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COMPETENCIES OF NEW IT GRADUATES REGARDING EMPLOYER'S EXPECTATIONS FOR WORK MODE PERFORMANCES

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ABSTRACT

The employer expectations for recent graduates working in the computer industry are generally not taken into account during the curriculum development of computer-related departments of the Turkish universities. In consequence, when the graduates enter the work force, there is a dissatisfaction between the employer expectations and the technical and/or social abilities of the new graduates. As a guide to the departments offering degrees in computing, an employer expectation survey has been conducted among senior professionals and managers from the government and private sectors to evaluate the strengths and weaknesses of their junior engineers. The results indicate significant differences in government and private sectors in terms of perceived competencies to some extent. In addition, some significant relationships between employer expectations from new graduates and perceived competencies focusing on graduates' performance in different work environments are expressed.

Key Words: Employer expectations, individual work, team work, perceived competencies, regression.

INTRODUCTION

The education offered by the IT departments often do not provide graduates with the competencies demanded by the industry leading to employer dissatisfaction in terms of the technical and social qualifications of their newly graduated employees. The set of hard (technical) and soft (personal) skills the graduates need to perform well in the computer sector have been the focus of various research (Nasr, 2014; Turhan & Akman, 2013; Dravid & Duncan, 2011).

Right after starting their employment, new graduates are expected to have specific knowledge, commercial awareness, disposition and qualifications to contribute to the organization's aims (Mason, Williams, & Cranmer, 2009). Employers expect the employees to work in different work environments, either on an individual basis or as a member of a team. Various studies have been conducted previously on individual vs. teamwork performance in different domains (Costa, Passos, & Bakker, 2014; Mumford, 2015). Yet, the competencies the graduates need to acquire for individual vs. teamwork have not been studied extensively.

In this research, a survey has been conducted to examine the effects of technical, personal and educational competencies of new graduates on their individual vs. teamwork performance from the employers' perspective. The results of the study can provide feedback to the IT departments for improvement of their programs regarding the expectations of the industry.

The remainder of the paper is arranged as follows. The next section introduces the research model followed by the research design. Then, the descriptive and test results are given in detail, followed by the conclusion.

RESEARCH MODEL

The present study performs a systematic approach to investigate the impact of competencies of new graduates on the sector of the establishments and employer expectations from new graduates, which can be considered as our empirical factors. The competencies were grouped as:

- technical competency (general software development activities, software development processes and adopting new methods in software development)
- personal competency (using time effectively, leadership skills and communication skills)
- educational competency (covering sociocultural issues in curriculum, medium of instruction and involvement of research activities in curriculumn)

Based on the available literature, the research model was developed to investigate the relationship between dependent and independent variables (Figure 1).

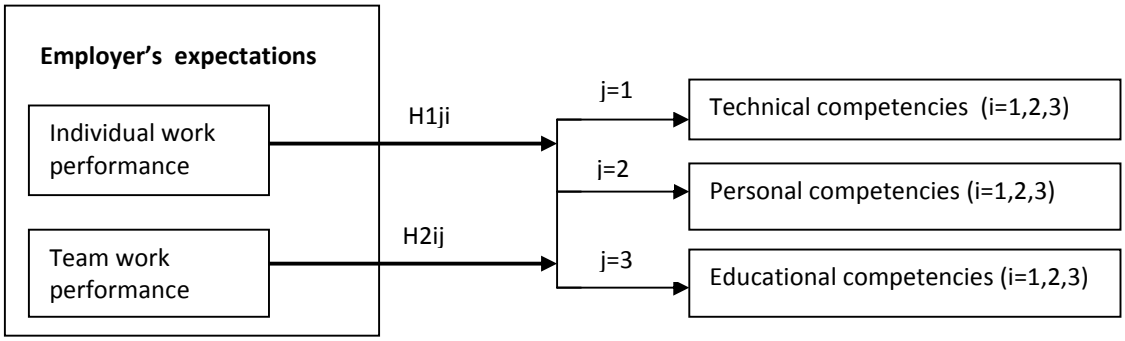

Figure 1: Research Model

The justification for each empirical factor and the corresponding hypotheses are provided below.

