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# MIS Students Perception of Most Wanted MIS Job Market Skills

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Received: February 18, 2011

Accepted: March 9, 2011

doi:10.5539/cis.v4n3p33

## Abstract

The rapid advancements in information technology and the global economic crisis have affected the MIS job market. Recruiters are no longer looking for Grade Point Average as a hiring criterion. New skill sets has been adapted by human resource departments with respect to hiring new MIS graduates. Keeping up to date with these new changing and rapidly growing skills is a continuous and challenging process for MIS curriculum developers at academic institutions. There is a growing need for a study to investigate the skills gap between MIS recruiters in Jordan and MIS graduates from Jordanian universities. This study is going to highlight the most important skills needed for entry level positions as perceived by MIS students at Applied Science University.

**Keywords:** MIS, MIS curriculum, MIS skills, Job market skills

## 1. Introduction

Management information system (MIS) is an interdisciplinary program that bridges the gap between information technology (IT) and business fundamentals. MIS as a field of academic study focus on solving the business problems and improving the organization's performance by designing and implementing information technology applications. Wide range of courses is offered by the MIS program as a result of its interdisciplinary nature. These courses should embodied hardware, software, data, procedures and people which are the five main components for information systems framework as described in (Kroenke & David, 2007).

In the past few years, the number of MIS graduate students increased rapidly. "The number of workers in the computer and software industries has almost tripled in the past decade" (Freeman & Aspray, 1999). As a result, MIS graduate students must have a solid foundation in some critical skills and knowledge to be in demand by information technology firms especially with the recent downward trend in this economy. A survey by the National Association of College and Employers found that 42.4 percent of employers indicated that they expect to cut college hiring (Lee, 2003). Such indicators reveal the importance of reviewing and updating the MIS curriculum in order to equip students with high technological skills that meet this dynamic field.

Skills are broadly categorized into soft and hard skills. Hard skills refer to the combination of technological knowledge, domain knowledge and experience (Langer et al., 2008). Generally, hard skills are profession and

job specific. Soft skills are non technical and people based skills that are defined as "skills, abilities, and traits that pertain to personality, attitude and behavior rather than to formal or technical knowledge" (Moss & Tilly, 2001). Programs' curriculums should include a balanced set of both hard and soft skills.

The identification of specific MIS skills required by recruiters is a challenging task due to factors such as the rapid developments in technologies and the continuous changes in the evolvement of these technologies in IT firms' strategic assets. Moreover, there is a non stop shifting with job descriptions, industry patterns and a greater tendency toward outsourcing according to the rapid globalization (Weber, 2004).

Based on the previous concerns this paper is going to highlight the key skills acquired by MIS students at Applied Science Private University in order to improve the quality of the courses offered at the MIS department and to increase the students enrolment in the program.

The rest of this paper is organized as follows: section 2, comprises a literature review; section 3 defines the research methodology; section 4 reports data analysis and results and concluding remarks are provided in section 6.

## 2. Historical Review

Several researches stressed the importance of mixing MIS hard skills with general soft skills. Under the patronage of Her Majesty Queen Rania Al Abdullah, the International Youth Foundation and the Arab Urban Development Institute organized a meeting of Middle East and North Africa experts to determine long term solutions to the fresh graduate's employment crisis. According to the forum's summary report (Youth – Employability – Opportunity, 2009) one of the major recommendation stressed by speakers of the private sector is the importance of building soft skills, or life skills (e.g. working in teams, communication, solving problems, time management and how to work under pressure) for employability.

Moreover, according to the Road Not Traveled: Education Reform in the Middle East and North Africa report conducted by (World Bank, 2008) countries in the Middle East and North Africa need to realize the potential of reforming education to include soft skills which are essential for increasing productivity and to become competitive in the global market. The report found that students need more inquiry based learning to deliver a set of soft skills (e.g. problem solving, foreign language and communication skills) which are absolutely critical to further advancement in the region.

The top five skills required in the Middle East job market is good communication skills, team player and cooperative skills, overall personality and demeanour, leadership skills and trustworthy. That is one of the significant findings of the Middle East jobs index survey conducted by (Bayt, 2010). The survey's online data collection was done from 4th to 30th January 2010 and the number of working respondents was 3,698 out of 3,942 total sample respondents. Key skills according to the Middle East jobs survey see Table 1.

