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RESEARCH ARTICLE

Perceived-Development of Soft Skills Support Confidence to Obtain a Job: An Evidence Among Science-Tech Graduates in Thailand

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Abstract: Graduates in science and technology are in demand by establishments in developing countries; however, job-seekers are concerned about the prospect of insecure employment in the changing future careers because of imminent oversupply in the labor market. Self-assured graduates would be able to confront with the dynamic world. The focus of this study is to investigate relationships between the perceived-development of soft skills provided by educational programs in university and the likelihood to obtain a job after graduation. Data were derived from the Annual Graduate Survey conducted by the Office of General Education, King Mongkut's University of Technology, Thailand, at the time of the graduation ceremony (six months after university course completion). Two cohorts of graduates (covering engineering, information technology, industrial education, science, and architecture) in the academic year 2016 and 2017 were included to be participants (n = 3,850). They were asked to reflect their perception of the extent to which they possessed soft skills during the period of degree programs. Results obtained by logistic regression analysis displayed significant personal attributes, communication, and learning skills that contribute to the likelihood to be employed after graduation. The perception of self-development supports individual self-efficacy to meet the challenges of job hunting. This study also indicates a small gender difference in the employment of science-tech graduates, that is, a female is more likely to obtain a job immediately after the completion of her studies. Interestingly, it is found that there is a non-significant relation between English skills and the likelihood to get a job in a non-English speaking country.

Keywords: science-tech graduates, soft skills, labor market

Quality graduates are the ones required by potential employers, given the competition in the labor market. The percentage of the workforce aged between 15–59 years is decreasing, whereas the quality of human capital is more highly needed. The emerging phenomenon of the decline of the young population in the next 20 years is prevalent among developing countries, including Thailand (International Labour Organization, 2013). Interestingly, a labor force survey of Thailand indicates that the numbers of unemployed persons are likely to expand, in particular, those attaining their education at the graduate study level (National Statistical Office, 2018) and to continuously rise from 18.99% in 2013 to 31.15% in 2017 (Office of the Higher Education

Commission, 2018). The gap between satisfactory graduates and the labor market has been increasingly widening because of the poor quality of graduates. A study of Thailand Research Development Institute (2011, as cited in United Nations Development Programme, 2014, p. 24) reported a tightening labor market in the last two decades and rising demand for high-skilled persons. It also found difficulty in the recruitment of capable local staff in ASEAN countries, as well as in Thailand; however, unemployment has been growing among graduates even in the fields of science and engineering, which are in high demand (United Nations Development Programme, 2014). This unbalanced condition is challenging the higher educational institutes to cultivate young human capital for the competitive global economy and future careers.

Higher education is seen as a principal point of knowledge and a great contribution to foster growth performance, prosperity, and competitiveness for young generations. Many institutions of higher learning provide various programs to prepare their students for employment. Job-specific skills are usually learned during the period of university study and training program; however, non-technical and social skills or attitudes such as adaptability, resilience, team-working, and communication are increasingly expected (Cunningham & Villasenor, 2014). Employers are looking for people equipped with the necessary skills and competencies and ready to work with a minimum of supervision (Andrews & Higson, 2008).

It is necessary for higher education institutions to reform their framework on developing graduates' employability skills. Non-technical skills contribution is supposed to be one set of generic outcomes favorably enforcing any undergraduate programs. Description of graduate attributes are broadly stated in any university's policy and are implemented into practical curriculums. Study programs are designed to enhance the skills of students by providing particular courses (Al-Mahmood & Gruba, 2007) and bring hands-on activities into the classroom. Apart from the academic curriculum, generic skills could be developed by a non-academic learning environment. Relationships between generic skills and attributes and professional careers are likely to deal with other aspects, including social context, culture, opportunity, and individual status within a community (Campbell, 2010).