There is a heavy body of research regarding factors influencing performance of employees. The available literature provides evidence for the role of different work environments on employees' performance. Imran, Fatima, Zaheer, Yousaf, and Batool (2012) provide one of the most recent studies in this respect. They studied the relationship between work environment and employee performance in the manufacturing sector and their results reveal positive and significant impact of work environment on employee performance. Moreover, the work environment was also found to play a mediating role in the relationship between transformational leadership and employee performance in their study. However, work environment in these studies is taken as the conditions in the work place. There is a lack of empirical research exploring the relationships between different work modes and expected employee performance, where work modes are taken as the individual work and team work environments. Schaubroeck, Lam, and Cha (2007) support the existence of differences between the performance of employees in individual and team work and report that performance of work teams is generally viewed as a function of members' individual performances. These differences have important consequences for the establishments' strategies on organizational standards, values, motivations, expectations and employment policies (Frank & Lewis, 2004; Zeffane, 1994; Cuyper, Heijden, & Witte, 2011). Moreover, existence of relationships between work modes and adequacies of employees has not been studied in the literature yet. Therefore, we include employer's performance expectations from different work environments as dependent variables in this study.

During the last two decades, rapid changes in technology and, specifically, in information and communication technologies are being witnessed. These changes are not only affecting the daily life of people but also having significant impact on higher education. Education has been a subject of discussion for quite a long time and the existing literature on education mainly consists of conceptual discussions, descriptive surveys and analytical modeling. A number of researchers have studied the education from employability point of view (Cuyper et.al., 2011; McQuaid & Lindsay, 2005; Bernston, Sverke, & Marklund, 2006). Although not very obvious, employability is generally seen as conditional upon workers' educational position (Cuyper et.al., 2011). Berntson et al. (2006) report a positive association between educational level and perceived employability. Other studies focus on the relationships between learning outcomes and employers' expectations (Nair, Patil, & Mertova, 2009; Mukhtar et.al., 2009; Shatat, Hazim, & Hariga, 2010). In their study, Nair et al. (2009) identified 12 employers' expectations for engineering graduates and their relative importance, elaborating about the links between engineering graduate attributes and employers' expectations indicating that engineering university graduates lacked skills required by the employers. They further proposed a possible solution to address the competency gaps between the industry requirements and graduate outcomes by teaching and assessing competencies required by the industry in the engineering and technology educational programmes. Mukhtar et al. (2009) propose additional collaboration by corporations and universities since this is assumed to lead to a greater integration of the varied approaches taken by the various disciplines. Most of these studies are either focusing on employability (Bernston et.al., 2006; Mukhtar et.al., 2009) or are based on data collected from a specific academic or organizational environment (Nair et.al., 2009; Shatat et.al., 2010). Additionally, they do not provide a systematic or exploratory analysis on the relationships between employee expectations and outcomes of higher education. On the basis of this rationale, the following set of hypotheses is proposed.

Based on the overview above, we can formulate our following set of hypotheses:

Hyp.	Definition
$H1_{1i}$	Perceived technical competency$_i$ (i=1, 2, 3) of new IT graduate is significantly related to employer's expectation for individual work performance.
$H1_{2i}$	Perceived personal competency$_i$ (i=1, 2, 3) of new IT graduate is significantly related to employer's expectation for individual work performance.
$H1_{3i}$	Perceived educational competency$_i$ (i=1, 2, 3) of new IT graduate is significantly related to employer's expectation for individual work performance.
$H2_{1i}$	Perceived technical competency$_i$ (i=1, 2, 3) of new IT graduate is significantly related to employer's expectation for team work performance.
$H2_{2i}$	Perceived personal competency$_i$ (i=1, 2, 3) of new IT graduate is significantly related to employer's expectation for team work performance
$H2_{3i}$	Perceived educational competency$_i$ (i=1, 2, 3) of new IT graduate is significantly related to employer's expectation for team work performance

RESEARCH DESIGN

A survey questionnaire was developed for testing the hypotheses. Initially, a pilot version of this questionnaire was prepared and a group of IT professionals was interviewed to finalize the questionnaire. The questionnaire contains 11 items, and each item reflects a discrete variable. Table 1 summarizes the definitions, scales, and the range of values for these variables. The variables "individual_work" and "team_work" are the dependent variables, whereas the others constitute the dependent ones.

