EXPLORING THE COMPETENCY GAP OF IT STUDENTS IN THAILAND: THE EMPLOYERS' VIEW OF AN EFFECTIVE WORKFORCE

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ABSTRACT

Adapting to the digital economy is part of the national agenda in many countries. Developing IT workforces to support business growth and innovation in Thailand is now a matter of urgency. Universities which are directly responsible for producing graduates for the employment market lack direction in designing curricula because they lack understanding of industry requirements. The absence of industrial demand research leads to a loss of opportunity to develop skills within the country's working population and to maximize productive employment. The study described in this paper focused on IT internship students' competencies and aimed to analyze the gap in information technology competencies between employers' expectations and their assessment of the current competencies of intern students they employ, and to analyze the important areas which make up an effective IT student from the employers' perspective. The digital competence framework and the information technology competency model were modified to generate a structured questionnaire comprising closed-ended items, which was sent to organizations that are collaborating on work-integrated learning programs with universities in Thailand. Descriptive statistics, correlation and regression analysis were used as the analysis tools. The results found that employers' highest expectations were in respect of the self-effectiveness competency and that students do not meet their expectations in that area. However, the interns exceed the employers' expectations in respect of workplace ability and industry-wide core IT foundation skills. The regression models constructed suggested that the performance of IT students in the academic literacy and workplace ability competencies were most predictive of the average level of employers' expectations. The findings from this empirical study can be used by universities to support curriculum reform in order to meet industry requirements and by students who need to be aware of employers' needs in order to prepare themselves for employment in the IT industry.

Keywords: *IT competency, information technology, digital skills, work integrated learning, industry perspective*

1. INTRODUCTION

The digital economy has been widely discussed in the last few years. This new economy encourages the adoption of technology by business, especially information technology (IT), and results in productivity growth, improvement of products, quality marketing and employment (Atkinson & McKay, 2007). Jobs in technology linked sectors tend to be more flexible than in the past (Leahy & Wilson, 2014). Although full-time jobs still exist, the trend is towards flexible employment in part-time jobs, contracted labor, and individuals operating on a freelance basis (Leahy & Wilson, 2014). Many countries have realized that their economic outlook is dependent upon being globally competitive. Therefore, they are urgently preparing policies, infrastructure, and their people to cope with that situation. For example the United Kingdom has announced its UK Digital Strategy 2017[1] and, The USA has continuously stimulated the development of its digital economy[2]. Further, in South Korea, the National Information Society Agency has published a digital vision for both domestic and global strategy[3], and in Thailand, the Ministry of Digital Economy and Society has a twenty year history of planning for the digital economy[4].

The Global Information Technology Report in 2016 ranked the readiness of countries for the digital economy in the NRI Index (Baller, Dutta, & Lanvin, 2016). One indicator that is used to measure the readiness for the digital economy is citizen skills and undoubtedly IT skills are the key skill in the digital age. Therefore, the availability of an IT workforce is a key success factor in the digital economy.

The term, 'IT workforce' has no standard definitions in the digital era, but based on the definition of the digital economy in Atkinson and Mckay (2007) and the characteristics of digital technology and platforms from Lamsfus et. al (2015), a suggested definition of the IT workforce in the digital era is a person who has the ability, knowledge and skills related to IT including digital technology and digital platforms to help organizations to operate in the digital economy.

However, using IT does not mean that it is used correctly (ECDL Foundation, 2016). Therefore, to become a successful member of the IT workforce in the digital era requires education and professional experience as well as a willingness to learn and self-develop (Breivik, 2005; Partnership for 21st Century Skills, 2008). However, although people can construct or increase their competency in many ways (López-Bassols, 2002) it is the universities that are the main source of skills and learning opportunities

Universities are directly responsible for developing their curricula with the aim of producing quality graduates for the labor market (Brennan, King, & Lebea, 2004) student ability can be enhanced not only by course design (Pitner & Ministr, 2015; Carnegie, Andreae, Watterson, & Bubendorfer, 2016), teaching approach (Al-Mahmood & Gruba, 2007), and practical methodology (de Beer & Angelov, 2015; Vakaloudis & Anagnostopoulos, 2015;

