

Impact of Emotional Intelligence on the Academic Performance and Employability of Female Engineering Students in Saudi Arabia*

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Present study aims to investigate the impact of emotional intelligence (EI) on academic performance and employability of female engineering students in Saudi Arabia. Data were collected from 50 industrial employers and 300 female students of varied engineering disciplines. Academic performance was assessed using cumulative grade point average of the students, while EI was assessed with the help of a structured questionnaire comprising 24 questions divided into four categories. Findings of the study revealed a strong relationship between EI and the academic performance of students with less variation between fresh and senior students. However, significant variation in EI was observed among students of different engineering disciplines. In addition, the employability chances of female engineering students were found to be around 60% based on an analytical equation, which was derived with the help of inputs from industrial employers. Findings clearly indicate a strong impact of EI on the academic performance as well as future employability of these students.

Keywords: emotional intelligence; academic performance; employability; female engineering students; Saudi Arabia

1. Introduction

In the last few decades, emotional intelligence (EI) has emerged as one of the leading predictors of personal and professional success [1] due to its ability to drive and affect human behaviour. People with good EI not only understand and handle their own emotions in a better way but also exhibit strong empathy and social awareness for others as well. Numerous studies have established the positive impact of EI on job performance [2, 3] and overall well-being [4] of the workforce [5]. Nowadays, IQ alone cannot guarantee success and organizations prefer graduates with characteristics of self-awareness, self-regulation, empathy, social skills and motivation [6]. EI also plays an important role in the employability of engineers [7] and students with good EI have better chances of employment as compared to graduates with weak interpersonal and intrapersonal skills [8]. Also, emotionally intelligent students perform better in academics due to their early adjustments with peers, as compared to those, who took more time in getting comfortable with others [9]. Kolachina observed that students' academic grades are influenced by factors like EI and social intelligence [10]. Marai-chelvi concluded in his survey of 300 female students that EI is not a trait, which is commonly available among students [11], further, highlighting the importance of developing EI among students. As, it not only affects the employability and academic performance of students [8, 12] but also plays an

important role in the decision making and problem solving of an individual [13].

A research conducted at the Islamia University of Bahawalpur, Pakistan found that students with high EI achieved excellent grades as compared to students with low EI [14]. A similar research was conducted on 410 expatriate students of Arts and Science University of Dubai, UAE to find that positive correlation existed between student's EI and their academic performance [10]. Another research conducted on 48 males and 57 females of class XII of Patna Women's College, India showed a positive relation between EI and their academic performance in which students with high, low or average academic achievements displayed different levels of emotional intelligence [15]. Similarly, Khalili also found a positive effect of EI on the academic achievement of students [16]. However, a study consisting of 325 students from 3 different business schools revealed a weak impact of EI on academic performance [17].

In a study conducted by Singh, no significant difference was observed in the personal domains of emotional intelligence, namely, self-awareness, self-management and social awareness, but, considerable difference is observed in the social domains of men and women [18]. Lim also observed a higher level of relationship management in women than men [19]. A study conducted in Malaysia revealed that self-regulation and self-motivation levels declined during the 4 years of engineering program, while the domains of self-awareness,

* Accepted 12 September 2018.

social skills, empathy and maturity improved tremendously [20]. Also, Downey found a strong relationship between EI and the transformational leadership of female engineering managers [21]. In a study conducted by Abdulrahman Alasmari on 100 male and 100 female English language undergraduates in Saudi Arabia, it was found that female students not only scored higher in EI but also had positive impact on their performance in English language tests [22]. Another study on medical and pharmacy students in Saudi Arabia revealed that students with low EI scores had high stress levels [23]. Eman carried out a research on 338 female students of a Saudi Arabian university and found that EI has a positive relation with their religious behaviours [24]. Various studies have highlighted the impact of EI on academic performance, however, results are context specific that further highlights the importance of similar study in a country like Saudi Arabia, where number of female engineering students are continuously increasing. Most of the existing studies focused on relationship between EI and academic performance missing its critical impact on their future job performance. Thus, present study not only aims to explore the relationship of EI with academic performance but also investigates its impact on their future employability as well. Importance of this study further enhances due to increasing unemployment (around 34%) in health care and education sectors [25], thus, encouraging female students to adopt engineering field as their priority career path.