Table 1: Summary of Research Questions and Variables

Quest.	Variable	Definition	Range of values
1	Individual_work	How important is the individual working performance of new IT graduates in your organization?	very much, much, average, little, very little
2	Team_work	How important is the team working performance of new IT graduates in your organization?	very much, much, average, little, very little
3	SD_background	Do new IT graduates in your organization have a significant background in Software Development?	very much, much, average, little, very little
4	SD-processes	Are new IT graduates in your organization competent in software development processes?	very much, much, average, little, very little
5	SD_methods	Are new IT graduates in your organization competent in adapting to new software development methods and approaches?	very much, much, average, little, very little
6	time	Are new IT graduates in your organization competent in using time effectively?	very much, much, average, little, very little
7	leadership	Are new IT graduates in your organization competent in leadership capacity?	very much, much, average, little, very little
8	communication	Are new IT graduates in your organization competent in communication?	very much, much, average, little, very little
9	sociocultural	How important is it for your organization that the curricula provide sociocultural awareness to students?	very much, much, average, little, very little
10	language	How important is it for your organization that the new IT employees graduated from a university, whose instruction medium is English?	very much, much, average, little, very little
11	projects	How important is it for your organization that the new graduated IT employees have worked in a project during their undergraduate education?	very much, much, average, little, very little

The respondents were either senior IT professionals or IT Project managers from both major government and private sector establishments. The participant organizations were selected using “judgement sampling”. A total of 72 completed survey questionnaires were received.

One of the principal areas of statistical inference is the test of statistical hypotheses. Linear regression provides a powerful statistical testing method (Milton & Arnold, 2006). Multivariate linear regression technique was utilized to investigate the relationships between the dependent and independent variables in this study.

RESULTS

The results of the survey are presented in the following sequence. Initially, the results of the survey are revealed using descriptive analysis. As it was mentioned earlier, chi-square test method was used whenever there was a need to have a better insight to the respondents’ profile in this part. This is followed by the results of regression analysis for each demographic factor.

Descriptive Results

The descriptive profile of respondents is provided in Table 2.

Table 2: Descriptive Results

Variable	Turkish graduate students	
	Number	%
Sector	72	100
private	49	68
public	22	31
unknown	1	1
Current position	72	100
unit/project manager	60	83
senior professional	12	17
Graduation of respondent	72	100
IT	42	59
engineering	13	18
others	16	22
unknown	1	1
Organization's satisfaction from new graduates	72	100
	0	0
very much	11	15
much	47	65
average	8	11
little	4	6
very little	2	3
unknown		
Level of in-service training	72	100
very extensive	5	7
extensive	22	31
average	29	40
not much/little	14	19
no in-service training	2	3

The respondents from private sector establishments were observed to be dominant (68%) from the inspection of Table 1. It is not surprising to note that most of the respondents reported their position to be manager (83%) since this was the intention during the sampling procedure. The percentage of IT graduate respondents were 59% and this also meets the sample requirements in this survey. Of the IT graduates only 21% are working in public sector establishments. The percentage for graduates of other branches is higher (41%). This should be considered normal because the demand for IT graduates is still high in the country and the salaries are generally lower in public sector organizations than that of their private sector counterparts. In consequence, most of the IT graduates prefer working in private sector organizations and public sector meets its demand with graduates of other fields.

Interestingly, in-service training was reported by all the participant organizations in this study. However, the amount of in-service training was observed to be around "average" and "more" (78%). This should be considered normal because the respondents' organizations were accumulated around "average" and "little" (76%) in terms of level of organizational satisfaction of new graduates. Surprisingly, none of the organizations reported "very much" in this respect (0%). It was observed that, of the government sector organizations, 43% provides either extensive or very extensive in-service training for new graduates. This percentage is lower (36%) for private sector. This should be expected considering the fact that most IT graduates prefer to work in private sector and government sector employs graduates of other branches as IT specialists.

Test Results

The results of regression tests for the hypotheses are given in Table 3.

Table 3: Test Results for "Work Mode"

Empirical factor	Test variables	Individual work (IW)			Team work (TW)		
		Hyp.	Coeff.	p-val.*	Hyp.	Coeff.	p-val.*
Technical competen.	SD_background	$H1_{11}$	-0.287	0.048*	$H2_{11}$	0.285	0.024*
	SD-processes	$H1_{12}$	0.160	0.251	$H2_{12}$	-0.276	0.041*
	SD_methods	$H1_{13}$	0.154	0.350	$H2_{13}$	0.297	0.058**
Personal competen.	time	$H1_{21}$	-0.196	0.170	$H2_{21}$	-0.274	0.041*
	leadership	$H1_{22}$	-0.249	0.066**	$H2_{22}$	0.058	0.641
	communication	$H1_{23}$	0.275	0.050*	$H2_{23}$	0.338	0.010*
Education. competen.	sociocultural	$H1_{31}$	-0.293	0.011*	$H2_{31}$	0.215	0.023*
	language	$H1_{32}$	0.171	0.139	$H2_{32}$	0.255	0.027*
	projects	$H1_{33}$	0.085	0.390	$H2_{33}$	-0.071	0.399

(*) and (**) indicates statistical significance at 5% and 10% significance levels respectively.

