

Alumni assessment of Management Information Systems job skills and skill gaps

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Abstract

The aim of this paper is to epitomize on the outcomes of the skill gap questionnaire of Management Information Systems (MIS) alumni from Ahlia University, Bahrain. This study evaluated the importance of the job skills and the skill gaps which are associated with 58 technical and non-technical (soft) skills. These skills were assembled into five classifications in relevance with prior literature. The outcomes of this study can help instructors in the MIS programs of the higher education institutions to improve the MIS curricula, hence the programs, as per the current needs of MIS graduates.

Introduction

Currently, Information system and information technology careers are considered as the highest bands for knowledge employees within organizations. In the United States, knowledge employees form over half of the country's workforce. IT professionals consist of systems analysts, programmers, web designers, database administrators and network specialists. (Laudon, 2007). The required skills to be successful within the Management Information Systems (MIS) job market are developing constantly due to the rapid growth of technology trends. Therefore, periodic assessments of skills requirements are crucial in order to make sure that MIS programs are offering graduates required skills in order to be successful within the workplace. (Janicki, Kline, Gowan, and Konopaske, 2004). The purpose of this paper is to evaluate the crucial skills that contribute in creating successful career levels within MIS related jobs, and to investigate required adjustments within the curricula. This study critiques a review of past literature related with management information system skill gaps and skill importance. The objectives of this study are to identify the crucial skills which contribute to the success of the early MIS career positions, identify existed gaps among actual and required skill levels, and prioritize skills so to be included within the MIS curricula

Literature review

There are ample studies related to MIS skills and gaps, conducted through surveys distributed to MIS alumni, educators and students. Further, analysis of ads for online jobs and focus groups was conducted with the sole purpose to analyze and identify the required skills for the IT professionals. (Wilkerson, 2012). Golding et al., (2008) stated that surveys of current students assist in evaluating students' skill levels within MIS program, however, are limited by such studies collecting information that is related to required skills for successful workplace because of scant experience of the respondents. Similarly, conducting surveys of graduates are crucial in order to assess the curricula of courses because they target individuals with work experience which include students who will be influenced by changes within the curricula. Ample studies have been conducted on MIS alumni. E.g. (Davis & Woodward, 2006; Sumner & Yager, 2008; Koopi, 2009; and Reinig, 2007).

Pllice and Reinig (2007) distributed a survey to alumni to identify whether the balance between technical content and business should be modified within MIS programs. They stated that alumni are moving into jobs

that require additional management responsibilities, thus, knowledge and management skills should acquire higher attentions than technical skills. Their findings were consistent with other studies (McMurtrey et al., Davis & Woodward, 2006; Merhout et al., 2009; Golding, 2008; Noll & Wilkins, 2002)

Sumner and Yager (2008) indicated that soft skills are more crucial than technical skills for the MIS alumni, however a balanced curriculum contributes to prepare the alumni to attain important technical skills which are also required. Further, Sumner and Yager specified that skills and knowledge within emerging application development are specifically crucial technical skills for MIS alumni. Fang, Koh and Lee (2005) argue that previous studies related to IS job skills were using number of classifications IS skills of job, thus, obtaining comparison of job skill studies is hard. However, studies were built on the previous work of (Todd, 1995; Lee et al., 1995) to offer a classification scheme composed of interpersonal skills, organizational knowledge, core technical IS knowledge and IS knowledge, and personal skills. Core IS knowledge consists of knowledge that differentiates an IS personnel from other company colleagues. Organizational knowledge consists of knowledge of functional areas of business including marketing, accounting, etc. Interpersonal skills are communication and team skills. Personal skills are related to personal capabilities and traits including critical thinking and creative skills as well as personal motivation. Subsequent studies organized their questionnaires based to Fang et al. classifications of job skill scheme (McMurtery et al., 2008; Golding et al., 2008; Tesch et al., 2008). Previous studies used the analysis of skill gap to determine the differences between actual and expected skill levels of alumni and recommend curricula changes (McMurtrey et al., 2008; Richards et al., 2011; Trauth et al., 1993; Cappel, 2001; Fang et al., 2005; et al., 2008; Nelson, 1991; Tang et al., 2001).