2. Scope

Scope of this study is restricted to King Abdul Aziz University (KAU) and Effat University (EU) located in the city of Jeddah, Saudi Arabia. KAU is a public sector university while EU works in the private sector. These universities are one of the few institutions that provide engineering education for females in Saudi Arabia. Due to the demographic location of Jeddah, most of the students register in these two universities come from the western side of KSA. Alumni of these universities, who come for different professional development training programs offered by their respective universities, are excluded from the scope of present study.

3. Data collection

Targeted population for this study were female engineering students of KAU and EU. The sample population consisted of a mix of three different engineering majors; industrial, electrical and architecture engineering from different years; freshman, sophomore, junior, and senior from both univer-

sities. Three hundred students were randomly selected for this study with 95% confidence interval. Data were collected through carefully structured two questionnaires. The first questionnaire comprises of four main sections, i.e., self-awareness, self-management, social-awareness and relationship management. These main categories are further divided into descriptive questions to properly assess the EI characteristics of female engineering students. Five point Likert type scale is used to register responses of students. The survey was conducted manually for King Abdul Aziz University students, whereas, it was conducted online for the students of Effat University. Both the institutions were located in the metropolitan city of Jeddah. The second questionnaire was used to collect data from 50 employers of different engineering organizations. It was also based on 5 point Likert type scale to measure the importance of EI from employers' perception. They were asked to rate each EI domain according to their requirement from fresh graduates. This survey was also conducted online. A preliminary survey was initially conducted before final data collection to pilot test the credibility of questionnaires, which were found to be consistent and reliable with Cronbach's Alpha (α) value of 0.706.

4. Data analysis

Table 1 gives the demographic profile of 300 students who were part of this study. These students were classified according to their age, CGPA, major, year and work experience (internships). The collected data was analyzed using SPSS.

Table 2 corresponds to section II of the questionnaire, where students were inquired how well they are familiar with the concept of emotional intelligence

Table 3 provides an outlook on the assessment of students' EI based on their score in the questionnaire.

Based upon literature, following hypothesis are developed to meet the objectives of this study.

Hypothesis 1: There is a significant correlation between Emotional intelligence and academic performance of students.

Hypothesis 2: There is a difference in emotional intelligence level between students of freshman and senior year.

Hypothesis 3: Emotional intelligence varies in students of different engineering majors.

4.1 Hypothesis testing

H1: There is significant correlation between emotional intelligence and student's academic performance.

Table 1. Demographic Profile of students (n = 300)

Students' Profile	Classification	Frequency	Percentage (%)
Age	18–20	48	16.0
	21–22	186	62.0
	23–26	66	22.0
CGPA (out of 4.00)	>3.9 (A+)	100	33.3
	3.70–3.89 (A)	56	18.7
	3.40–3.74 (B+)	44	14.7
	3.00–3.39 (B)	35	11.7
	2.70–2.99 (C+)	21	7.0
	2.40–2.69 (C)	21	7.0
	2.10–2.39 (D+)	6	2.0
	1.80–2.09 (D)	6	2.0
	<1.80 (F)	11	3.7
Major	Electrical engineering	105	35.0
	Architecture engineering	85	28.3
	Industrial engineering	79	26.3
	Unspecified	31	10.3
Year	Freshman	33	11.0
	Sophomore	66	22.0
	Junior	99	33.0
	Senior	102	34.0
Work Experience	No	163	54.3
	Yes	137	45.7

Table 2. Distribution of students according to their Awareness level

Awareness level	Frequency	Percentage (%)
Very well	13	4.3
Much	41	13.7
Little	165	55.0
Not at all	81	27.0
Total	300	100.0%

Table 3. EI score distribution of students

Total emotional intelligence	Frequency	Percentage (%)
Very poor	7	2.3
Poor	12	4.0
Moderate	206	68.7
High	75	25.0
Total	300	100.0%

Table 4. The correlation between EI total score and student's academic grades

Variables	Academic score (out of 100)	
	Person's correlation coefficient	P-value
Total EI score	0.227**	< 0.01

** Indicates that the correlation is significant at $\alpha = 0.01$.

This hypothesis is tested using Pearson's correlation by plotting total score of EI against their respective academic scores. Results indicate that the value of the correlation coefficient between the students'

academic score and their total scores is reaching 0.227, which is statistically significant at $\alpha = 0.01$ and a p-value < 0.01. Therefore, it can be concluded that, there is a significant positive correlation between the students' EI levels and their academic performance. As EI level increases, the corresponding academic score increases as well.