[1] The UK Digital Strategy 2017 (https://www.gov.uk/government/publications/uk-digital-strategy/uk-digital-strategy)
[2] The digital economy related contents from Department of Commerce (www.commerce.gov)
[3] The local and worldwide strategy from National Information Society Agency (http://eng.nia.or.kr)
[4] The Thailand Digital Economy and Society Development Plan (http://www.mict.go.th/view/1/Digital%20Economy)

Sixsmith & Litchfield, 2010) but also through collaborations with industry (Rampersad, 2015; Staehr, Martin, & Chan, 2014) where students can gain first-hand knowledge from real situations.

However in the last decade, a number of studies have revealed the existence of gaps between company expectations in IT related industries and the skills and abilities of university graduates (Radermacher & Walia, 2013; Royle & Laing, 2014; Aničić & Arbanas, 2015; Collet, Hine, & Plessis, 2015). Research findings have shown that the IT industry requires a set of competencies from their new employees which relate not only to academic literacy or IT knowledge but also to other factors such as: *graduate employability skills* (Finch, Hamilton, Baldwin, & Zehner, 2013; Md Saad, Robani, Jano, & Majid, 2013), *ICT skills* (Breivik, 2005), *soft skills* (Lievens & Sackett, 2012; Jane & Higson, 2008), *functional skills* (Laker & Powell, 2011; Redish & Smith, 2008), *pre-graduate work experience* (Callanan & Benzing, 2004; Gault, Leach, & Duey, 2010), and *generic graduate attributes* (Barrie, 2004). Clearly therefore, university graduates and other entrants into the labor market who have these competencies can increase their employment opportunities.

In a study which ranked the nations of the Emerging and Developing Asia Group (Baller, Dutta, & Lanvin, 2016), Thailand was noted to have paid attention to the digital economy and in May 2016 the Thai government announced the Thailand Digital Economy and Society Development Plan under the vision 'Smart Thailand' (Pooparadai, Thailand Digital Economy, 2016). A significant part of this policy is to construct an IT workforce to support digital economic development (Ministry of Information and Communication Technology, 2016). This policy is intended to take immediate effect along with the development of necessary infrastructure. However, as mentioned above Thailand's universities are largely responsible, for the production of the IT workforce but they appear to lack direction in how to meet the demand for a suitably qualified IT workforce capable of dealing with the new economic situation. This lack of guidance may lead to a lost opportunity to develop skills among Thailand's population and thereby to promote employment in the IT sector. Therefore, the development of suitable competency is necessary in order that Thailand may remain competitive with other developed and developing nations in the digital era.

This research was conducted to study the needs of the IT industry in the context of Thailand and its digital economic situation. The list of sample organizations was from IT faculties from four Thai universities. The purpose of this research was to analyze the competency gap between employers' expectations and the current abilities of IT students both with respect to the IT industry and IT in non-IT industries, and to analyze the important areas which make up an effective IT student from the employers' perspective. The two questions addressed were:

(i) Does a competency gap exist between employers' performance expectations and student's assessed performance?
(ii) What is the relationship between employers' expectations and student

performance and which competencies have the greatest effect on the average level of employers' performance expectations?

Quantitative data was collected and the results reflect the real needs of industry. The benefit of this paper is for universities to know the market situation and prepare for curriculum change. Furthermore, students can use the findings to prepare themselves and increase their employment opportunities.

2. LITERATURE REVIEW

2.1 IT workforce competencies, definitions and dimensions

According to Atkinson and McKay (2007), information technology (IT) is a key driving factor for the economy. In order to work in the new and more complicated economic environment IT workers must work with the organization by which they are employed and help it to develop and enhance its business growth. The workforce therefore must have competencies enabling them to understand and integrate digital knowledge and trends in technology in order to fulfill their tasks and achieve organizational goals.

Competency requires the combining of knowledge, skills, ability, behaviors, and attitude in one person to do a particular task and to achieve a target (McClelland, 1973; Lucia & Lepsinger, 1999). The U.S. Department of Labor's SCANS report highlighted the fact that employers seek candidates with definite expertise, learning ability, teamwork, and adaptability to be their prospective employees (U.S. Department of Labor, 1991).