Tesch et al. (2008) indicated that the three skills that have high gap between actual and expected skill levels include written communication, ability to listen and self-motivation. These three skills were ranked top five most importance skills in the employer job skills survey. Moreover, they are considered as soft skills. Cappel (2001) conducted survey on employers on soft and technical skills and revealed skill gaps in sixteen to nineteen technical skills. While, Lee and Han (2008) focused on analyzing hundreds of online job ads posted on Fortune 500 organizations' websites and reported that technical skills of programmers and analysts are more crucial than soft skills.

From past literature it is noticeable that employers and MIS graduates believe that soft skills are more crucial than technical skills. However, both skills are significant. Further, significant skill gaps exist, and should be addressed in both skill aspects. Soft skills, including communication ability, ability of effective teamwork, and personal motivation are important skills of all professionals, and contribute to create a successful work-force. However, these skills do not differentiate MIS professionals from other business professionals including marketing and accounting professionals who should attain soft skills for career success. (Downey et al., 2008)

Research methodology

A survey was searched out from MIS literature which was reviewed for related job skills and skill gaps. The most relevant survey that meets the aims and objectives of this study was adopted from Wilkerson (2012), An alumni assessment of MIS related job skill importance and skill gaps by Jerod W. Wilkerson. The adopted survey items from Wilkerson (2012) were further modified to ensure consistent wording of the remaining items. Additional items were added, and the resulting survey was reviewed by two MIS faculty members who further advised few modifications and refinements.

The resulting survey (appendix A) consists of 78 items. The first 16 items consist of demographic and employment questions. The second part of the survey consists of 62 MIS related skill and knowledge questions organized into categories according to the Fang et al. (2005) classification scheme. An additional category—Technical Competencies—was added. The method of Meier, Williams, and Humphreys (2000) was used for all the 62 skills of the survey. Respondents were asked to rate their level of competence and importance from a scale of 1 to 5. 5= 'Very competent' or 'Very important' and 1= 'Not at all competent' or 'Not at all important'.

To develop the results in terms of comprehension and to conserve the accuracy with prior results(Meier et al., 2012; Wilkerson, 2012), the scores of both the competency and importance were transfigured into a

100-point scale, which was achieved by subtracting the score by 1 and then multiplying it by 25. To calculate the skill gap of the competency, the scored mean of the current competency is subtracted from the scored mean of the current importance. The positive scores designate the skills which contain skill gaps as the importance exceeds the competency. The higher the number, the bigger the skill gap. Meier et al. (2000) stated that results alone are not adequate enough to prioritize the skills with accuracy to make curriculum changes. Making inaccurate changes in the curriculum could result in new skill gaps. Thus, Meier et al. came up with a formula to calculate the priority taking into consideration the skill gap and importance:

$$\text{Priority} = (i + (i - c)) / 2$$

where 'i' is skill importance and 'c' is skill competency. The priority score highlights the items with the highest importance and the highest skill gaps, which are the items that should receive the greatest attention when making curricular adjustment decisions.

Limitation

The limitation that was faced is that access was not permitted for international calls. Therefore, the study was conducted on Bahraini students only. Another limitation is that sample size is small as the research targets only one private university in Bahrain and it only graduated 123 MIS students and the researchers were only able to reach 90.

Demographic results:

The total respondents were 90, 51% of them were females, and the remaining 39% were male. Taking into consideration that overall number of females in the department is 72 out of 123. This could mean that females are more attracted to MIS than men. In other words, the department is female dominant.

Results

The results in this section are regarding part D of the survey which can be seen in Appendix A. The results are presented category wise in order of importance.

Table 1:

Category	Scaled Mean	Rating question mean
Interpersonal	83.39	
Personal	81.5	
Organizational	72.42	
Technical competency	67.5	
Core technical IS knowledge	66.75	

Table2:

Functional Topic	Scaled Mean	p-value
Marketing	77.75	.068
Operations	76.5	.567
Accounting	67.5	.161
Finance	67.5	.508
Economics	66.75	.741

Table 3 through 7 do show the scaled mean importance of all the five main categories. that in turn had the results sorted by descending order, in other words they're organized from most important to least important as highlighted by their necessities within the Tables above. the categories are depicted in order of importance

as shown in Table 2. it is also notable that an item with a scaled mean of 50 is equivalent to earning a score of 3 (on a score of 1 to 5 that is), and an item with a scaled mean of 75 is equivalent to earning a score of 4 on the survey. However, it is notable that items earning a score of less than 50 would be tabled as unimportant to career success. As evident in Table 3, the nine items that fall under the interpersonal category ranged in importance from a scaled mean of 89 to 79.5, attesting that all interpersonal skill items measured in the survey are highly imperative to any career success. the survey also showed that the average of all interpersonal items is 81.5.