In (Litecky et. al, 2009), the authors used a web content data mining program to find the required skills for MIS graduates based upon the skill frequencies in the MIS job advertisements from various job websites. In their research they classified the skills mentioned in those advertisements into three categories: Business skills (e.g. project management, financing, accounting and marketing), Soft skills (e.g. communications, leadership and initiative), and General technical skills (e.g. programming, database management, system administration and networking). The most important skills in each category according to their analysis are summarized in Table 2.

Some of the previous skills match the skill requirements reported in (Goles, Hawk, and Kaiser, 2008) which showed that software and services providers prefer business domain skills over technical skills. Moreover, the authors found that recruiters place emphasis on soft skills even though it is not mentioned in ads frequently because these skills can be mostly evaluated in job interviews.

(Lee and Fang 2008) explored the knowledge and skills gaps between IS recruiters and students for a new entry-level IS hire. The authors noted that both, Information Systems (IS) recruiters and students consider all of the interpersonal/personal skills (e.g. communication skills, team skills, leadership skills and critical thinking skills) the most important skills for career success. A further set of skills that have considerable importance among both groups is development related software skills (e.g. project management skills and CASE). Finally the authors found that web based software and personal productivity software skills have been rated as more significant than high level and object oriented programming skills.

Other interesting survey conducted by (Davis and Woodward 2006) for IS graduates from 1999 to 2005. The graduates were asked to mark a line from not important to very important for general hard and soft skill areas. A value from 1 to 5 was assigned for each mark according to a particular scale. After analyzing the results, the authors found that soft or non technical skills are considered to be more important than hard skills. The most

important IS graduates skills according to their analysis are summarized in Table 3.

Although the previously mentioned researches stressed the importance of both soft and hard skills with more emphases placed on soft skills other researches have stressed the importance and impact of hard skills and technical expertise in increasing the MIS graduates hiring opportunities. A survey conducted by (Computerworld, 2007) indicated that the top five IT skills that recruiters in IT firms would hire for are programming/application development, project management, IT/business analysis, security, and help desk/technical support. A study by (Gallivan, 2004) analyzed 2297 IS, print and web, job advertisements and conclude that the majority of advertisement content are devoted to technical skills.

(Koh et al., 2001) claim that first-entry IS hires start with hard skills as basic requirements, and then move to jobs that need soft skills requirements as their careers develop. In other words, the required skills for IS graduates can be identified according to the organizational position level. Entry-level positions require more hard skills; mid level positions require more project management and skills.

As the literature indicates, a set of hard and soft skills should be embedded in our MIS program curriculum to solve the mismatch between the Jordanian education system and what the labor market demands.

### 3. Methodology

In order to determine student's perception of the most wanted skills in the MIS job market, a survey was conducted to assess undergraduate students' skill level in relation to soft skills, technical skills and knowledge skills. The survey was conducted at the end of the semester in a variety of MIS-related undergraduate classes at Applied Science University - ASU. The MIS department is part of the Faculty of Economics and Administrative Science. The faculty has an approximately 60% of the 10000 total student population at the university level.

The survey was distributed in classes that have 100% MIS students' participation to eliminate the participation of other non MIS majors in the survey. A total of 182 responses were received, valid questionnaires were reduced to 147 usable instruments.

Of the 147 respondents, 53% were seniors, 24% juniors, and 23% were sophomores. 57% of the respondents were female and the remaining 43% were male respondents. This strongly indicates that a large number of female students are interested in earning an MIS degree.

In addition to the questions about demographic information on the subjects of the study the survey instrument consisted of 50 questions about perceived most wanted skills for an MIS job. 8 questions were relate to the required soft skills, 15 questions were about technical skills, 7 about knowledge skills and the remaining 20 questions were relate to specific skills gained by MIS courses taken at ASU.

### 4. Data Analysis and Results

The statistical data analysis was conducted by using SPSS software package. Both frequency and percentage were calculated and each category of skills was evaluated based on the results outputted by SPSS.

#### 4.1 Soft skills analysis

To understand student's perception of most wanted MIS job market skills a combination of positive and negative statements were given for students. Table 4 displays the results for student's perception of soft skills. A large number of students (89.9%) "agreed" or "strongly agreed" that communication skills is important for an MIS job. (82.6%) of students "agreed" or "strongly agreed" that team player skills is important. (88%) of students "agreed" or "strongly agreed" that personality skills is also important. Student's perception of leadership skills scored a somewhat average response of (72.7%) "strongly agreed" or "agreed". Trustworthiness and honesty scored the highest percentage among all items in this category with a (59.3%) "strongly agreed". (82 %) of students "agreed" or "strongly agreed" that creative thinking is considered an important skill for an MIS job. With an "agreed" or "strongly agreed" score of (83.4%) students considered problem solving one of the major skills recruiters look for in an MIS graduate. The ability to work under pressure skill received a (72%) "agreed" or "strongly agreed" response. In all MIS soft skills are considered an important factor for MIS graduates employability.

