read and write. A correlation test revealed an important negative correlation between the four facets of an apprenticeship assessment and the need for developing abilities in reading, math, time administration, and professional ethics, while a positive correlation was found between internship performance and the requirement for skill development in critical thinking and system thinking.

Keywords: Internship; Engineering graduates; Skill development

I. Introduction

Employability skills were prioritized more from the moment pupils reached high school and were strengthened after they began their college studies. These are necessary both hard and soft abilities that learners should know and have as part of the educational goals for engineering programmes (Awang & Daud, 2015). Problems arise when students are

nearing graduation but still lack the employability abilities that are significant, conditions not absolutely necessary, for an internship or job-training programmes. Students' confidence and self-worth may suffer if they enter the profession unprepared, making it harder for them to pursue their goals and objectives in the years to come (Asonitou, 2015).

The main responsibility of colleges and universities is to provide students with the fundamental information, abilities, and work ethics necessary for them to succeed in their chosen careers (Beard, 1998). Through college educational programs, graduates may be able to meet ASEAN Qualification Reference Framework standards. In order to make sure that engineering students graduate with these skills, Esa et al. conducted an investigation on how employability abilities are included into the teaching-learning procedure in three (3) Malaysian Polytechnics.

In the meantime, Saputra [12] discovered that Indonesian businesses want communication, industry-specific, and ICT skills from graduates of engineering. These are seen as necessary talents that students can still develop through internships. An internship is a crucial learning activity that allows students to put their theoretical knowledge into practise (Beckton, 2009). One of the goals of an internship is to give pupils the opportunity for practical learning and real-world exposure to a particular field or industry in order to improve their work ethics and abilities. Universities take great care in crafting the practical curriculum because they understand how important training programmes are for students' overall development. The specialized engineering programs offer the essential information on how the ideas might be utilized into practise. HEIs are working to match the syllabus to industry expectations, where internships help students prepare for the rigours of professional life and where graduates of engineering work in very diverse environments (Blom & Saeki, 2011).

In order to help students find their place in the world of business, HEIs provide internship programmes that expose them in the working world (Bourne et al., 2005).

Additionally, businesses in the manufacturing sector are hiring student-trainees to join their teams and workforce. Due to their advocacy for enhancing the capabilities of the

future labour force, businesses are now sharing their experience with students at universities and colleges. In addition, they take in student-trainees who have recently graduated from university. Students receive hands-on instruction as though they were normal employees of the business. Through the development of their knowledge, skills, and values, the trainees acquire their abilities during training (Bridgstock, 2009). An internship can be thought of as an apprentice or an intentional activity planned to accomplish learning objectives while under the supervision of a mentor or supervisor (Bringula et al., 2016).

The acquisition of interpersonal skills and work ethics, which are crucial for working in interdisciplinary teams and being a part of an environment that could affect the behavior of other employees, is an aspect of the training. According to ABET guidelines, one of the student goals for all engineering degree programmes is the capacity to function in an environment that is multidisciplinary. Both general and technical talents are given more weight by both domestic and international manufacturing as well as design businesses. In the backdrop of globalization, Chaibate et al.'s study [24] placed more focus on the development of employability skills among Moroccan engineers with global aspects.

The importance of professional growth in preparing pupils to become professionals who are globally competitive in accordance with the international certification and standards for educational results can be determined by analyzing the connection amongst the outcome of internship achievement and the improvement requirements on employability abilities of engineering pupils. Students studying engineering face a problem in adapting to the requirements of the global labor market with appropriate employability skills due to the rising need for engineers in various regions of the Middle East.

II. Objectives

In order to create employability skill programs for engineering students, this study set out to identify their unique needs. Additionally, it was designed to demonstrate how well the intern performed throughout their internship as determined by their immediate supervisor in terms of understanding, technical ability, attitude, and character. The study looked at

the variations between groups of engineering learners, according to their degree programs, in terms of the development of job readiness abilities and the outcomes of intern evaluations of performance.

Hypothesis

1. There is no discernible difference between engineering students' demands for developing employability skills when they are categorized according to degree programmes.
2. When they were categorized according to degree programs, there was no discernible difference in the outcome of the internship performance rating.
3. There is no correlation between the technical students' requirement to strengthen their employability skills and the outcomes of their internship performance review.

III. Methods

Research Approach

The study used a quantitative description form of research. In terms of the necessity for engineering students to build employability skills, it is considered appropriate to identify their underlying conditions. The quantity of respondents needed for the study is best handled using a survey question.