Generic skills, or what are generally known as "soft skills," refer to non-technical skills that have been further issued since knowledge society and the technology revolution came out. Only specific technical skills or "hard skills" are supposed to be insufficient to succeed in times of insecure employment. Soft skills are the set of skills supporting the ability and opportunity to be employed by the desired job. These competencies would be transferable as well as be used regardless of the job at which an individual is working. Given that most organizations pay attention to employees' soft skills, it is very crucial for new graduates to develop these skills to increase their hiring opportunities in target organizations. Employers in many organizations do not require only the perfect qualifications of applicants, but they also expect soft skills, which have a higher contribution to the employability than qualifications of their potential staff (Nickson, Warhurst, Commander, Hurrell, & Cullen, 2012). Soft skills are individual's skills and attributes that can increase their job performance, interactions, and advancement in a career (Goswami, 2013). They are people skills or applied skills that can facilitate an individual to interact effectively with others, which in turn can increase the possibilities of their success in their responsible tasks.

There is a wide range of variations in the understanding of a certain set of skills for employability. However, the favorable soft skills overlap, for example, communication, problem-solving and coping with uncertainty, interpersonal relationships, team working, critical thinking, lifelong learning, adaptability, self-management and responsibility, and leadership (Andrews & Higson, 2008; Archer & Davison, 2008; O'Leary, 2013). Barrie (2012) suggested five common clusters of generic graduate attributes— research and inquiry; information literacy; personal and intellectual autonomy; ethical, social, and professional understanding; and communication. Barrie (2012) defined research and inquiry as to the ability to create new wisdom and to carry out a thorough inquiry process. Information literacy is to use information effectively in a range of contexts. Individuals with personal and intellectual autonomy could work independently and keep on their works successfully with openness, curiosity, and a desire to meet new challenges. A sense of ethical, social, and professional features would preserve individual values and beliefs consistent with the responsibility as a member of local, national, international, and professional communities. Another is communication, which is interpreted as a

tool for negotiating, communicating, or interacting with others, and facilitating one's learning.

These can enhance the confidence level of the new graduates to adjust themselves effectively in the new working places and gain more attention from employers. It could be proposed that the development of the soft skills of graduates could have an association with their abilities to be employed.

Meanwhile, employability skills further refer to the ability to keep and do well on a job (Rothwell & Arnold, 2007; Zaharim, Ahmad, Yusoff, Omar, & Basri, 2012), as well as learn how to succeed in and sustain a career path (Andrew & John, 2007). Besides specific and non-technical skills, the development of self-identity, including self-efficacy, self-confidence, and self-esteem, will play a key role in supporting an individual on challenging job opportunities (Lorraine & Peter, 2007). People who are perceptive of their well-developed soft skills presumably feel more confident during their presentations, public speaking, and job interview. In contrast, individuals with a lower perceived-level of soft skills are less likely to expose themselves in situations of social communication or interaction with others, which in turn can reduce their chance to advance in their careers (Williams, 2015).

Graduates with developed soft skills tend to know how to adapt their opinions and communication styles according to the nature of working environments, team members, and customers. This can reduce conflict among co-workers and create both their own job satisfaction and employers' satisfaction with their performances in the long run (Goswami, 2013). On the other hand, the new graduates with a low level of soft skills tend to have a high possibility of quitting their jobs during the probation period because they find it difficult to work well with other members in the organizations and to proceed with different contexts of assigned tasks. Several studies also confirmed that soft skills are the required qualifications that can contribute to individuals' employability in various contexts (Nickson et al., 2012; Nusrat & Sultana, 2019; Shukla & Kumar, 2017; Yao & Tuliao, 2019; Zaharim et al., 2012). Given all the supporting evidence regarding the contribution of improved soft skills, it is very crucial for new graduates to possess these skills to strengthen their ability to be employed.