#### 4.2 Technical skills analysis

Technical skills were divided into 4 sub sections (Programming languages, General Tools, System Administration, Networking and Security). Each one gives an indication on how students perceive these skills in reference to their expected job opportunities after graduation.

##### 4.2.1 Programming languages skills

Table 5 shows students perception of Programming Language's Skills. Although students response to this

category are lower than expected this maybe due to the fact that most MIS students come from non technical backgrounds and thereby perceive programming as a non essential skill in the job market.

This is evident in the Object Orient Language skill where only 42% of students perceived this skill as important. Other languages also received lower percentages and they all came shy of reaching 70% of respondents.

#### 4.2.2 General tools skills

In Table 6 we see how students perceive General Tools Skills. Under this sub category 86% of students perceived the use of Microsoft Office tools as important tools for job market employability. 63% of them perceived ERP applications such as SAP and PeopleSoft as less important and 74% perceived project management tools are important skills.

On the other hand 63.4% perceived CASE tools as important and 32% were neutral about the importance of having knowledge in CASE tools skills. Database Server tools such as Oracle and MySQL scored an average score of 66.6%.

#### 4.2.3 System Administration skills

Table 7 shows that for systems administration skills 76% of students perceived Microsoft operating systems skills as important for entry level jobs. 66.7% perceived UNIX operating systems skills important and 69.3% perceived Computer server administration skills. On the other hand 56% were “neutral”, “disagree” and “strongly disagree” that UNIX operating system skills are important for the job market.

#### 4.2.4 Networking and Security skills

In the networking and security section students in general agreed that Networking and Security skills are considered important for an MIS job in the market. With 60% “strongly agree” and “agree” that Networking skills are important and 73.3% that Security skills are important see Table 8.

#### 4.3 Business and industry skills

Since the MIS degree plan at ASU covers both Business and IT courses student’s response to the importance of business and industry skills were average. 69.3% of students as shown in Table 9 below believe that knowledge of general business environment is important for an MIS entry job. 55.3% think that knowledge in the industry sectors such as telecommunication, education and other related industries is a needed skill for MIS graduates.

Skills related to the organizational functional areas such as marketing, production and finance received a score of 67.3% indicating a good perception of the importance of these skills for an MIS job after graduation. 66.6% of students believe that knowledge of the organization students apply for a job at is important to land a job with that organization. Information Systems technology trends and Information Systems competitive advantage skills received a 72.7% and 73.3% respectively indicating a higher positive attitude from students to the importance of these two skills for an MIS graduates. Also knowledge of the SDLC methodologies (Systems Development Life Cycle) was considered important with a score of 70%. This result can be justified if we take into consideration that the Systems Analysis and Design course is considered one of the most important courses taught at the MIS department.

#### 4.4 Skills taught at MIS department

Table 10 below summarizes the results of students perception of the Skills taught at the MIS department. The scores ranged from 43.4% to 97.3% depending on students understanding and perception of the skills they acquired from MIS classes. The highest response came for Web Publication Languages (97.3%), Interactive Web Programming Languages (93.7%) and CASE Tools skills (91.7%).

Second in rank came Leadership (83.2%), Problem solving (87.5%), Object Oriented languages (87.6%) and Web server administration skills (85.7%). Communication, Team player, Creative thinking, Database query languages, Server Database tools, Microsoft operating system and security certification skills scored between (71.8% and 78.3%). Microsoft office tools and Project management tools scored (68.7% and 67.3%) respectively. On the downside the Enterprise resource planning tools scored a (44.6%), the UNIX operating systems skills scored (45.2%), Computer server administration skills scored (43.4%) and Networking skills scored (44.9%) reflecting a negative response to the technical skills related to Networking and Server administration skills taught at the department.

### 5. Discussion

Demographic results indicate that more than 75% of total respondents were seniors and juniors and the remaining were sophomores. Additionally 57% of the respondents were female opposite to 43% male

respondents. Due to these facts further statistical analysis was conducted to explore differences or similarities across different demographic profiles.