The US Department of Labor IT competency model defined a group of competencies necessary for recruits to the IT workforce to work in IT and related industries (ETA, U.S. Department of Labor, 2016). Personnel should be self-effective and have academic literacy, workplace ability and foundation IT proficiency. Moreover, it was recognized that each industry needs a different subset of IT skills and expertise, so IT workers need to have IT-specific competency for the business in which they are employed. Further, Vuorikari et al. (2016) mentioned digital skills as an important competency for IT workers otherwise employees who use IT may not be proficient in their IT careers (ECDL Foundation, 2016).

Self-Effectiveness means the self-capabilities of a person who has a good attitude in working or sharing with others. Being honest with oneself and colleagues is an important personal characteristic as is the ability to rely on facts when solving problems as well as being willing to adapt as the situation requires. *Academic Literacy* includes written and oral communication ability and understanding how to write various types of documents such as detailed and summarized reports, formal letters, etc. This competency group includes basic mathematics and science skills that must be used in every day working. *Workplace Ability* is the competency of a person in a workplace who can work with a team, plan and organize schedules, have creative ideas, make decisions and solve problems, use technology and tools, and know

business fundamentals. *Industry-Wide Core IT Foundation Skills* combine IT knowledge and foundation skills, knowledge of databases and other applications, networks and communications, software management and development, customer support, digital visualization and media, ethical and legal issues, and risk management.

Digital Skills covers five main dimensions: digital information management, digital collaboration and communication, digital content creation, cyber security, and technical problem solving. *Digital Information Management* focuses on the ability to browse, search and filter digital information, and also to store and retrieve information from the Internet. At the same time, personnel should be able to evaluate the accuracy of content from the Internet. *Digital Collaboration & Communication* includes the skills of using a variety of tools and technologies to interact in online communication, together with sharing online information, and personnel must appreciate the benefits and risks inherent in an online society. A good worker should understand etiquette and ethics in the use of digital communication channels and be able to work in an organization using a variety of online services in order to enhance company productivity. *Digital Content Creation* means competency in creating and improving digital content via digital channels such as websites, blogs, etc., and in using content created by other people, understanding and respecting intellectual property rights. *Cyber Security* involves the capacity to create sophisticated user names and passwords, and to be aware of security when sharing digital content. Moreover, being aware of the impact of technology on health and the environment is very important. *Technical Problem Solving* is a skill which is very important in an IT career. This skill requires fundamental IT experience in order to address problems and to successfully solve them. Problem solving also includes the ability to enhance technology and to write programs or create other valuable work in a business context.

2.2 Previous gap analysis research related to the IT industry

Education can assist a person to be professional (Breivik, 2005). Many researchers have found that even though universities teach students and assign them suitable practical exercises, there is still a disparity of competence between that held by students and that demanded by industry, particularly in the IT industry as well as in IT in non-IT industries.

Radermacher and Walia (2013) analyzed previous gap analysis studies relating to organizational requirements and the competency of students studying computer science, information systems, and information technology. The findings showed that three groups of skill gaps were frequently mentioned: technical ability, personal skills, and professional skills. Sub-skills mentioned were personal skills, communication skills (written and oral), teamwork, problem solving and critical thinking, ethics, leadership, software process development including database literacy and the ability to apply software tools, testing skills and project management.

Royle and Laing (2014) investigated the gap in digital marketing skills in communication and creative industries and found a disparity between industry requirements and marketing education. The organizations were found to have a high need for specific technical skills and

intelligent future-proofing skills. The researchers proposed a model by which the gap found between industry needs and available skills could be closed.

A study performed by Aničić and Arbanas (2015) evaluated the gap between higher education and the IT industry in The Croatian Labor Market by comparing the e-Competence framework with the competencies specified in IT job advertisements. The findings revealed that employers demanded both IT technical skills as well as generic competencies such as teamwork, communication and language ability which were noted to be equally important to IT technical skills.