Procedure is repeated to determine the relationship between each element of EI and its respective academic score. Consequently, the results revealed a significant correlation between self-awareness, self-management, relationship management and the students' academic score, while no significant association was found between social awareness and academic grades, since the P-value of the correlation coefficient is greater than 0.05, as shown in Table 5.

H2: There is a difference in EI levels of students belonging to different years and majors.

T-test was used to compare EI level of freshman and senior year students. It was observed that value of T-test is equal to 0.549 and a P-value greater than 0.05 was obtained. In addition, the value of the calculated T-test statistics was less than the tabulated value. Thus, it could be concluded that there was no statistically significant difference in EI between students in freshman and the final year. Table 6 demonstrates the results in tabulated form.

Under the light of these results, the hypothesized difference of EI amongst students from freshman and senior year is not supported and therefore, the hypothesis is rejected.

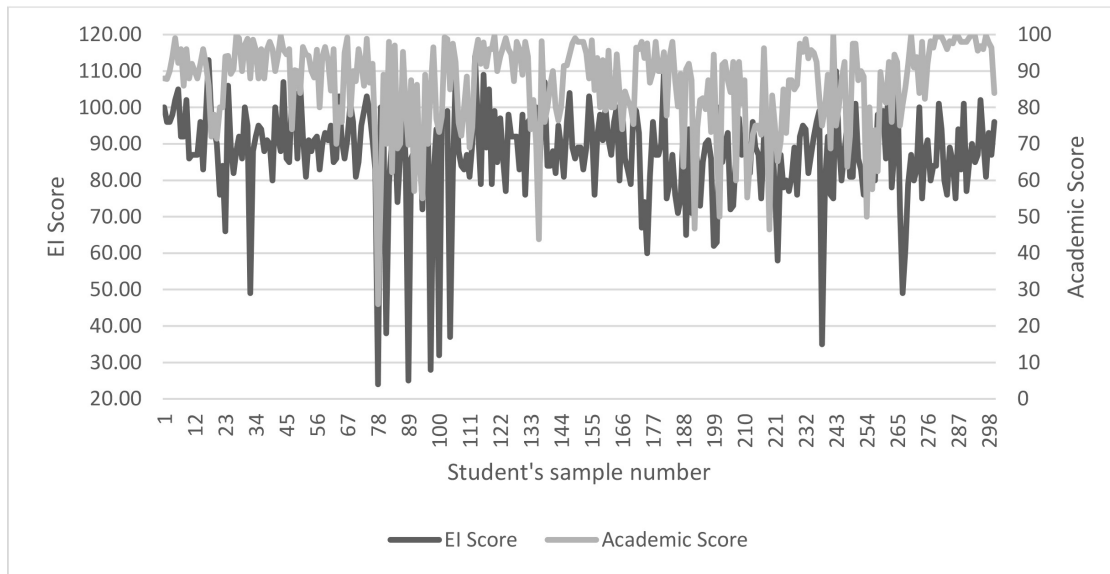


Fig. 1. Correlation between EI level of students and their academic score.

Table 5. Correlation between EI elements and academic score

Variables	Academic score (out of 100)	
	Person's correlation coefficient	P-value
Self-awareness	0.273**	<0.01
Self-management	0.237**	<0.01
Social awareness	0.077*	0.18
Relationship management	0.130*	0.024

* Indicated that the correlation is not significant at α is greater than 0.05.

** Indicated that the correlation is significant at $\alpha = 0.01$.

H3: Emotional intelligence varies in students from different engineering majors.