The participants

The study's participants are engineering graduates from 2014 to 2016 who are divided into three batches and total 125 graduates from four (4) distinct engineering programmes at a higher education institution. The following engineering disciplines are covered by these four bachelor degree programmes: industrial, computer, mechanical, and electronic.

Tool

Table 1. Employability- Skills review Questionnaire trustworthiness examination

Employability Skill set	Number of Entry	Cronbach's Alpha Value.
LNS	5	0.902
CTS	6	0.911
LS	5	0.908
MS	4	0.932
IS	6	0.925
ITS	7	0.930
STS	7	0.900
WE	7	0.917
Assessment of Internship Performance		
Information	5	0.908
Technological Skills	5	0.924
Approach	5	0.915
Persona	5	0.908

Procedure

Before the commencement of their fourth year level, as a one year preparation before they join in internship programme in fifth year, the questionnaire was administered to determine the growth needs of engineering learners towards gaining employability skills. Three years (2014, 2015, and 2016) of these questionnaires were distributed during the month of July. The study's goal was clearly explained to the students. They are aware that the study's conclusions will help them to better their employability abilities. Every year, the university offers them the chance to take part in a variety of workshops and training sessions to advance their abilities in accordance with their determined needs. In the meantime, a documentary

In the meantime, the results of the internships evaluations from the internship office were obtained through documentary examination. The ratings of the students, along with their names and survey responses about employable skills, were classified and totaled over a three-year period. the student names have been removed from the database once the

processing of the required data has been completed. To support the evaluation's findings, the debate also included the employers' actual comments, drawn from their assessment.

Analysis of Data

The weighted average is a type of descriptive statistics that is used to reflect the outcome of employers' comments on intern performance evaluations and the employability level of the students.

The association between the requirement for growth and the outcome of the internship was tested using Pearson's r . Utilizing the analysis of variance, it was determined how differently the students in the four (4) degree programmes needed to build their employability skills. The study used a parametric test since the data was regularly distributed in character. Using the provided scale, the performance and growth needs of the internship were interpreted: As excellent: 4.50-5.00; Very Good: 3.50-4.49; Good: 2.50-3.49; Fair: 1.50-2.49; Poor: 1.00-1.49.

The test of variance on the needs of learners in engineering for developing employability skills is shown in Table 2. The findings demonstrated those engineering students' job enhancement requirements in terms of analytical thinking, management, and managerial skills differ significantly from one another. The null hypothesis that there is no substantial difference is thus rejected. The top 3 priority areas stated by the respondents generally show that engineering pupils have extremely high needs for growth in system thinking abilities (4.57), high level needs in analytical skills (3.33), and moderate requirements in interpersonal skills (3.03). Work ethics (2.31), competence in leadership (2.60), and mathematical and reading skills were the three least mentioned abilities that engineering students thought that they already have (2.02).

**Table 2. Test of Differences on Employability Skill Improvement
Requirements of Engineering Learners**

*Significant at p -value < 0.05**

Employability Skills	BSIE	BSCpE	BSME	BSECE	Total (R)	f-value	p-value
Literacy and Mathematical Skills	2.1	1.93	1.83	1.92	2.02 (8)	0.187 4	0.903
Analytical Skills	3.4 7	3.27	2.02	3.23	3.33 (2)	3.047 6*	0.031 0
Leadership Skills	2.6 2	3.85	2.46	2.36	2.60 (5)	3.266 2*	0.042
Administrative Skills	1.8 6	2.28	2.47	2.50	2.21 (7)	4.281 6*	0.038
Social Skills	3.1 0	2.77	3.13	2.97	3.03 (3)	0.236 3	0.868
IT Skills	2.9 4	2.38	2.58	2.14	2.70 (4)	0.847 8	0.483
Systematic Thinking Skills	4.6 0	4.58	4.52	4.40	4.57 (1)	0.544 1	0.658
Professional Ethics	2.4 7	2.10	2.07	2.00	2.31 (6)	0.283 8	0.837
Total Composite Mean	2.9 0	2.89	2.63	2.70	2.84		

The findings also revealed that students studying industrial engineering have significantly higher growth requirements for analytical capabilities (3.47) than do students studying mechanical engineering, whereas they have significantly fewer development requires for administrative skills (1.86) than do students studying electronic engineering, who have substantially higher needs for growth. Electronics engineering pupils (2.27) have a much lower need for leadership skill development than computer engineering students (2.83), who have a significantly larger requirement. In contrast, there are no appreciable differences in the development needs of learners in engineering across the four programmes in terms of mathematical and literacy abilities, interpersonal abilities, technological skills, systemic thinking abilities, and professional ethics.