In a study conducted using factor analysis, Collet, Hine, and Plessis (2015) identified a gap between workforce requirements and new graduate ability in knowledge-intensive innovation industries in Australia. They found gaps in many competency areas. The top five demanded competencies were knowledge for working, enterprise leadership, business function, technical management, and teamwork ability, all areas in which new employees were unable to reach expectations.

2.3 Conceptual framework and hypotheses

In order to answer the research questions, the conceptual framework illustrated in Figure 1 was adopted to show the relationships between nine independent variables (X1-X9) and employers' performance expectations (the dependent variable). Self-effectiveness(X1), academic literacy(X2), workplace ability(X3), and industry-wide core IT foundation skills(X4) were adapted from IT competency framework (ETA, U.S. Department of Labor, 2016). Digital information management(X5), digital collaboration and communication(X6), digital content creation(X7), cyber security(X8), and technical problem solving(X9) were modified from digital skills framework (Vuorikari, Punie, Carretero, & Brande, 2016). The three hypothesizes were as follows:

Hypothesis 1 (H1): There are gaps between employers' performance expectations and students' actual performance in different competencies.

Hypothesis 2 (H2): There is a significant positive relationship in competency between students' actual performance and employers' performance expectations.

Hypothesis 3 (H3): The average level of employers' performance expectations is affected by their experience of students' actual performance

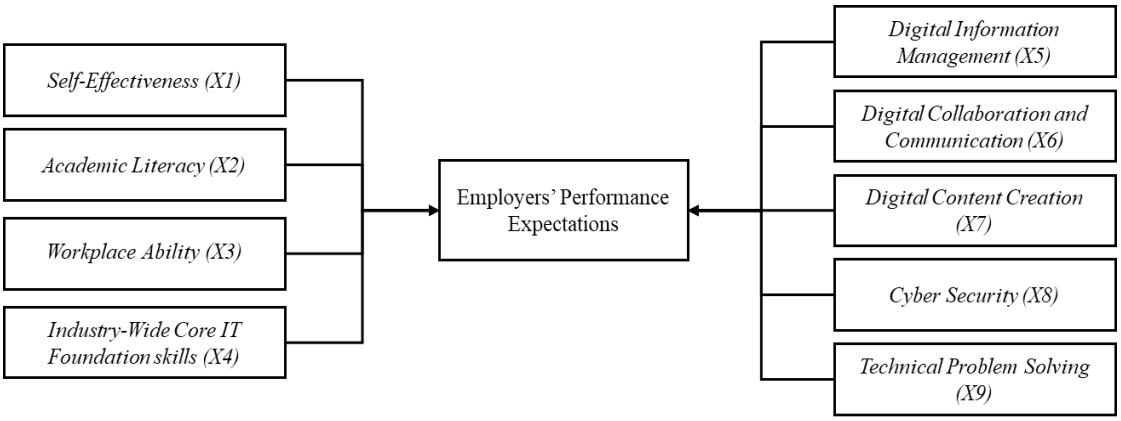

Figure 1: Research conceptual framework

3. RESEARCH METHODOLOGY

This research was conducted using a survey that explored the performance expectations and actual performance of IT students based on the views of employers the data from which were used to identify gaps in competency and the relationship between expectations and actual performance. The requirements of organizations in Thailand were established using a questionnaire to collect data which was then analyzed with the results being expressed as descriptive statistics, correlation coefficients, and a regression analysis.

3.1 Population and sampling

The population of this research was those companies who have joined work integrated learning (WIL) programs with four Thai universities IT faculties. The participant companies were selected based on those employing WIL staff. Questionnaires were sent to all companies based on university lists. 70 organizations were asked to fill questionnaires between 1 November 2016 and 20 December 2016. Of those, 49 responded to the survey who thus formed the study sample.