Despite the favored position in science and technology in developing countries, a study to predict labor demand in Thailand (Chaisrisawatsuk, 2016) indicates that the supply of graduates in the fields of social science, engineering, and architecture is much larger than the anticipated labor demand in the next five years. This oversupply forecast has been a source or argument about the roles of universities in terms of producing graduates with intensive professional skills and productive attributes. Employability for science-tech graduates—for example, engineers—requires knowledge and professional competence, as well as the ability to work with others across contexts (Winberg et al., 2018). A study on the employability of civil engineering students (Creasey, 2013) suggested three components consisting of a good degree, generic skills, and a set of personal attributes, all of which could be developed by university education (Wolf, 1991). Engineering employability skills have been investigated and identified in many studies (Abdulwahed, Balid, Hasna, & Pokharel, 2013; Creasey, 2013; Zaharim, Yusoff, Zaidi, Mohamed, & Muhamad, 2009). Those essential soft skills contain communication, problem-solving, interpersonal, or team working skills, ICT skills, lifelong learning, self-management, and business and management. Personal attributes, including ethical sense and responsibility, have been increasingly proposed by employers as well.

Many educational institutes throughout the world equip their students to acquire deep intellectual capabilities and learn work-related applicable skills (Archer & Davison, 2008). They are intensely reforming their education approach and teaching system to produce a new generation of active learners for a new world of careers. This significant shift in employability support has been enacted across higher education over recent decades.

The uncertainty of the labor market in Thailand has also increasingly called for qualified and suitable persons who are the outputs from tertiary education institutes. To react and reform higher education, many universities in Thailand have significantly improved their curriculums by concentrating on how to boost students' soft skills. New approaches to teaching and learning have been implemented into certain programs, as well as additional general education courses for undergraduate study. The common goal is to cultivate and prepare their students for a challenging world.

Therefore, the focus of this study is to investigate the intensity of demanded soft skills that are provided by educational programs based on the probability of obtaining a job after graduation, particularly for

those completing science and technology majors. The study would provide the current condition and offer suggestions for higher education institutes. It would urge our young science-tech students to realize and to learn and develop their generic competencies to enhance their confidence and get ready for the competitive and dynamic world.

Methods

The data was derived from the Annual Graduate Survey conducted by the Office of General Education, King Mongkut's University of Technology, Thailand. The purpose of the annual survey is to evaluate the amount of generic skills having been developed during undergraduate study and would be expected in workplaces. The goal is also to suggest curriculum development efforts in the way of general education. The survey is usually conducted during the period of graduation ceremony preparation. Therefore, the target of this survey covers just graduates who attend the ceremony. For this study, only two cohorts of graduates finishing their bachelor's degree at the year of 2016 (N = 2,702) and 2017 (N = 2,612) were included because their questionnaires were similar. Only graduates attending commencement day were asked to complete the paper-based questionnaires involving self-perception on how much their generic skills have been developed during undergraduate degree programs. There were 38 items with a 4-interval rating scale ranging from 1 (least) to 4 (most). There were a total of 3,850 respondents from those two cohorts (n = 1,654 in 2016, n = 2,196 in 2017). According to voluntary participation, the non-response rate was about 39% and 16%, respectively, depending on how the ceremony instructor set the schedule at that time. Given that the non-respondents were not targeted to be excluded, the bias would be less expectation, and the information from respondents could refer to the graduates' characteristics.

The majority of respondents were male (51.2%). The participants had completed their bachelor's degree in five major disciplines, which were 18.7% science, 46.8% engineering, 26.4% industrial education, 5.4% information technology, and 2.8% architecture. The survey included the regular Thai program, English program, and bilingual program. Those variables were considered as controls in the multivariate analysis. Ethical approval was obtained from the KMUTT Institutional Review Board with KMUTT-IRB-COE-2018-045.

Initially, principal component analysis (PCA) with varimax rotation was employed to aggregate variables of perceived developed skills and attributes. The percentage of missing data for each item ranged only between .1 and .5, so there was no significant difference in the employment rate among those who were included and those who were not. Then the listwise method was used for this aggregation test. Factor loadings in Table 1 indicated five elements accounting for 53.42% of the variance. Factor regression coefficients were calculated as particular factors for further analysis. According to five components from factor analysis, internal consistency reliability by Cronbach's alpha coefficients were analyzed as shown in Table 2. Each factor was given a particular name based on specific items loading in the factor. Then logistic regression analysis was determined to explore the ability to be employed in the group of s cience-tech graduates. SPSS version 22 was used for the analysis.

