

Impact of SRL Strategies and Academic Achievements on Recruitment of Information System Graduates in Saudi Arabia

Mona Masad Almutairi^a, Mozaherul Hoque Abul Hasanat^{b*}

^{a,b}*College of Computer and Information Sciences, Al Imam Mohammad Ibn Saud Islamic University, Riyadh, Kingdom of Saudi Arabia*

^a*Email: muna.masad@live.com*

^b*Email: mhhasanat@imamu.edu.sa*

Abstract

Soft and hard skills have become a challenging issue for Information Systems (IS) graduates and recruiters in Saudi Arabia. IS students are lacking the skills that are required by Saudi industry. Recruiters, on the other hand, consider the academic achievement as a major factor for hiring IS candidates. This paper shows the most required soft and technical skills for IS students. Also, it discusses the impacts of self-regulated learning (SRL) strategies and academic achievements on matching the required skills by the Saudi industry. Therefore, it empirically identifies the most required skills of IS jobs in Saudi industry and how the skills of IS students in major Saudi universities can match them. In this research, two surveys were conducted, one for recruiters and another for students. The first survey is to assess the required IS skills in Saudi industry by recruiters. Whereas the second survey is to capture the skills, SRL, and academic achievement of IS students. Based on the statistical analysis, the study proved that academic achievement does not have impact on the students' level of matching with local job requirements. Rather, acquisition of SRL has greater effect on the employability of IS students.

Keywords: Self-Regulated Learning; Employability; Saudi Arabia; Information Systems.

* Corresponding author.

1. Introduction

It has become difficult to define the skills required to fill Information System vacant positions. New challenges have appeared in Information and Communication Technology (ICT) employment [1]. One challenge is related to the students' skills acquisition. Goswami in [2] emphasizes on the need for IT students to understand the criticality of both technical and soft skills to improve their employability. He suggested that IT students should get training courses during their study to improve their soft and technical skills [2]. Piopiunik, Marc and his colleagues in [3] investigated the set of skills required for students to be invited by HR managers for the jobs available and found that cognitive skills, social skills and maturity are three main set of skills that employers focus on. So, MIS students should continue improving their soft and technical skills to fit the market demand [20]. Further, it is crucial for students to have a balance between soft and technical skills to improve their chances to have jobs and be professional [6,7,8]. Seetha in [9] mentioned that the lack of soft skills is a reason for the unemployment statistics in Malaysia. Indeed, she showed that employers are not satisfied with graduates' skills, so the graduates should improve both soft and technical skills.

Another challenge is the gap between the required IS skills and recruiters which leads to improper hiring [4,5]. Seetha in [9] shows that employers in general are not satisfied with the soft skills of the fresh graduates as students should focus on communication, analytical thinking, problem solving, etc. Baqader in [22] conducts a survey to measure the perceived acceptance of manufacturing industry to the skills that students obtain during their education. the results reveal that there is skills gap between the students and the market demand in the Saudi industry due to social, cultural and economic factors. Further, Alsafadi and Abunafesa in [1] studied the gap of IT professional and graduates in the Saudi industry and found that there is a medium gap in the soft skills and big gap in the technical skills.

Therefore, Ismail and Sharma in [10] emphasize on the importance of having not only soft and technical skills for technology students but also the skills contributing in controlling learning process which agree on Alharbi and his colleagues suggestion in [11]. Winne and Baker suggested to use self-regulated learning (SRL) skills to help students improve their academic achievement and work professionalism [12]. Focusing on SRL skills could improve students' outcomes of their education life and increase their self-dependency [13,15]. Toring and his colleagues in [21] highlighted that students and educational institution can measure the perceived SRL to improve the educational outcomes. Accordingly, the government in Saudi Arabia is investing in raising the self-regulation skills of Saudi workforce especially in small and medium enterprises (SMEs) [14].

Although skills have been critical for employment [6], students' GPA on the other hand has been defined as a main factor for recruiters to select their candidates [8,16]. In [17], Sultanova et.al. proposed using Employability Readiness Indicator (ERI) as factor for students' performance which defines skills and students' competencies as indicators for students' job readiness. They stated that GPA and ERI are two important indicators for employability and universities should consider them both. In [18,19] the researchers stated that many different individuals' attributes drive to better educational outcomes and improve employability rates. They concluded that the use of students' skills and academic information can improve students' behavioral outcomes through data analysis.