3.2 Instruments

This research used a questionnaire as the research instrument by which both qualitative and quantitative data were collected. There were three sections the first relating to the demographic characteristics of the company and the second and third, quantitative sections relating to the IT competencies of student interns. In the second section, nine competency groups with the items being measured on a 3-point Likert scale at a low level of 1 (foundation), a medium level of 2 (intermediate) or a high level of 3 (advanced) were initiated. The respondents with their expectations regarding intern competencies were inquired. The third section was comprised of the same competency areas as the second section and collected data related to the respondents'

assessment of the actual competencies demonstrated by interns. We measure the quality of questionnaire by the coefficient of reliability also referred as Cronbach's α. Each question is tested for an internal consistency. The Cronbach's α for the IT competency questionnaire was 0.989. It means that the questionnaire tool is reliable (Tavakol & Dennick, 2011).

3.3 Data collection and analysis procedures

The sample surveyed comprised of organizations who have WIL experience with bachelor IT student in Thailand. Each company was asked to mark their competency expectations from interns working and to also mark the same items set based on their assessment of the actual level of intern abilities from interns they employ.

For the analysis, descriptive statistics which were Mean (M) and Standard Deviation (SD) were used to assess each competency gap between employers' expectations and the reality of student's performance in order to address hypothesis H1. Correlation analysis was used to test the correspondence of the overall employers' performance expectations and assessed competencies to address hypothesis H2. To address hypothesis H3, regression analysis was used to analyze the competencies, based on the students' actual performance in the nine competency areas (independent variables) that result in the average level of employers' performance expectations (dependent variable).

4. RESULTS

Out of the 70 organizations approached, 49 responded to the survey, representing a response rate of 70%. The organizations were separated into two groups, IT companies such as software houses, IT consultants, etc. and IT in non-IT organizations such as logistics businesses, government departments, etc. Table I shows the frequency and percentage of responses to the questionnaire by organization types. The respondents' percentage separated by IT and non-IT company types were 79.60% and 20.40% respectively.

Table 1: Summary of companies by organization type

Company Type	Frequency	Percent
IT Industry	39	79.60
Central Thailand	3	
Eastern Thailand	13	
Northern Thailand	6	
Southern Thailand	17	
Non-IT Industry	10	20.40
Central Thailand	-	
Eastern Thailand	2	
Northern Thailand	2	
Southern Thailand	6	
Total	49	100.00

4.1 H1: There are gaps between employers' performance expectations and students' actual performance in different competencies.

Table 2 shows the results of the gap analysis. It was found that employers' expectations on the self-effectiveness competency were highest at a mean level of 2.42 (SD=.48) followed by digital information management competency (M_{ep}=2.38, SD=.57) and the digital collaboration and communication competency (M_{ep}=2.33, SD=.61). The three lowest means were for the industry-wide core IT foundation skills competency with a mean of 1.97 (SD=.60) followed by the technical problem solving competency (M_{ep}=2.01, SD=.68) and the academic literacy competency (M_{ep}=2.13, SD=.54). The results for the actual levels of competency of IT students showed that the three highest competencies were in the workplace ability competency (M_{ap}=2.41, SD=.51), the digital information management competency (M_{ap}=2.31, SD=.66) and the digital collaboration and communication competency (M_{ap}=2.28, SD=.62) while the technical problem solving competency (M_{ap}=1.93, SD=.70), academic literacy competency (M_{ap}=1.98, SD=.65), and industry-wide core IT foundation skills competency (M_{ap}=2.04, SD=.65) resulted in the three lowest scores assessed by the organizations surveyed.

Comparison of these results suggests that students have abilities from intermediate upwards in most competencies based on the employers' perceptions which are consistent with the organizations' competency demands which were also at the medium to high levels. The organizations' expectations on the workplace ability competency were high (M_{ep}=2.22), and the students' ability score was also at a high level (M_{ap}=2.41) on that competency. On the other hand, for the industry-wide core IT foundation skills which had the lowest expectation score (M_{ep}=1.97), the students' actual skills were assessed at a figure beyond the organizations' expectations (M_{ap}=2.04). However, for self-effectiveness (M_{ep}=2.43, M_{ap}=2.14), academic literacy (M_{ep}=2.13, M_{ap}=1.98), digital information management (M_{ep}=2.38, M_{ap}=2.31), digital collaboration and communication (M_{ep}=2.32, M_{ap}=2.28), digital content creation (M_{ep}=2.13, M_{ap}=2.06), cyber security (M_{ep}=2.17, M_{ap}=2.12), and technical problem solving (M_{ep}=2.01, M_{ap}=1.94; all figures, organizations' expectations and assessments, respectively) the competencies expected by the organizations surveyed exceeded their assessment of the actual abilities of the students they employed and thus students have to improve their abilities to meet industry demands in the expected areas.