Table 1

Factor Loading and Communalities Based on a Principle Components Analysis With Varimax Rotation for 38 Items From Perceived Development Questionnaire (N = 3,694)

Items	1	2	3	4	5	Communalities
1. Report Writing			.631			.566
2. Proposal Writing			.657			.556
3. Summarization and Presentation			.607			.523
4. English Listening				.844		.741
5. English Reading				.846		.755
6. English Speaking				.842		.735

continued Table 1...

Items	1	2	3	4	5	Communalities
7. English Writing				.813		.685
8. Information Detecting, Gathering and Screening			.607			.525
9. Using Technology for Learning			.609			.526
10. Self-motivated Inquiry			.540			.458
11. Learning Passion			.492			.492
12. Adaptability and Social Life	.594					.470
13. Optimism	.497					.472
14. Leadership	.481					.417
15. Dare to Comment	.549					.427
16. Team Working	.656					.528
17. Accountability	.608					.475
18. Volunteering	.553					.494
19. Health Care					.653	.557
20. Self Esteem	.517				.437	.525
21. Respect for Diversity	.646					.541
22. Open Mind	.688					.571
23. Empathy	.567					.517
24. Systematic Thinking	.403	.575				.534
25. Critical Thinking		.631				.582
26. Initiative		.563				.491
27. Reasoning and Decision Making	.420	.570				.549
28. Awareness of Surroundings and Social Change		.500				.447
29. Ability to Adapt Knowledge for Work and Life		.552				.520
30. Multi-disciplinary Integration		.603				.521
31. Problem Solving		.644				.537
32. Risk Management		.573				.503
33. Goal Setting and Orientation		.538				.455
34. Time Management		.549				.479
35. Personal Financial Management		.473			.552	.562
36. Project Management		.559			.402	.535
37. Ethical Sense					.502	.523
38. Social Compliance					.471	.511

Note: Factor loading < .3 are suppressed.

Table 2

Descriptive Statistics for the Five Factors of Perceived Developmental Skills and Attributes

	No. of items	M (SD)	Skewness	Kurtosis	Cronbach's alpha
Personal Attributes (Factor 1)	11	3.17 (0.49)	-0.770	0.959	.885
Skills to Work (Factor 2)	12	2.96 (0.51)	-0.696	0.959	.903
Communication and Learning Skill (Factor 3)	7	2.87 (0.52)	-0.588	0.644	.826
English Skills (Factor 4)	4	2.69 (0.65)	-0.141	0.042	.874
Self-management and Citizenship (Factor 5)	4	2.87 (0.60)	-0.439	0.159	.754

Results

Factor loadings for each domain of perceived skills and attributes were used for further investigation. Bivariate analysis in Table 3 displays the existence of gender discrimination through the two periods of study. Males reported less development on all soft skills, including personal attributes ($t = 5.690$, $p < .001$; $t = 5.687$, $p < .001$ for years 2016 and 2017, respectively), supporting skills for work ($t = 2.384$, $p < .05$; $t = 2.329$, $p < .05$ for years 2016 and 2017, respectively), communication and learning skills ($t = 4.261$, $p < .001$; $t = 4.029$, $p < .001$ for year 2016 and 2017 respectively), and self-management and citizenship ($t = 2.530$, $p < .05$; $t = 3.970$, $p < .001$ for years 2016 and 2017, respectively). Only English skills were found significant to be more developed during undergraduate programs among those who were male comparing to female graduates ($t = -2.005$, $p < .05$ for only year 2017).