The attempts of this research are to identify the skills required in Saudi market for IS graduates suitability to the industry jobs. The research answers the following questions:

- What are the skills that IT managers highly require from IS graduates?
- What is the level of matching between IS students' skills and the required skills by IT managers?
- What is the relationship between the students' GPA and their level of skill matching?

2. Research methodology

The study is divided into three main steps: data collection, data analysis and analysis results. Figure 1 shows a high-level illustration of the steps of this study.

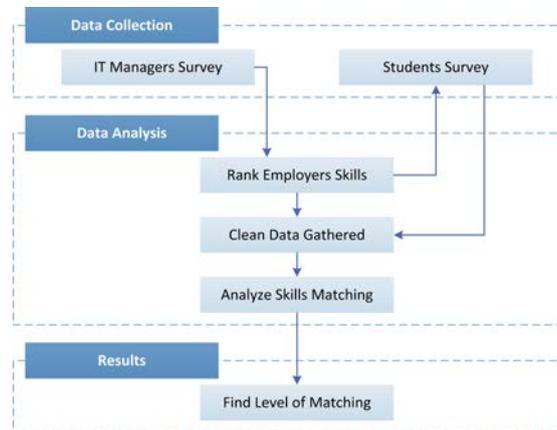


Figure 1: Methodology

2.1. Data collection

The methodology starts with “Data gathering” where data was collected from two sources using questionnaires techniques, as shown in Figure 1, IT Managers Survey and the Students Survey. The aim of the managers’ survey is to know the skills required from the Saudi industry. So, this survey was built with list of general questions and list of soft and technical skills. The skills listed in the survey were based on the research done by Strnad who identified all IS required skills for an industry [20]. In this research, the targeted companies are medium and big size companies to be part of the population. The final number of IT Managers population was 175 IT Managers around Riyadh, Saudi Arabia. The chosen random sample of recruiters is 55 decision makers in employing IS students that matches the sampling criteria defined. The data collection of this survey took four months of the fall semester during the academic year 2014-15. The answers were based on Likert-scale of importance ranking for each skill in the IS positions.

The second survey, students survey, aims to know level of skills acquisition in the graduates respectively where students were asked to tell the level of their skills acquisitions. This survey includes generic questions, soft and hard skills that were captured from IT managers survey, and self-regulation learning (SRL) skills. The SRL part

of the survey is based on Self-Regulation of Learning Self-Report Scale (SRL-SRS) that was developed and validated by Toeringa and his colleagues in [21]. SRLSRS is “a 6-scale, 50-item assessment of students’ awareness about and use of leaning and study skills”. The survey was distributed among IS students who are in the last year of their bachelor degree from King Saud University and Princess Nora University and Al-Imam University. Both female and male students at seventh and eighth semesters of the spring semester of the academic year 2014-15 are considered in this study to be asked to fill the survey. The overall population is 533 IS students (Male/Female) across the three universities. The final sample is chosen randomly of 194 students (Male /Female) who were available during the survey distribution.

2.2. Data analysis

The analysis of data was built on different phases. First, once IT Managers responded to the questionnaire, there was a ranking of the skills that the employers need. The highly ranked skills are ordered to get the top ten ranked technical and soft skills based on the mean of the skills. Then this can answer the question “what are the skills that IT managers highly require from IS graduates?”.

The highly ranked skills by IT managers were included to the student’s survey. The students were asked about their level of acquisition to the skills that the IT managers highly ranked. After collecting students’ responses, the quartiles analysis is followed to check the level of matching between market skills requirements and the student’s skills acquisition. This statistical technique “Quartiles” depends on dividing the data set of values into quartiles. The lower half includes all values below the median; however, the upper half of the data set includes all values above the median. Q1 and Q3 are the median of lower half and upper half respectively. If the value of a student’s skill is in the range between Q1 and Q3, the student is qualifying the industry requirement of that skill. If the student’s skill value below Q1, the students is under qualified for this skill. Otherwise the student’s skill is above Q3 which means he is over qualifying the market need, see Table 1.

Table 1: Skills matching criteria using quartile analysis

Criteria	Number	Value	Quartile
Under Qualified	1-7	3	
	8-13	4	
Qualified	14	4	Q1
	15-19	4	
	20-27	4	
	28	4	M
Over Qualified	29-33	4	Q3
	34-41	5	
	42	5	
	43-55	5	

After completing all the skills for a given students record, the median of a student’s skills criteria defines the qualification to the industry in the skills. See Figure 2 for more information.