Analysis of variances was run to determine the correlation. Table 7 shows that F statistics or F critical value is equal to 5.024 which is much greater than $\alpha = 0.05$. Furthermore, the greater value of calculated F than the tabulated F indicated a significant difference in emotional intelligence related to engineering majors. That means the emotional intelligence is different according to different majors. Multiple comparison was run to further

Table 6. Results of the T-test statistics to examine difference in EI level of students in freshman and final year

	N	Mean	Stdv.	T-test	DF	P-value
Senior	102	88.85	11.57	0.549	133	0.58
Freshman	33	87.36	7.75			

The tabulated T-test is calculated at the (0.05) significant level and DF (133) equal to (1.645).

Table 7. The results of variances (ANOVA) to examine if there is a correlation between emotional intelligence and engineering majors

	N	Mean	Stdv.	F-test	DF	P-value
Industrial	79	90.84	12.00	5.024**	(2, 266)	0.007
Electric	105	87.06	15.58			
Architecture	85	84.07	12.56			

** The tabulated F-test is calculated at $\alpha = 0.05$ and DF (2, 266) equal to (3.00).

(I) Major	(J) Major	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Industrial	Electric	3.77830	2.03643	0.065	-0.2313-	7.7879
	Architect	6.76485*	2.13682	0.002	2.5576	10.9721
Electric	Industrial	-3.77830-	2.03643	0.065	-7.7879-	0.2313
	Architect	2.98655	1.99499	0.136	-0.9414-	6.9145
Architect	Industrial	-6.76485-*	2.13682	0.002	-10.9721-	-2.557-
	Electric	-2.98655-	1.99499	0.136	-6.9145-	0.9414

* The mean difference is significant at the 0.05 level.

Table 8. EI Requirements of employers from engineering graduates expressed as percentage

EI Domain	Percentage (%)
Self-Awareness	16.44
Self-Management	23.20
Social Awareness	28.56
Relationship Management	31.80

Table 9. Mean scores of EI domains and their respective percentages (n = 300)

EI Domain	Mean Score (out of 37.5)	Percentage (x, y, z, w)
Self – Awareness	22.17	59.12
Self – Management	21.45	57.20
Social Awareness	21.71	57.89
Relationship Management	21.90	58.40
Total (out of 150)	87.23	58.15

elaborate this difference, and the results in Table 7 revealed the significant difference on the side of industrial as compared with architecture.

4.2 Job market analysis

During this survey, the concerned human resource department and relevant hiring people were consulted. Correspondingly, data on job market requirements regarding emotional intelligence and its different domains were gathered from them. Questionnaire was aimed to find the importance of different EI domains according to employers’ perception in relation with requirements of the job market. Results of the survey are given in Table8.

Table 8 gives a demographic profile about the importance of different EI domains required by the employers from engineering graduates in order to secure employment. It can be seen that employers require an employee to be proficient in teamwork and conflict management at work (relationship management), followed by empathy and organizational awareness (social awareness), then emotional self-control and adaptability (self-management) and finally emotional self-awareness. As shown in Table 8, employers gave respective weightages to these four dimensions of EI as well. Equation (1) was thus derived, in which four dimensions of EI were denoted with w, x, y, z to be multiplied by their respective importance given by the employers. This equation is then used to predict the employability chances of a candidate.

$$\text{Employability} = 0.1644 x + 0.2320 y + 0.2856 z + 0.3180 w \dots \dots \dots (1)$$

Where,

- x = self-awareness score
- y = self-management score

- z = social awareness score
- w = relationship management score

Using the mean value of scores in Table 9 obtained by 300 female students in all four domains of EI, we can compute their chances of employability both individually and as a population.

By putting the tabulated values of x, y, z and w into Equation (1); the percentage chances of finding employability were found to be 58.09%, which is below average, keeping in view the current job market and economic conditions of Saudi Arabia.