Table 3:

Functional Topic	Scaled Mean
Oral communication skills	89
Working effectively in teams	86
Persuading others	84.75
Teaching/training others	83.25
Giving effective presentations	83.25
Writing clearly and effectively	82.25
Resolving conflicts	81.75
Effectively leading a team or group	80.75
Listening to others	79.5

In table 4 it shows the scaled mean importance of the nine items from the personal category. these items ranged in importance from 86.5 to 77 with an average of 81.5. The survey determines that ‘Generating new ideas’ was the most important skill in this category, followed closely by the skill ‘Working under pressure’.

Table 4:

Functional Topic	Scaled Mean
Generating new ideas (creative thinking skills)	86.5
Working under pressure	83
Accomplishing assignments	83
Analyzing problems and developing solutions (critical thinking skills)	82.5
Perform multiple tasks at the same time	81.75
Making decisions	80.5
Working independently to accomplish a goal/objective	79.75
Learning new skills and concepts	79.5
Managing time effectively	77

table 5 shows the scaled mean importance of items within the Organizational category. these items ranged in importance from 85.5 to 64.75. while the survey showed the two most important items in this category are none other than ‘Business ethics and privacy issues’ and ‘Marketing’.

Table5:

Functional Topic	Scaled Mean
Business ethics and privacy issues	85.5
Marketing	77.75
Operations	76.5

Functional Topic	Scaled Mean
General business functions and principles	75.75
Knowledge of a specific business industry	69.75
Accounting	67.5
Finance	67.5
Economics	66.75
Knowledge of a specific company or organization	64.75

Table 6 depicts the scaled mean importance of the items in the Core Technical IS Knowledge category. These items ranged in importance from 67 to 49.75; meaning that this category contained a combination of skills associated with systems analysis, system design and implementation. All the aforementioned skills scored above 50: except ‘Designing system architecture.’

Table 6:

Functional Topic	Scaled Mean
Creating web pages and web sites	67
Anticipating implementation problems	60
Creating or evaluating computer security and privacy policies	59.25
Designing user interfaces	59.25
Computer programming	59
Developing applications in multiple environment/platforms	57.75
Performing feasibility analysis	57.25
Using a specific computer operating system	55.25
Performance tuning of databases	54.25
Using a specific database management system (Oracle, Sybase, SQL Server, MySQL, etc.)	53.75
Applying software design patterns	53.5
Using software testing tools and strategies	51.75
Programming in object-oriented language	50.25
Data modelling	50
Designing system architecture	49.75

Table 7 depicts the scale’s mean importance of the technical competencies ranging from 68.5 to 54. The most important technical skill is ‘*Creating Flow Charts*’ with a scaled importance of 68.5. The next most important skill was ‘*Using MS Access*’ with a scaled importance of 67.75. The two lowest scoring items are ‘*Programming in Java*’ and ‘*Programming in C++*’.

Table 7:

Functional Topic	Scaled Mean
Creating Flow Charts	68.5
Using Ms Access	67.75
Creating HTML pages	66.5
Creating Data Flow Diagram (DFDs)	65.75
Programming in PHP	63.5
Using project management tools (MS Project, etc.)	62.75

Functional Topic	Scaled Mean
Using static tools (SAS, SPSS, Minitab, etc.)	62.75
Programming in Visual Basic	62.25
Using Oracle	62.25
Using Spreadsheet tools (Excel, Lotus, Quattro Pro, etc.)	62
Processing XML documents	61.5
Using MySQL	60.75
Using data analysis and data mining tools	60.75
Using integrated development environments (Visual Studio, Eclipse, etc.)	60
Creating or reading UML diagrams	59.75
Using Enterprise Resource Planning (ERP) tools (SAP, etc.)	59.75
Using SQL Server	58.5
Developing applications using ASP	57.75
Programming in Java	55.75
Programming in C++	54

Table 8:

Functional Topic	Scaled Mean	p-value
Ms Access	67.75	.012
Oracle	62.25	.058
MySql	60.75	.113
SQL Server	58.5	.561

Table 9:

Functional Topic	Scaled Mean	p-value
PHP	63.5	.016
Visual Basic	62.5	.200
Java	55.75	1.000
C++	54	.426

As shown in the table above, PHP is the most important programming language included in the survey, which is then followed by Visual Basic. The least important programming language is C++.