Finally, the overall students matching is based on the soft and technical qualification mentioned in Figure 2. If a student’s is qualified it means the student matches the skills requirements. On the other hand, a student does not match the skills requirement if he or she is not qualified. This means that a student will have one attribute that shows his or her matching with the industry most required soft and technical skills “Match” or “No Match”, as shown in Table 2.

Table 2: Possible options for overall matching of a student’s skills to the industry requirements

Students Soft Skills	Students Technical skills	Overall
		Match
Match	Match	Match
No Match	Match	No Match
Match	No Match	No Match
No Match	No Match	No Match

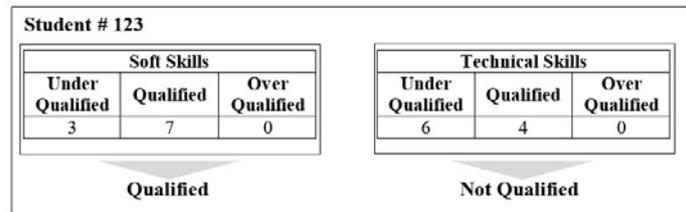


Figure 2: Overall qualification analysis based on the type of skill

After defining the level of matching between the students and recruiters, the relationship between students’ GPA and their level of matching was checked. To examine this, a statistical study using Spearman rank correlation is used to analyze this relationship. The value of correlation coefficient (r) in Spearman is between (-1 and +1) where the negative values indicate negative correlation and positive values indicate positive correlation. The zero tells that no correlation between the attributes. A hypothesis of this correlation is defined as H₀ (null hypothesis) is “there is no relationship between students’ GPA and their level of skill matching.” And H₁ (alternative hypothesis) is “there is a statistically significant positive relationship between students’ GPA and their level of skill matching.”

Next analysis tasks included the analysis of students’ responses of SRL-SRS. SRL-SRS attributes were classified to six subcategories. Those categories are planning, self-monitoring, evaluation, reflection, effort, and self-efficacy. Those subcategories can get numeric values and can be calculated by getting the average of the questions representing them. Therefore, each question in the survey is linked to one category, for example

Planning includes questions 1-9, Self-monitoring includes questions 10-17, Evaluation covers questions 18-25, Reflection includes questions 26-30, Effort includes questions 31-38 and question 40, finally self-efficacy covers questions 41-50 and question 39. Next, students' responses were analyzed to show the six categories or factors of SRL-SRS. The answers average of the range of questions of each factor were calculated to represent the final value of the SRL factors.

3. Findings and discussion

This section shows the results of the study and investigation on two main stages: (1) skills required from IS students for Saudi Industry and their matching, and (2) relationship between GPA and level of skills matching. Strnad and McMahan in [20] affirmed that employers in the IT industry are facing obstacles in finding the best fit with the desirable skills for their positions. This study affirms that where most employers have agreed that the soft and technical skills are the key drivers in making their decision for employment, 34.5% and 32.7% respectively. However, only 12.7% have stated that the overall GPA is their driver to employment decision. Table 3 presents more information about hiring drivers in Saudi industry. This clearly showed that the soft and technical skills are the main focus on employment by 67.2% of the employers above 5 other drivers in this study.

Table 3: Drivers for hiring a full-time is job candidate

Qualification	Frequency	Percent	Rank
Soft and Communication skills	19	34.5	1
High overall GPA	7	12.7	3
High IS GPA	3	5.5	5
Intern work experience	5	9.1	4
Management Skills	2	3.6	6
Recommendations	1	1.8	7
Technical skills	18	32.7	2
Total	55	100.0	

As many studies emphasized on the need to define the required skills of the market, Baqadir stated that the required skill from the private technology sector in Saudi Arabia industry should be defined [22]. He emphasized on the need to clearly have a preset of required skills from IS graduates to help students getting jobs. All recruiters ranked "teamwork" as the most important soft skill, as shown in Table 4, with a mean of 4.62. On the other hand, the IT managers ranked "managerial" skill as the least important soft skill from IS graduates, with a mean of 2.47.