Table 2: Survey result of workplace demands and the real competency situation

Competencies	Employers ' expected performance		Students' actual performance	
	Mean (M_{ep})	Std. Deviation	Mean (M_{ap})	Std. Deviation
(X1)Self-Effectiveness	2.43	.481	2.14	.635
(X2)Academic literacy	2.13	.541	1.98	.654
(X3)Workplace ability	2.22	.559	2.41	.512
(X4)Industry-wide core IT foundation skills	1.97	.602	2.04	.647
(X5)Digital information management	2.38	.570	2.31	.66
(X6)Digital collaboration &communication	2.32	.610	2.28	.62

Competencies	Employers ' expected performance		Students' actual performance	
	Mean (M_{ep})	Std. Deviation	Mean (M_{ap})	Std. Deviation
(X7)Digital content creation	2.13	.606	2.06	.747
(X8)Cyber security	2.17	.642	2.12	.717
(X9)Technical problem solving	2.01	.6760	1.94	.701

4.2 H2: There is a significant positive relationship in competency between students' actual performance and employers' performance expectations

The relationship between overall employers' performance expectations and actual performance was calculated based on Pearson product moment correlations. The results including the statistical significance of the correlations are shown in Table 3.

The correlations for employers' performance expectations versus independent variables were highly positive at the significance level ($p<0.01$). The highest correlations related to employers' performance expectations were academic literacy ($r=0.805$), followed by self-effectiveness ($r=0.756$), and workplace ability ($r=0.721$).

Table 3: Correlation matrix on competencies between expectations actual performance

Competency	X1	X2	X3	X4	X5	X6	X7	X8	X9
Pearson correlation coefficient between expected and actual performance	0.756	0.805	0.721	0.669	0.604	0.639	0.579	0.654	0.501
p-value. (2-tailed)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Note: df=47, X1: self-effectiveness; X2: academic literacy; X3: workplace ability; X4: industry-wide core IT foundation skills: X5: digital information management; X6: digital collaboration and communication; X7: digital content creation; X8: cyber security; X9**:** technical problem solving.

4.3 H3: The average level of employers' performance expectations is affected by their experience of student's actual performance.

Regression analysis was conducted to establish how much of the variance in the average level of the employers' performance expectations (dependent variable) could be explained by their assessments of the performance of intern students in the nine competency areas (independent variables). Stepwise regression was conducted to test the study hypothesis (H3). The Stepwise process selected the predictive variables, optimized them and returned the best-fitting models. The results of the stepwise calculations appeared as two equations. The two models incorporating the most important competencies affecting the average level of employers' performance expectations are presented in Table 4.

Table 4: Summarized regression results

Model	R	R-Square	F	Predictors	Standardized Coefficients	t	p
I	0.805	0.648	86.43(.000)*	$X2_{ap}$	0.805	9.297	0.000
II	0.826	0.682	49.31(.000)*	$X2_{ap}$	0.601	4.847	0.000
				$X3_{ap}$	0.276	2.224	0.031

a. Dependent Variable: Average level of employers' performance expectations
Note: X2: academic literacy; X3: workplace ability.

Two equations which predicted the average level of the employers' performance expectations were found with an F test value less than 0.01. Model I and Model II were able to explain the average level of employers' expectations for an effective IT student at 64.8% and 68.2% respectively (R^2_I=0.648, R^2_{II}=0.682). The predictive models I and II are as follows:

(i) Employers' performance expectations = 0.805*academic literacy
(ii) Employers' performance expectations = 0.601*academic literacy + 0.276 *workplace ability

However, Model II can explain the average level of the employers' expectation of IT students' performance better than Model I ($R^2_{I} < R^2_{II}$). The competency factors that best predict the average level of employers' performance expectations are therefore *academic literacy* followed by *workplace ability*.