Table 3

Perceived Soft Skills Comparing Male to Female Graduates in 2016 and 2017

Soft Skills	Year of 2016			Year of 2017		
	Male (n = 896) Mean (SD)	Female (n = 758) Mean (SD)	T-test	Male (n = 1053) Mean (SD)	Female (n = 1067) Mean (SD)	T-test
Personal Attributes	3.06 (0.50)	3.20 (0.47)	5.690***	3.14 (0.50)	3.26 (0.46)	5.687***
Supporting Skills for Work	2.93 (0.52)	2.99 (0.49)	2.384*	2.93 (0.54)	2.98 (0.51)	2.329*
Communication and Learning Skills	2.81 (0.54)	2.92 (0.52)	4.261***	2.82 (0.53)	2.91 (0.49)	4.029**
English Skills	2.74 (0.66)	2.69 (0.62)	-1.618	2.70 (0.68)	2.65 (0.63)	-2.055*
Self-management and Citizenship	2.85 (0.60)	2.93 (0.58)	2.530*	2.81 (0.61)	2.91 (0.59)	3.970***

* $p < .05$, ** $p < .01$; *** $p < .001$

Logistic regression analysis presents the relationships between factors and the likelihood to be employed after graduation. Results also present that female graduates are more likely to be employed (OR = 0.840, $p < .05$). Graduates of the year 2017 are significantly less employed than those of the year 2016 (OR = 0.851, $p < .05$). Participants from regular Thai programs are more likely to get a job either in organizations or to be self-employed (OR = 1.348, $p < .01$).

Comparing the major disciplines in the sciences, graduates from all other disciplines, particularly in information technology (OR = 6.426, $p < .001$), are getting employment at the time of data collection. The multivariate analysis in Table 4 emphasizes the significance of two soft-skill factors when controlling for gender, year of data collection, study program, and major discipline. The domain on personal attributes (OR = 1.127, $p < .01$) and the domain on communication and learning skills (OR = 1.119, $p < .01$) play an important role in supporting the employment of science-tech graduates after finishing their study.

Table 4

Results of the Logistic Regression Analysis of the Likelihood to be Employed Among Science-Tech Graduates

N = 3,850

	Likelihood to be employed	
	Odds Ratio	**95 percent CI**
Male	0.840*	0.716, 0.985
Year of data collection: 2016 (reference)		
2017	0.851*	0.731, 0.991
Program: English and bilingual program (reference)		
Regular program	1.348**	1.052, 1.727
Major disciplines: Science (reference)		
Engineering	1.902***	1.540, 2.348
Industrial Education	1.883***	1.513, 2.343
Information Technology	6.426***	3.877, 10.652
Architecture	2.706***	1.559, 4.697
Perceived Generic Skills Development		
Personal Attributes	1.127**	1.044, 1.217
Supporting Skills for Work	1.057	0.981, 1.138
Communication and Learning Skills	1.119**	1.037, 1.208
English Skills	1.001	0.928, 1.079
Self-management and Citizenship	1.044	0.969, 1.126
Constant	1.293	
-2 Log Likelihood	4032.228	
Cox & Snell R Square	0.030	
Negelkerke R Square	0.043	

* $p < .05$, ** $p < .01$; *** $p < .001$

Discussion

Beyond professional skills, graduates with fulfilled soft skills and self-development would be able to challenge employability in the dynamic world. Our study aims to investigate the intensity of the perceived development of soft skills, which are provided by educational programs and the probability of obtaining a job after graduation. Target samples in the majors of science and technology were asked to fill self-evaluative questionnaires during the commencement rehearsal. Results display significant gender difference; that is, generic skills and attributes are reported to be more developed in the group of females during the period of studying in university. This is understandable as the result of the multivariate analysis shows a great opportunity for female graduates to get a job. This is correlated to some studies which found a difference in gender on the improvement of preferred employability-related traits (Moreau & Leathwood, 2006; Wickramasinghe & Perera, 2010). Female graduates were found to emphasize all employability skills much more than males and expressed a higher level of self-confidence and learning skills (Wickramasinghe & Perera, 2010).