Table 4: Soft skills ranking by IT managers for is fresh graduates

Skill	Mean Score	Rank
Teamwork/Cooperation	4.62	1
Communication	4.4	2
Integrity/Positive work ethic	4.27	3
Reliability	4.15	4
Critical thinking skills	4.09	5
Self-initiative	4.09	6
Time management skills	4.05	7
Interpersonal skills	3.87	8
Adaptability/Flexibility	3.96	9
Valuing education	3.84	10
Motivational skills	3.75	11
Sociability	3.25	12
Dependability	3.55	13
Client Service	3.49	14
Courtesy	3.24	15
Leadership	3.24	16
Influencing	3.05	17
Negotiation	2.95	18
Managerial	2.47	19

Table 5: Soft skills ranking by IT managers for is fresh graduates

Skill	Mean Score	Rank
IT process basic Knowledge	4.25	1
Office Software	4.07	2
System Development	3.98	3
Basic Troubleshooting	3.89	4
Methodology		
Fundamentals Security	3.87	5
Knowledge		
Database	3.73	6
Operating System Knowledge	3.73	7
Project Management Knowledge	3.73	8
Cloud based Technology	3.73	9
Web and electronic services	3.75	10
Networking	3.38	11
Hardware Architecture (CPU, I/O, Memory)	3.2	12
Mathematical capability	2.89	13
Mobile and Wireless Knowledge	3.09	14
Mainframe and Storages	2.78	15

In addition, Table 5 shows the technical skills that IT managers were asked to rank. Similar to the soft skills, the ranking was based on the mean and the respondents ranked IT process basic Knowledge as the most important skill, with a mean of 4.25.

In examining the means of the results and the ranked soft and technical skills, the finding revealed that the soft skills in general had higher importance to the technical skills. Since recruiters were asked to evaluate the importance level of each skill on a scale of 5, where 5 means very important, the average of recruiters' responses on the skills importance level of the soft skills was 3.76 out of 5 compared to 3.6 out of 5 for technical skills. This showed that recruiters believe that soft skills in general have more importance compared to technical skills for IS candidates. This confirms the recommendation of [20] where they emphasized on that near to graduate students should focus more on the soft skills. Also, this finding matches the defined skills of [6] regarding the required skills for fresh graduates to be employed. Table 4 and Table 5 define the most required soft and technical skills for Saudi market. Although [22] confirmed that there is a lack in defining the skills that improve students' employability, this study participates in filling the gap of defining the skills requested from IS students in Saudi industry.

3.1. Level of matching and GPA

Based on the collected data from 55 recruiters and 194 students, the level of matching between the required skills by Saudi recruiters and IS Students skills acquisition is calculated. The level of matching calculation was based on the quartiles methods. For each skill, the IT managers responses were divided into 4 quarters. For any skill that has a value below in the first quarter, this is marked as under qualified skills. Which means that students are under the qualification of the Saudi industry need for these given skills. If the value of a student's skill is more than or equal the fourth quarter, this skill is marked as over qualified. For any skill between first quarter and fourth quarter is marked as qualified.

After comparing the qualification of students' skills, the final skills matching attributes for all students have been defined. For each student, the number of qualified skills has been calculated. If the student has number of skills that matches the market, he or she would match the market requirement and his level of matching is Good Matching otherwise his or her level of matching would be Poor Matching. Then each student has one attribute for matching "Level of Matching".

The relationship between GPA and level of skills matching was measured by Spearman correlation. The correlation coefficient (r) value in Spearman ranges between -1 and +1. If the value of the correlation coefficient (r) is 0 (zero), this means no correlation between the attributes. But if the value is more than 0, there is an indication that the correlation is positive and vice versa. In the methodology section, the hypothesis was defined as per the below points:

- H_0 (null hypothesis): there is no relationship between students' GPA and their level of skill matching.
- H_1 (alternative hypothesis): There is a statistically significant positive relationship between students' GPA and their level of skill matching.

Table 6: Spearman’s rho correlation coefficient between GPA and LOM

		LOM
		Correlation Coefficient 0.021
GPA	Sig. (2-tailed)	0.775
	N	194

The correlation statistics presented in Table 6 shows weak correlation between students’ GPA and their Level of Matching. The p-value of the analysis is 0.775 for the 194 responses. This indicates that $p \geq 0.001$ which means that the resulted correlation is statistically not significant. Accordingly, the null hypothesis is accepted proving that GPA is not impacting the students’ level of matching.

3.2. Level of matching and SRL

The correlation statistics presented in Table 7 shows significant correlation between SRL attributes and Level of Matching. Two SRL attributes have major effect to the Level of matching and significant at the 0.01 level, Effort and Self-Efficacy. Also, the two other attributes of SRL, Self-Monitoring and Planning, have effects to the Level of matching and significant at the 0.05 level.