For the individual work mode, the inspection of p-values in Table 3 indicates that:

- Regarding technical competencies: there is sufficient evidence to accept $H1_{11}$ at a 5% significance level. This means the variables "SD_background" is significantly related to the variable "individual work" at 0.05 significance level. It is also true that the variables "SD_process" and "SD_methods" do not have significant impact on the variable "individual work" in this category. In other words, the new IT graduate's software development background is considered to be important for working individually by the employer.
- For personal competencies, the variables "leadership" and "communication" are supported by survey results. Hence, $H1_{22}$ and $H1_{23}$ are accepted at 10% and 5% significance levels, respectively. This means new IT graduates leadership and communication skills are perceived to be important by the employers for individual work environments. On the other hand, p-value does not show any significance for $H1_{21}$ and we reject it. This means that the capacity of new IT graduates to use time effectively does not have a significant impact on individual work performance.
- In education competencies category, the only factor supported by the survey results is sociocultural, which concludes acceptance of $H1_{31}$ at 5% significance level and rejection of $H1_{32}$ and $H1_{33}$. This means the curricula caring about the sociocultural capabilities of students have impact on their performance in individual work environments. Interestingly, language of instruction and project experience do not show any significance in this respect.

For the team work mode, the inspection of p-values in Table 3 indicates that:

- Interestingly, all the factors in technical competencies category are supported by the survey results. In other words, p-values in Table 3 indicate that "SD_background", "SD_process" and "SD_methods" are significantly related to employer's expectation for team work performance at 5%, 5% and 10% significance levels, respectively. Therefore we accept $H2_{11}$, $H2_{12}$ and $H2_{13}$ at 5%, 5% and 10% significance levels, respectively. In other words, new IT graduate's software background is considered to be important for team work by the employer.
- For personal competencies, the variables "time" and "communication" are supported by survey results. Hence, $H1_{21}$ and $H1_{23}$ are accepted at 5% significance level. This means new IT graduates effective time usage and communication skills are perceived to be important by the employer in terms of team work performance. Surprisingly, p-value does not show any significance for $H1_{22}$ and $H2_{22}$ and they are rejected. In other words, new IT graduate's leadership skill does not show any significant impact on team work performance.
- In education competencies category, surprisingly, the only factor, which is not supported by the survey results is project experience. This leads to rejection of $H1_{31}$. In other words, involving new IT graduate in projects during his/her undergraduate education does not count much for team work performance

expectations of the employer. The other two factors in this empirical category, namely, the relationship between teamwork performance, and sociocultural and the language of instruction, shows significance at 5% significance level (Table 3). This leads to acceptance of $H1_{32}$ and $H1_{33}$. This interestingly means, according to employer's perceptions, the curricula caring about sociocultural capabilities and universities with english instruction medium have significant impact on IT graduate's team work performance.

CONCLUSION

This paper presents the findings of a study based on the relationship between performance expectations in individual and team work environments in establishments and some characteristics regarding competencies of new IT graduate employees. A survey research approach was adopted for the set of data from a sample of IT managers and senior professionals for this purpose.

The dependent factors included in the study were "individual_work" and "team_work". The independent variables are grouped in three empirical categories as technical competencies (SD_background, SD_process, SD_methods), personal competencies (time, leadership, communication) and educational competencies (sociocultural, language, projects).

This research has arrived at interesting inferences regarding the impact of "individual_work" and "team_work" on the competencies of new IT graduates. According to the comparative analysis, the only factors in which there are no differences in employer's expectations regarding performance in individual and team work environments are "communication" and "sociocultural" since both are found to be significant. This means in individual and team work modes, communication skils and sociocultural awareness of new IT graduates are important factors in individual and team work environments in the work place.

We recognize some limitations of our study. First, for the followers of this paper, we propose to use larger samples which may lead to more insight into the relationships towards different categories of competencies. Second, studying the impact of work climates' in establishments from different sectors would also be of interest. Actually, analysis of administrative factors may also provide very interesting results. Finally, this study should also be designed to include the size (i.e. small and medium) of organizations from all sectors.

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