5. DISCUSSION

The results are discussed below by answering the research questions identified in the introduction.

5.1 Does a competency gap exist between employers' performance expectations and student's assessed performance?

There are clearly gaps between employers' expected performance and student's actual performance. Hypothesis H1 was largely supported since it was found that students were not meeting employers' expectations in respect of self-effectiveness, academic literacy, digital information management, digital collaboration and communication, digital content creation, cyber security, or technical problem solving. Employers expected students to be able to manage their work and have knowledge in their field of study. This result is similar a study in the Croatian IT industry where researchers found a gap between curriculum content and the real needs of industry (Aničić & Arbanas, 2015). That study found that teamwork, communication, and language ability were the competencies required which were not being met.

The result found in the present study that workplace ability and industry-wide core IT foundation skills exceeded employers' expectations confirms that Thai university managements

are following the right direction because universities are clearly offering courses which are suitable to prepare students for working responsibilities before joining WIL programs and the students have been able to perform in relation to these two competencies at a level exceeding expectations. This finding is consistent with that of Collet, Hine, and Plessis (2015) and Royle and Laing (2014) who found that workplace skills and fundamental IT skills were the most important dimensions in the real world.

5.2 What is the relationship between employers' expectations and student performance and which competencies have the greatest effect on the average level of employers' performance expectations?

Regarding hypothesis H2, it was found that all nine areas of student's assessed performance had positive significant relationships with the employer's performance expectations. In regard to hypothesis H3, the students' performance in the academic literacy competency factor was that which most affected the average level of expectations of organizations, followed by workplace ability. This shows that organizations expect essential academic knowledge along with workplace skills. These findings are consistent with those of Radermacher and Walia (2013), who found that personal skills and professional & technical quality were important competencies. To satisfy industry, universities must understand the needs of organizations because personal characteristics and knowledge are essential dimensions which employers expect to be developed during university education. Breivik (2005) suggested that IT is a profession that cannot be learned from textbooks and organizations therefore need universities to fulfill their responsibilities by preparing the workforce for the realities of the IT industry. In order to know the real demands of the IT industry, universities need to collaborate with the industry in order to produce graduates meeting the needs of organizations (Aničić & Arbanas, 2015; Collet, Hine, & Plessis, 2015; Royle & Laing, 2014; Radermacher & Walia, 2013).

6. CONCLUSION AND FUTURE WORK

This study investigated the competency expectations of employers in respect of university interns on WIL programs and their assessments of the actual competencies of the IT internship students' they employed. Two questions were answered. Gap analysis was employed to define the differences between the competencies demanded by organizations and the assessed competencies of intern students. The self-effectiveness, digital information management and digital collaboration & communication competencies were found to be the three most in demand from organizations and student performance was rated lower than demand in all these areas. In contrast, students' workplace ability and industry-wide core IT foundation skills were rated higher than the employers' competency expectations in these areas. Correlation was employed to analyze the relationship between expected performance and assessed performance. The assessed competencies of intern students were positively and significantly correlated with the employer's performance expectations. Regression models were used to show which areas of students' actual performance were predictive of the average level of employers' performance expectations. The

results suggest that students' academic literacy and workplace ability competencies were predictive of employers' performance expectations.

Based on the results of this study, universities be necessary to consider how to reform their existing curricula to meet industry demands. These findings also provide empirical information which can guide IT faculties, IT students, or relevant government departments seeking to develop IT competency in the context of the digital economy. However, this study was conducted within the context of IT and did not focus on any particular type of business. The results therefore represent an overall picture of the IT competency demanded in this digital era with limited organizations sample. The detailed study including the change and dynamicity of the digital situation must be taken into account. Future work will be conducted to investigate in-depth the competency requirements of organizations separated by business types, and will identify gaps between demand and supply. For example, some business may need a set of skills and other business may require the similar or different skills. The expected outcome is that by creating more realistic competence models, the skills that IT students should have may be identified and steps taken to meet their needs.

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