Table 7: Pearson correlation between SRL attributes and LOM

		LOM
Planning	Pearson Correlation	0.165
	Sig. (2-tailed)	0.022
	N	194
Self-Monitoring	Pearson Correlation	0.182
	Sig. (2-tailed)	0.011
	N	194
Evaluation	Pearson Correlation	0.094
	Sig. (2-tailed)	0.191
	N	194
Reflection	Pearson Correlation	0.122
	Sig. (2-tailed)	0.09
	N	194
Effort	Pearson Correlation	0.265
	Sig. (2-tailed)	0
	N	194
Self-Efficacy	Pearson Correlation	0.233
	Sig. (2-tailed)	0.001
	N	194

Based on the correlation, the focus on SRL during the study of IS students improves their level of matching to the market. Indeed, this can support students to have better job after their education. This confirms the finding that Cherian and his colleagues reached about the importance of self-efficacy for students [23]. They reported that self-efficacy is critical for employment and improving work opportunities. Also, this agrees with Wilson's conclusion about self-efficacy that states that self-efficacy is the crucial for students to focus on in order to predict their performance and their future capabilities [24]. Also, this finding agrees with the Green and his colleagues study that states SRL components lead to better employability in the market [25].

Accordingly, the consideration of SRL during the high education improves the educational outputs and students' capabilities. This supports Alharbi and his colleagues study stating that self-regulation supports students in their educational life and universities to yield professionals [11]. Also, the study agrees with Singh's finding that SRL is improving individuals' capabilities to become hyper active and long learners [13]. Moreover, this study stands for Baqadir's suggestion which aims to improve the focus of skills consideration in private sector to have professional business leaders [22].

4. Conclusion

In this research students' skills were matched to recruiters' requirements to define the level of matching. The study proved that GPA has little impact on the students' level of matching based on the statistical analysis. The correlation between GPA and the students' level of matching is not statistically significant. Therefore, universities and recruiters should cooperate to evaluate and promote the acquisition of SRL and individual skills among IS students.

4.1. Constraints and Limitations

There were some constraints countered during the work of this research as the following:

- Time constraints: is the first difficulty in collecting data from both recruiters and students. Building the students' survey was dependent on the recruiters' survey and was challenging to conduct both of them in same academic year.
- Surveys sampling: the surveys were limited to specific recruiters and universities, collecting the appropriate data and encouraging recruiters and students to participate was a real difficulty.
- Low response rate: students' surveys were personally distributed, governed, and collected across multiple universities. The total accepted records in the dataset were only 194, which can be considered a low response rate.

On the other hand, there are some limitations to the research as follow:

- Results of this research are based on students' self-reporting of their self-regulation and skills acquisition. Thus, students might not report their SRL skills accurately which might lead to inefficient results.
- The sample for this research is limited to final year students of IS department in the universities in

Riyadh, Saudi Arabia causing loss of potential respondents in previous levels.

4.2. Recommendations

This study left a room for future work to extend the skills measurement to the students who already completed their studies. Further research can be done on students after their graduation and correlate their job status to their LOM. Further, there is a potential investigation to study the level of differentiating characteristics between universities. Different students have different SRL capabilities as well as the universities. So, it is suggested to compare the level of matching between the Saudi universities. This can be done by applying the same approach on different universities.