Results show that the perceived development of soft skills plays an important part in supporting the employment of science-tech graduates in the labor market. Adaptability, optimism, leadership, teamwork, accountability, volunteering, self-esteem, respect to diversity, open mind, and empathy are personal attributes significantly related to obtaining a job after university completion. This is in line with a previous study (Creasey, 2013) presenting significant components of engineering employability of which a set of personal attributes includes enthusiasm for subjects, flexibility and adaptability, confidence and self-reliance, motivation, aspiration, seizing opportunities and standing out. In addition, communication skills consisting of writing and presentation are also keys to getting a job in developing countries. Consistently, studies of graduate employability in the U.S. and Europe (Andrews & Higson, 2008; Barrie, 2012; Eisner, 2010) indicated communication as one of the essential skills for the changing labor market. Authors suggested either verbal or nonverbal communication skills fitting in various contexts, and the ability to endure the process of inquiry.

Additionally, teamwork is needed in all organizations, which conduct inter-correlated projects. Communication and teamwork skills are likely to be confirmed as a priority for any discipline (Cunningham & Villasenor, 2014), and this is also true for engineering graduates (Abdulwahed et al., 2013). Moreover, the result from the current study indicates the importance of learning skills through data accounting from information recap, self-motivated inquiry, and learning passion, which has a positive correlation to the likelihood of being employed. Findings from the current study are compatible with the trend of 21st-century skills, which pinpoint the advantage of skills, abilities, and learning dispositions. Life-long learners will be able to provide other essential competencies and support the development of society further.

Apart from the knowledge in the areas of their study, it is also crucial for university students to improve their soft skills quotient to be more effective and readier for today's competitive labor market. To date, both local and multinational organizations pay more attention to soft skills training programs for their employees because of customer complaints about staff. Some companies receive suggestions to organize training that focuses on communication and interpersonal skills, among others. If the graduates acquire all these required skills and attributes during the time that they spend in universities, it will prepare them very well for future working places and provide more benefits to the organizations that they will go to work in. According to surveys conducted by Boston College and the University of Michigan, soft skills training could enhance productivity by 12%, increase employee retention, and deliver a 56% return on investment for the organizations (John, 2009). Generally, organizations that provide these training have aimed to enhance various skills such as assertiveness, negotiation, communication, and interpersonal relationships building (John, 2009).

Furthermore, soft skills of employees are found to increase teamwork, improved employee satisfaction and morale, and increase their performance (Goswami, 2013). Another study found that a soft skills training program can enhance confidence level and upgrade the technical skills that employees possess, which in turn creates higher productivity from them (Adhvaryu, Kala, & Nyshadham, 2018; John, 2009). Thus, soft skills become significant qualifications for new

graduates and employees in organizations and are trending to be very valuable and provide benefits to both new graduates and their working places.

Interestingly, results from the current study display a non-significant relation between perceived English proficiency and the likelihood to get a job in a developing country. Even though Thailand has been moving to modernization and globalization, which has welcomed international investment for decades, most people in organizations and industrial sectors are Thais except for some managerial positions in transnational businesses. Most graduates from science and technology majors, like engineers, usually start their application for a position in a domestic manufacturing industry. As Thailand has her own language (Thai) and uses Thai as the only official language, the working context in Thai society provides a comfort zone for native speakers and requires English in only technical terms during work and a few occasional contacts with foreign customers and supervisors. Even though there are non-Thai speaking foreigners staying in the country, they usually try to actively understand either Thai or Thinglish (Thai-English) speaking and also create inter-communication with non-verbal language. This is consistent with a study on employer demands across countries, including the U.S. and countries in Europe and Asia (Cunningham & Villasenor, 2014). The study reported that demand for foreign language (English) skills for new staff would be less required by global employers when comparing to other highly needed skills, for example, higher-order cognitive skills of the local language and oral communication. However, a foreign language, especially English, is highly expected for the new generation of employees to enhance an organization's capacity in the world. English skills development is increasingly demanded as an indicator of the employability of potential employees. The annual survey of labor demand conducted by the National Statistical Office Thailand (NSO) has regularly asked establishments about the current levels of English skills of their employees. This could say that English skills are highly required for growth in careers or somewhat required in professions, but it may not be remarkably a crucial expectation for new staff.