Discussion and conclusion

Consistent with prior studies, these results indicate that ‘soft’ skills are more important to MIS professionals’ career success than technical skills. The below table shows skills with gaps. The results of this paper will be compared with the results of Wilkerson (2012). The Interpersonal category has skill gap in 5 skills out of 9. ‘Teaching/ training others’ has the highest skill gap in the category which is 5.49 and the lowest skill gap was ‘Resolving conflicts’ with a score of 0.25. Wilkerson measured the same skills but got different skills except for two which are ‘Persuading others’ and ‘Writing clearly and effectively’. The Personal category had 9 skills and gaps were found in 8 of them, meaning, only one skill did not have a gap. This shows that participants think that all these soft skills are important but don’t have the required competency in

them. Wilkerson evaluated 15 skills and found skill gaps in the same skills except for one skill ‘Working independently to accomplish a goal/objective’. The study found skill gaps in the organizational category. It has 5 skill gaps with the highest score of 5 in ‘Knowledge of a specific business industry’ and the lowest score of 1 in ‘Finance’. Wilkerson did not get any skill gaps in the organizational category.

The Technical Competency category bares 20 skills; 13 of which have skill gaps. The item with the highest skill gap is ‘*Creating Flow Charts*’ with a score of 5.25. Whereas, the minimum skill gap was ‘*Using Enterprise Resources Planning (ERP) tools (SAP, etc.)*’ with a score of 0.5. The last category, Core Technical IS Knowledge had 11 items with skill gaps. More than one item is regarding databases; ‘Performance tuning of databases’ and ‘*Using a specific database management system (Oracle, Sybase, SQL Server, MySQL, etc.)*’.

Skill	Skill Gap
<i>Interpersonal</i>	
Teaching/training others	5.49
Writing clearly and effectively	5.25
Persuading others	5.24
Working effectively in teams	4.50
Resolving conflicts	0.25
<i>Personal</i>	
Generating new ideas (creative thinking skills)	10.5
Accomplishing assignments	9.5
Working under pressure	5.25
Making decisions	4.75
Perform multiple tasks at the same time	4.75
Working independently to accomplish a goal/objective	3.75
Analyzing problems and developing solutions (critical thinking skills)	2
Learning new skills and concepts	1
<i>Organizational</i>	
Knowledge of a specific business industry	5
Marketing	2.75
General business functions and principles	2.5
Business ethics and privacy issues	2.25
Finance	1
<i>Technical competency</i>	
Creating Flow Charts	5.25
Programming in PHP	5.25
Using Oracle	4.5
Using MySQL	3.75
Using integrated development environments (Visual Studio, Eclipse, etc.)	3
Using project management tools (MS Project, etc.)	2.9
Using static tools (SAS, SPSS, Minitab, etc.)	2.75
Processing XML documents	2.5
Using Spreadsheet tools (Excel, Lotus, Quattro Pro, etc.)	2.5
Programming in C++	1.5
Using data analysis and data mining tools	1.5

Skill	Skill Gap
Using Enterprise Resource Planning (ERP) tools (SAP, etc.)	0.5
<i>Core Technical IS Knowledge</i>	
Creating web pages and web sites	6
Applying software design patterns	5.75
Designing user interfaces	5.75
Anticipating implementation problems	5.5
Creating or evaluating computer security and privacy policies	5
Performance tuning of databases	4.75
Developing applications in multiple environment/platforms	3.5
Using a specific computer operating system	2.75
Performing feasibility analysis	1.5
Using software testing tools and strategies	0.75
Using a specific database management system (Oracle, Sybase, SQL Server, MySQL, etc.)	0.5

Majority of the skills that has skill gaps highest priority items are from the Interpersonal and Personal categories. The highest item based on curriculum priority are: Generating new ideas (creative thinking skills), accomplishing assignment, oral communication skills, working effectively in teams, persuading others, and writing clearly and effectively. The skills in the Technical competency category with the highest priority: using project management (MS project, etc.), programming in PHP, and creating flowchart. Only these three skills were in the top 1/3 of the curriculum priority items. Only one item from the Core Technical IS Knowledge category; creating web pages and websites.

This study also concluded that soft skills are more important than technical skills. Emotions could also be an important factor that needs to be taken into consideration in the future. (Alalawi & Razzaque, 2016).

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