References

- [1] L. Alsafadi and R. Abunafesa, "ICT Skills Gap Analysis of the Saudi Market," in Proceedings of the World Congress on Engineering and Computer Science, vol. I, 2012, pp. 284–289.
- [2] Goswami, R., "Importance of Soft Skills in the employability of IT students," in Proceedings of National Conference on Emerging Trends: Innovations and Challenges in IT, Vol. 19, p. 20, 2013.
- [3] Piopiunik, Marc, Guido Schwerdt, Lisa Simon, and Ludger Woessmann, Skills, Signals, and Employability: An Experimental Investigation, 2018.
- [4] Collet, C., Hine, D., & du Plessis, K., Employability skills: perspectives from a knowledge-intensive industry. *Education+ Training*, 57(5), 532-559, 2015.
- [5] S. Lee and X. Fang, "Perception Gaps about Skills Requirement for Entry-Level IS Professionals between Recruiters and Students: An Exploratory Study," *Information Resources Management Journal*, vol. 21, no. 3, pp. 39–63, 2008.
- [6] N. Sultana, "Soft skills for employability," *International Journal of Organizational Behaviour & Management Perspectives*, vol. 3, no. 1, pp. 745–749, 2014.
- [7] Calitz, A., Greyling, J., & Cullen, M. South "African Industry ICT Graduate Skills Requirements," Southern African Computer Lecturers' Association (SACLA), 25-26, 2014.
- [8] S. M. Barakat, K. Yaghi, and Z. Hamdan, "MIS Students Perception of Most Wanted MIS Job Market Skills," *Computer and Information Science*, vol. 4, no. 3, p. 33, 2011. [Online]. Available: <http://www.ccsenet.org/journal/index.php/cis/article/view/9539>
- [9] Seetha, N., Are soft skills important in the workplace? – a preliminary investigation in Malaysia. *International Journal of Academic Research in Business and Social Sciences*, 4(4), 44-56, 2014.
- [10] Ismail, N., & Sharma, A., Goal orientation and self-regulated learning strategies as predictors of EFL students' GPA. *Journal of Educational Review*, 5(1), 111-125, 2012.
- [11] A. Alharbi, D. Paul, F. Henskens, and M. Hannaford, "An Investigation into the Learning Styles and Self-Regulated Learning Strategies for Computer Science Students," in Proceedings ASCILITE, 2011, pp. 36–46.
- [12] P. H. Winne and R. S. Baker, "The Potentials of Educational Data Mining for Researching Metacognition, Motivation and Self-Regulated Learning," *JEDM - Journal of Educational Data Mining*, vol. 5, no. 1, pp. 1–8, 2013. [Online]. Available at:

- <http://www.educationaldatamining.org/JEDM/index.php/JEDM/article/view/28>
- [13] P. Singh, "Accounting Enrichment Program For Gifted High School Pupils: Self-Regulated Learning Strategies To Develop Our Future Business Leaders," *International Business & Economics Research Journal (IBER)*, vol. 12, no. 1, p. 103, 2012. [Online]. Available at: <http://cluteinstitute.com/ojs/index.php/IBER/article/view/7515>
- [14] Zafar, A., Almale, A., Alshahr, S., Alqahtani, S. S., & Alqahtani, N. D., Role of information systems in KSA small and medium enterprises (SMEs). *International Journal of Advanced Research in Computer and Communication Engineering*, 4(5), 6-11, 2015.
- [15] P.-H. Lu, *Self-Regulated Learning in College Students' Work Volition: The Mediating Effects of Self-Efficacy, and Self-Perceived Employability*. La Sierra University, 2014.
- [16] Ramalheira, D., The effect of the grade point average and of extracurricular activities on the perceived employability of business job applicants. *Dissertation of Master in Management*, 2015.
- [17] G. Sultanova, S. Svyatov, and N. Ussenbayev, "The Efficiency of Universities in Transmitting Competencies: Employability Readiness of Students," in *European Conference on Knowledge Management*. Academic Conferences International Limited, p. 849, 2016.
- [18] R. P. Fontana, C. Milligan, A. Littlejohn, and A. Margaryan, "Measuring Self-Regulated Learning in The Workplace," *International Journal of Training and Development*, vol. 19, no. 1, pp. 32–52, 2015.
- [19] A. N. Nandakumar, "A Study on Educational Data Mining Through Questionnaire Survey," *IJITR*, vol. 3, no. 2, pp. 1938–1941, 2015.
- [20] M. A. Strnad Sr. and C. McMahan, "Recommended skill requirements of recent management information systems graduates for employment: A Modified Delphi study," *Ph.D. dissertation*, 2013.
- [21] T. Toering, T. M. Elferink-gemser, L. Jonker, M. J. G. van Heulen, and C. Visscher, "Measuring self-regulation in a learning context: Reliability and validity of the self-regulation of learning self report scale," *International Journal of Sport and Exercise Psychology*, vol. 10, no. 1, pp. 24–38, 2012.
- [22] A. A. Baqadir, "A skills gap between industrial education output and manufacturing industry labour needs in the private sector in Saudi Arabia," *Ph.D. dissertation*, 2013.
- [23] Cherian, J., & Jacob, J., "Impact of self-efficacy on motivation and performance of employees," *International Journal of Business and Management*, 8(14), 80-88, 2013.
- [24] Wilson, K. S., *Individual use of self-regulated learning strategies and motivation in a computer-supported collaborative learning environment*. Tulsa: The University of Tulsa, 2013.
- [25] Green, A., de Hoyos, M., Barnes, S.-A., Owen, D., Baldauf, B., & Behle, H., "Literature review on employability, inclusion and ICT", Report 1, Joint Research Centre of the European Commission, 2013.