Internship Outcome	BSIE (R)	BSCpE (R)	BSME (R)	BSECE (R)	Total (R)	f-value	p-value
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Information	4.52 (3)	4.61 (3)	4.56 (4)	4.58 (3)	4.54 (3)	0.8428 7	0.4434 1
Technological Skills	4.47 (4)	4.54 (4)	4.61(3)	4.51 (4)	4.51 (4)	0.5375 0	0.7323 4
Approach	4.77 (1)	4.88 (1)	4.85 (1)	4.70 (2)	4.80 (1)	0.1654 5	0.9154 5
Persona	4.71 (2)	4.84 (2)	4.80 (2)	4.78 (1)	4.78 (2)	0.3578 3	0.7324 5
Total compound Mean	4.62	4.72	4.70	4.67	4.67		

Table 3. Test of Differences on Internship Outcome of Engineering Learners

**Significant at p-value<0.05*

Table 4: Employment and Employability Requirements for Skill Development and Internships Results

Skills Required	Information (P Values)	Skill (P Values)	Perspective (P Values)	Persona (P Values)
Knowledge & Computation	-.635 (<0.01)**	-.738(<0.01)**	-.693(<0.01)**	-.715(<0.01)*
Logical Skills	0.791(<.001)**	0.682(<.001)**	.752(<0.01)**	.652(<0.01)**
Direction	.213(>0.05)	.303(>0.05)	.210(>0.05)	.242(>0.05)
Adm	-.484(<0.05)*	-.589(<0.05)*	-.603(<0.05)*	-.534(<0.05)*
Info Tech	.229(>0.05)	.304(>0.05)	.343(>0.05)	.289(>0.05)
Systems Thinking	.694(<.001)**	.744(<.001)**	.725(<0.01)**	.684(<0.05)**
Assiduousness	-.595*(>0.05)	-.655*(>0.05)	-.623(<0.05)*	-.715(<0.05)*

****Significant at p-value<0.01, *Significant at p-value<0.05**

According to the assessments of their separate employers or direct superiors, engineering students performed differently throughout their internships, as shown in Table 3. The findings indicated that when learners in engineering were categorised according to educational programs, there was no statistically significant difference in how well they

performed during their internships. The null assumption that there is no substantial difference is therefore adopted.

They came out on top across all degree programmes in the performance assessment for attitude, with the exception of the group of Electronics Engineering students, who came in second on this criterion but first in personality. They came in third in terms of knowledge, behind only the entire class of BS Mechanical Engineering students, when compared to technical skills. Students from the BSME programme scored fourth on the knowledge test, but third on the technical skill evaluation. The outcome of the ranking showed that their respective companies gave them similar ratings.

Additionally, as indicated by a calculated p-value of below the 0.05 alpha level, there's a substantial positive correlation between the demand for social skill development and the internship evaluations on the approach of technical learners. With calculated p-values above the 0.05 significant level, management and information technologies have no meaningful link with the outcome of intern success.

The correlation between the demand for developing skills and internship performance is shown in Table 4. Results indicated that, with the exception of managerial and technological skills, there is a considerable correlation between engineering students' internships assessments of performance and their growth requirements. As a result, the null assumption that there is no meaningful association is disproved.

Additionally, as indicated by a calculated p-value of below the 0.05 alpha level, there is a substantial positive correlation between the demand for interpersonal development of skills and the apprenticeship assessment of outcome on attitudes of the students studying engineering. With calculated p-values above the 0.05 significant level, management and IT have no meaningful link with the outcome of internship outcome.

V. Conclusion

Each engineering student has to be ready to study and have employability abilities when they leave academic institutions in order to face the difficulties of fierce opposition while it is related to job placement. This study's findings show how learners in engineering perceived the need to improve these abilities in order to become job-ready.

There are variations in the needs for developing strategic thinking, leadership, and management abilities, but there are not significant variations in the other specified employable qualities in aggregate.

In order to complete the tasks and obligations allotted to them during their internships and maintain their education until they enter the real work world, learners in engineering

must further develop their technical skills and knowledge. Institutions of higher learning should be cautious of the needs of their pupils, not only in terms of employability capabilities but in terms of other areas such as character, morals, and personality development to help them reach their full potential as potential leaders in their fields and communities.

The research was used as information to enhance training and increase outcome-based education techniques so that future engineering professionals' skills, expertise, and character are developed holistically.

According to the results of this study, it is necessary to address the shifting employment values of the generation and how they see the worth of employable skills. Furthermore, how students were raised in the academy always has an impact on how successful they are in their fields of interest. The efficient delivery of educational resources and the good educational opportunities that have a bearing on the lives of pupils are other factors in the complete growth of the students.

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