Given that our results indicate a correlation between the perception of the development of soft skills and the ability to be employed, we could propose that individuals trust their own capacity or self-efficacy to influence how they think, feel, and act (Bandura, 1995). Persons with higher self-efficacy can achieve their goals even in a situation with high obstacles, and they will not give up until they can accomplish their objectives (Bandura, 1994). Generally, people with high self-efficacy have more confidence in responsible tasks and feel enjoyment to perform unfamiliar challenging tasks (Bandura, 1977), whereas people with low self-efficacy prefer a stable life with predictable situations and tend to have less confidence in making decisions regarding their future career (Konanahalli et al., 2014). Previous research mentioned that graduates with a higher level of career self-efficacy are more likely to be confident about their competencies to perform their assigned tasks and can create positive outcomes and facilitate themselves to explore more opportunities for future advancement in their career (Maietta, 2013). Several studies (Fort, Jacquet, & Leroy, 2011; Konanahalli et al., 2014; Lin & Flores, 2013; Maietta, 2013) also indicated that career self-efficacy of graduates could promote their confidence to encourage them to perform challenging tasks and express their performance outcomes. Thus, given all the evidence about the benefits of self-efficacy of graduates to enhance their opportunity to get a job, it is very significant for the graduates to possess self-efficacy in order to be persistent in performing their responsible tasks. An exhaustive study would be our proposition on how self-efficacy of graduates could increase their opportunity to enter into the target working places.

Results from our study provide more evidence regarding the benefits of soft skills and self-efficacy to graduates to get a good future career. The study also helps tertiary education institutions to understand the qualifications needed in the labor markets and suggests underlining balanced competencies of their students to make them ready and confident for their working places. Research on the transition from study to work among engineering students indicated extracurricular activities contributed generic skills and cultural values (Stiwne & Jungert, 2010), so soft skill training would be additionally provided to senior students before graduation. However, it is notable that the interpretation should be of concern due to the limitation of information. Data were derived from new graduates from only a certain group of faculties (science, engineering, industrial education, information technology, and architecture). Thus, we would suggest

a comparative study among other disciplines that have different natures of knowledge and practice**.** Some variables (such as academic achievement, experiences on extracurricular activities, or job training) should be included in the model analysis as moderators.

Moreover, it would be difficult to directly predict employment like causal relationships, as there would be many antecedent factors, including individual and socioeconomic factors. Labor forces in some careers or the young generation regularly circulate from place to place or from one job to another in a short space of time. This is also a cross-sectional analysis in which data was collected at the same time based on participants' self-reporting. Hence, a longitudinal follow-up study should be undertaken to scrutinize progressive performance in employees' work lives, as well as the graduates' potential evaluation would additionally be balanced by others, for example, the standardized test for employability skills.

Conclusion

On the situation of high-quality demand and uncertain labor markets in developing countries, job opportunities for graduates in science and technology, for example, engineering and information technology, have been increasingly insecure. People with excellent professional and fulfilled soft skills are highly needed by organizations. This study shows the significance of perceived development on soft skills, which could refer to self-efficacy on the opportunity to obtain a job after graduation. Persons who believed that they possessed highly-developed skills were more likely to get a job rather than those who reported their developed skills at a lower level. Especially for the perceived development of personal attributes and communication skills, they are indicated as significantly correlated factors. English skills would be of concern as an important capacity to sustain and grow in desired jobs and international workplaces. A recommendation for higher education would emphasize how to improve students' soft skills, in particular, self-efficacy on personal attributes and communication ability. Other skills supporting work performance may be able to be reformed after being employed by the provided training program for staff because certain works need certain performance and organizations also need persons who can adapt themselves to an explicit organizational culture. Graduates themselves should realize the insecurity of job markets and actively boost up their own skills to challenge the future world.

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Declaration of ownership:

This report is our original work.

Conflict of interest

None.

Ethical clearance

The study was approved by the institution.

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