As Soft Skills were perceived by respondents very important to land an entry level job after graduation, demographic profiles analysis showed that higher results came from seniors and juniors. This may be attributed to seniors and juniors exposure to higher level courses which employs more of communication, team player, personality, leadership, creative thinking, problem solving, trustworthiness, honesty and work under pressure skills. Also seniors work on a graduation project course makes them interact with the industry which leads to enhancing their perception of what the job market requires from new graduates.

Programming Language's Skills response was fairly low. This can be attributed to the fact that the MIS program does not offer too many courses in programming and the emphasis is on non technical courses such as systems analysis and design and database design, decision support, information systems management and other business related courses. Also as we mentioned before most MIS students come from non technical backgrounds and thereby perceive programming as a non essential skill in their specialization. There were no demographic differences among different students groups under this category.

General tools skills perception was higher for the use of Microsoft Office tools among sophomores and lower among seniors and juniors. On the other hand seniors perceived ERP applications such as SAP and PeopleSoft and other project management tools as more important than what sophomore's and junior's results were. A large number of the respondents who perceived CASE tools as important were seniors and juniors. The majority of the 32% who were neutral about the importance of having knowledge in CASE tools skills were sophomores. This is due to the fact that sophomore students are not yet exposed to systems analysis and design courses at this level.

Results for System Administration and Networking and Security skills came somewhat similar in the demographic analysis since students from all levels were almost equal on their perceptions regardless of their school year. This is attributed to the fact that students are exposed to the component and infrastructure of Information Systems right from the start and in most MIS introductory courses.

Business and industry skills perception varied between seniors and juniors. A large number of the positive response came from seniors. Although the MIS degree plan at ASU covers both Business and IT courses student's response to the importance of business and industry skills is not perceived until the senior year.

The results of students perception of the Skills taught at the MIS department were variable. Lower scores came from sophomores. Highest response came from seniors and juniors who perceived Web Publication Languages, Interactive Web Programming Languages, and CASE Tools skills as very important. Leadership, Problem solving, Object Oriented languages and Web server administration skills came second in importance by seniors and juniors. Communication, Team player, Creative thinking, Database query languages, Server Database tools, Microsoft operating system and security certification skills came third in importance and lastly Microsoft office tools and Project management tools were less important.

## 6. Conclusion and Future Work

This research is part of an ongoing effort to bridge the gap between MIS most wanted skills in the job market and the skills taught at the MIS department at Applied Science University. The outcome of the first phase of the research is considered a great tool for the designers of the MIS department curriculum and degree plans. It shall help them to build programs that equip students with the needed job market skills and to prepare students for MIS jobs after graduation. It also serves as a guiding tool for MIS students to focus on these skills to meet MIS job market demand. Future research shall take into account including MIS students from other universities in Jordan and the region and studying needed skills from the employer's and MIS job market perspectives.

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Table 1. Key skill in demand in ME job market (Bayt, 2010)

No. of Jobs	Base	Good communication skills –Arabic & English	Team player - Cooperative / helpful/ flexible	Overall personality and demeanor	Good Leadership skills	Trustworthy / Honest
Total	3698	64	48	44	41	40
Algeria	123	29	39	29	34	37
Bahrain	35	57	60	40	46	37
Egypt	912	68	48	43	37	36
Jordan	216	75	52	46	45	46
Kuwait	167	74	46	43	38	42
Lebanon	73	45	49	26	48	37
Morocco	125	19	32	34	26	32
Oman	49	78	55	41	39	43
Qatar	126	63	52	40	47	31
Saudi Arabia	1035	74	51	52	42	44
Syria	81	67	46	46	44	49
Tunisia	93	20	30	25	28	34
UAE	539	60	51	42	47	42

Table 2. Critical skills in MIS job advertisements (Litecky et. al, 2009).

Main Categories	Critical Skills	Skill frequencies in the MIS job ads
Business skills	Managing/Supervising	45.83%
	Financial	37%
	Business Process Redesign and Re-engineering	24.51%
Soft skills	Leadership	30%
	Problem Solving	11%
	Responsibility	10%
General technical skills	Web-oriented skills such as : HTML, XHTML and DHTML (programming skills)	19%
	SQL and Oracle (database management)	17%
	Microsoft operating systems (system administration)	13%
	Voice/Data Telecom and Cisco (networking)	6%

Table 3. Rankings of Importance of soft and hard skills (Davis and Woodward 2006)