5. Discussion

The present study revealed some important dimensions for the educational leaders and policy makers of higher education in KSA. Results indicate a positive relationship between EI and students’ academic grades. In a tight economic situation, where job market is already shrinking and organizations are tightening their hiring processes, better academic grades can surely improve the employability chances of female engineering graduates. During discussion with HR managers of the industrial employers, it was revealed that most of them preferred the same assessment tests that are being used in the developed countries. However, developed countries have simultaneously been working to develop EI among their graduates and appropriately design their skill assessment tests as well. Interestingly, using the same assessment tests to measure levels of EI skills among graduates in KSA further reduce their employability chances, because neither students are aware about EI nor academic institutions develop these competencies among their students. Fifty five percent of the students, who participated in the survey showed little awareness, while 27% of the students expressed complete ignorance about EI. Further analysis revealed that students, who scored high in self-awareness, self-management and relationship management had comparatively higher academic grades and vice versa. Social- awareness, however, did not have any strong relationship with their academic performance. Under these situations, it is quite unfair, if these students are evaluated by the job market against those skills, for which they are having little or no awareness. Similarly, no significant difference is observed between EI scores of fresh and senior level students, further authenticate the notion that during five years of graduation, no specific efforts were made to develop or improve EI competencies among the students. Delay in employment not only create depression and anxiety among fresh graduates, but also questions the credibility of institutions from where they are graduated. It is

thus, imperative to look into students' perception right from the start, as they possess different perceptions with respect to their majors [26] that eventually affect their EI scores as well. Similarly, their attitude and engagement towards engineering also play an important role in predicting their academic success [27].

Average students demonstrated little to moderate level of awareness regarding EI and therefore scored better on the assessment. However, top students exhibited high awareness level regarding EI and therefore their assessment was well above average. These results further highlighted the importance of EI among students' as it not only improve their grades but also increase their chances of employability as well. Moreover, students belonging to industrial engineering had the highest EI score, indicating that certain engineering departments either transform their curriculum or arrange some specialized programs to develop these skills among their students.

In last couple of decades, women of Saudi Arabia, for the first time started entering into the job market and current policies of the government further encourages them to excel in different professions including engineering. Majority women in KSA spent most of their time inside homes with no or very little workplace exposure. Due to lack of any prior exposure of job market and considering their family engagements in the socio-cultural conditions of KSA, females need to have strong EI levels, in order to create a fine balance between their personal, social and professional responsibilities. It holds true in the field of engineering as well, where female job positions are even scarce than medical, finance or retail industry. Making them competitive with their male counterparts, female engineering students should also be given required knowledge of industry related projects. Similarly, internships can be arranged with their future employers to give them early exposure of those skills, which are given prime importance by their future employers, because any delay in their employment can cause stress and anxiety among them [28]. Specific courses can be designed to develop emotional intelligence and its related attributes among female engineering students. One of the major research limitations was the small sample size due to cultural and geographical constraints. Although, results indicate a clear picture about the importance of EI, yet, they can be more enriched with the help of data from universities and organizations located in the other cities of KSA. Findings of the study are unique in Saudi Arabian context because existing studies solely focused on finding relationship between EI and academic performance, thus, missing its critical impact on their future job performance. However,

present study not only aims to explore the relationship of EI with academic performance but also investigates its impact on their future employability as well. Its importance further enhances due to increasing unemployment in the health care and education sectors of KSA, thus, encouraging female students to adopt engineering field as their priority career path.

6. Conclusions

Findings of the study indicate a positive correlation between emotional intelligence and academic performance as well as employment of the female engineering students. No significant difference was observed in the EI scores of final year and first year engineering students, highlighting the fact that less attention was paid to develop these skills among students. Moreover, students with different majors also scored differently in their EI scores with industrial engineering students took the lead, followed by electrical and then architecture engineering. An equation was derived to predict the future employability chances of female engineering graduates using feedback of industrial employers about the importance given to different domains of EI. Results revealed their employability chances to be 58.09% based upon their current levels in different domains of EI. Therefore, management of engineering universities must act appropriately to reduce their employability time. In this regard, contents of the existing courses can be updated or short courses can be offered to develop EI and other skills among them. Moreover, specialized training workshops can also be offered to create awareness about these skills. Similarly, organizations can also be contacted to inquire about their requirements from fresh engineering graduates and curriculum can be regularly upgraded in the light of these expectations. It not only improves the employability chances of female engineering graduates, but also provide quality human resource to the organizations.

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Maha Bashir, Fatema Bawareth, Rawan Kamrani, Razan Noorelahi were Industrial Engineering students at the time of data collection for this paper in 2017. Now, all of them have completed their studies and graduated from the Industrial Engineering Department of King Abdulaziz University, Jeddah, Saudi Arabia.