Soft/ Hard Skill	Total
Thinking Skills	4.5645
Personal Characteristics	4.4977
Desire to Learn	4.4972
Personal Attitude and Motivation	4.4894
Teamwork	4.4673
Communication Skills	4.3486
Computer Software Skills	4.2069
Supervisory Skills	4.1761
Telecommunications/Networking	4.1465
Computer Hardware Skills	4.1201
Business Foundation and Analytical Skills	4.0894
Programming Skills	3.8037
Systems Analysis, Design, Implementation	3.7410
Database Design	3.5982
Information Systems and Technologies	3.4936
Project Management	3.4537
Records and Information Management	2.7547



Table 4. Soft Skills as perceived by MIS students

Soft Skills	Number of response (%)				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Communication skills – Arabic & English	48.7	41.2	8.0	.7	1.3
Team player skills	35.3	47.3	10.7	4.7	.7
Overall personality	49.3	38.7	7.3	2.7	1.3
Good Leadership skills	28.0	44.7	22.7	2.7	.7
Trustworthy/honest	59.3	26.7	9.3	1.3	2.7
Creative thinking / the desire to make a difference	46.0	36.0	11.3	2.0	2.7
Problem solving skills	42.7	40.7	14.0	.7	2.0
Ability to work under pressure	31.3	40.7	20.7	3.3	3.3

Table 5. Programming Languages Skills as perceived by MIS students

Programming Languages Skills	Number of responses (%) Frequently “Strongly Agreed” or “Agreed”
Web Publication Languages (e.g. HTML, XHTML)	98 (65.3%)
Object Oriented Languages (e.g. C++)	63(42%)
Interactive Web Programming Languages (e.g. JAVA, XML)	79(52.6%)
Database Query Languages (e.g. SQL)	104(69.3%)

Table 6. General Tools Skills as perceived by MIS students

General Tools Skills	Number of responses (%) Frequently “Strongly Agreed” or “Agreed”
Microsoft Office tools (Excel, Word, PowerPoint, MS Access)	129 (86%)
Enterprise Resource Planning Tools (SAP, PeopleSoft)	95(63.4%)
Project Management Tools (MS Project, Primavera)	111(74%)
CASE Tools (MS Visio, UML)	80(53.3%)
Server Database Tools (Oracle, MySQL)	100(66.6)

Table 7. System Administration Skills as perceived by MIS students

System Administration Skills	Number of responses (%) Frequently “Strongly Agreed” or “Agreed”
Microsoft operating systems skills	114 (76%)
UNIX operating systems skills	66(44%)
Computer server administration skills	100(66.7%)
Web server administration skills	104(69.3%)

Table 8. Networking and Security Skills as perceived by MIS students

Networking and Security Skills	Number of responses (%) Frequently “Strongly Agreed” or “Agreed”
Networking skills	90 (60%)
Security Skills	110(73.3%)

Table 9. Business and Industry Skills as perceived by MIS students

Perception of Business and Industry Skills	Number of response (%)				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
General business environment (e.g. economic, legal)	27.3	42	17.3	10.7	2
Industries (e.g. telecommunications, education, automobile, computers)	13.3	42	29.3	13.3	1.3
Organization functional areas (e.g., finance, marketing, production)	23.3	44	26.7	4.7	1.3
The organizations you are applying to.	21.3	45.3	27.3	2.0	1.3
IS technology trends	22.0	50.7	21.3	4.7	.7
IS competitive advantage	23.3	50	20.7	4	.7
SDLC (Systems Dev. Life Cycle) methodologies	33.3	36.7	18.7	8.0	2.7

Table 10. Perception of skills taught at MIS department

Perception of Skills Taught at MIS Department	Number of responses (%) “Strongly Agreed” or “Agreed”
Communication skills – Arabic & English	73.6
Team player skills	74.9
Good Leadership skills	83.2
Creative thinking / the desire to make a difference	78.3
Problem solving skills	87.5
Web Publication Languages (e.g. HTML, XHTML)	97.3
Object Oriented Languages (e.g. C++)	87.6
Interactive Web Programming Languages (e.g. JAVA, XML)	93.7
Database Query Languages (e.g. SQL)	71.8
Microsoft Office tools (e.g., Excel, Word, PowerPoint, MS Access)	68.7
Enterprise Resource Planning Tools (e.g., SAP)	44.6
Project Management Tools (e.g., MS Project)	67.3
CASE Tools (e.g. MS Visio, UML)	91.7
Server Database Tools (e.g., Oracle)	76.3
Microsoft operating systems skills	73.1
UNIX operating systems skills	45.2
Computer server administration skills	43.4
Web server administration skills	85.7
Networking skills	44.9
Security certifications	76.6