DOI: 10.20472/TE.2017.5.1.004

AN ESTIMATE OF MAJOR-JOB RELEVANCY AND THE RELATIVE IMPORTANCE OF PROFESSIONAL SKILLS IN THE WORKPLACE IN HONG KONG

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Abstract:

Studies have revealed that many graduates have jobs unrelated to the subjects they majored in at tertiary level. Other research around graduate attributes has found that in seeking employment, discipline-specific skills are not as important as generic skills, such as languages, critical thinking, problem-solving, and communication skills, with many employers highlighting work attitude and communication skills as the two most important graduate attributes. Generic skills are learnt through, among other channels, general education courses that teach students soft and transferrable skills, and general education has been made part of the bachelor's degree programs in most colleges and universities. However, many students may not be aware of the relevance of general education to their future employability and so are not enthusiastic about non-discipline specific courses. The study set out to explore the relevance of disciplinary and generic skills to employment in Hong Kong in order to shed some light on the significance of generic skills and the role of general education in the tertiary curriculum. The research questions of this study are: First, among all the degree holders in the working population in Hong Kong, what is the percentage of those holding jobs related to their major of study? Second, is there any difference in the level of relevance of an individual's major at college to the type and nature of the job that the graduate holds (hereafter "major-job relevancy") across demographic groups with different education levels, majors of study, qualifications obtained from different countries, occupations, income levels, and genders? Third, what are the most important skills for different groups of employees in Hong Kong? The population of this study is comprised of working degree/sub-degree holders. Only the first degree (for degree holders) or sub-degree (for sub-degree holders) was taken into consideration in investigating the issue of major-job relevance. A total of 1,139 questionnaires were collected through random telephone cold-calling and social media. Among these respondents, 490 possess a sub-degree or above academic qualification. Our data suggest that, in Hong Kong, less than 50 percent of graduates in employment are in jobs perceived to have more than 50 percent relevancy to their major of studies. There is a difference in major-job relevancy among different groups of graduates.

Keywords:

Major-job Relevancy, General Education, Graduate Attributes

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Citation:

TILO LI, MARK TSANG, MARINE YEUNG, EUGENE LI (2017). An Estimate of Major-job Relevancy and the Relative Importance of Professional Skills in the Workplace in Hong Kong. International Journal of Teaching and Education, Vol. V(1), pp. 36-53., 10.20472/TE.2017.5.1.004

Understanding General Education

The term “general education” is sometimes used interchangeably with “liberal education” or “liberal arts education”. In contrast with discipline-based education that provides training in discipline-specific knowledge and skills (Toffler, 2000), general education develops students’ general knowledge and intellectual capacities. Such general knowledge and skills govern people’s thoughts, feelings and behaviors (Borghans et al., 2008). Through general education, students acquire transferrable, generic skills that are also referred to as soft skills, non-cognitive skills (Garcia, 2014), or non-technical skills (Williams, 2015). While definitions of such skills vary, general education is commonly believed to build a foundation for students’ studies, prepare students to become effective employees (Walker, Roberts, & Mehlhorn, 2015), and teach them how to think and how to learn (Toffler, 2000). Recognizing the indispensability of such skills, Beane (1980) advocates that all students should take general education courses so that they are trained to solve problems. He further suggests that general education courses should be the core in a curriculum, and discipline-specific courses should be electives. Meanwhile, Hager and Holland (2006) indicate that students need to be equipped with more “employ-ability” skills through general education training.

As its name implies, general education denotes the provision of all-round skills training to facilitate whole-person development, although there is not a universally accepted list of traits constituting an all-rounded person. Hager and Holland (2006, p. 2) include in their list such generic skills and personal attributes as “logical and analytical reasoning, problem solving, and intellectual curiosity; effective communication skills, teamwork skills, and capacities to identify, access and manage knowledge and information; personal attributes such as imagination, creativity and intellectual rigor, and values such as ethical practice, persistence, integrity and tolerance”. These underlie the qualities that employers typically look for in their employees, which include “ability to work flexibly as part of a team, the ability to work autonomously, capacity to adapt to change, (and) ability to work creatively” (Hager and Holland, p. 4).

Hager and Holland (2006) identify three skill types that have increasingly gained attention, namely generic skills, core skills, and basic skills. Generic skills are soft, personal skills that are inter-disciplinary and transferrable across different disciplines (Winch, 2006). Generic skills can be tangible or intangible. For example, body language in interpersonal communications is tangible, but analytical reasoning abilities are intangible. Basic skills are language and arithmetic skills. The American Management Association (2010) has identified similar skills required for workers in the 21st century. These skills include the traditional skills of reading, writing, and arithmetic (known as

the 3Rs), and those, which have become more important in the 21st-century workplace, identified as the 4Cs – critical thinking, communication, collaboration, and creativity. The 3Rs and 4Cs are analogous to the basic skills and generic skills respectively in Holland and Hager's classification.

Further employability attributes have been identified in other surveys. In the United States, for example, Public Opinion Strategies and Peter D. Hart Research Associates conducted a national survey of 800 registered voters in 2007. The survey identified a broad range of fourteen 21st-century must-learn skills. They are listed in descending order of importance as follows: reading comprehension; computer and technology skills; critical thinking and problem-solving skills; ethics and social responsibility; written communications; teamwork and collaboration; oral communications; lifelong learning and self-direction; mathematics; leadership; creativity and innovation; media literacy; global awareness; and natural science (Partnership For 21st Century Skills, 2007). Similar lists of employability skills have also been published in other developed countries (Australian Government, 2008; The Conference Board of Canada, 2000)

The Organization for Economic Co-operation and Development (OECD, 2001), covering 16 European countries, Australia, Canada, Japan, New Zealand, and the United States, have reported a similar but more elaborate list of graduate competencies for the 21st century. In addition to the basic reading, writing, and arithmetic skills, graduates need to be equipped with interpersonal skills, intrapersonal skills, as well as information and communication technology skills. Interpersonal skills include working with the others towards a common objective. Intrapersonal skills are personal qualities that include motivation and attitude, self-learning ability, analytical and problem-solving skills, and communication skills. The OECD (2001) report finds that employers weigh interpersonal and intrapersonal skills more than learned skills. In particular, employers rank initiative, motivation and communication skills as the most important graduate competencies. Employers generally believe that job-related skills can easily be learned if new recruits have good motivation and personal qualities.

As can be seen, studies and surveys on desirable employee traits across the globe have come up with very similar lists of generic skills and attributes. Some may argue that it is difficult to draw a clear-cut line between generic skills and discipline-specific knowledge (Winch 2006), because skills acquired from a disciplinary course may be transferable to a different context and can therefore be considered generic. For example, skills learned from a research method course designed for social science students may be applicable to other work and study contexts that are unrelated to social science research; knowledge gained from a business communication course may in turn

enhance general communication skills, which are generic in nature. However, although it is true that many skills are inter-related, most if not all of the desirable employee attributes identified in the studies are not discipline-specific. This shows that generic skills are not only identified as a distinct skill set, but they are also known to serve distinctive functions in the workplace.

Growing Importance of General Education

It is therefore evident that generic skills, and by that extension general education, can enhance graduates' employability; they have become essential for graduates' survival in the job market with the growing trend of mismatch of jobs and academic qualifications. This means that university graduates increasingly find themselves in jobs that are not directly related to the disciplinary training they have received, and consequently they must use skills acquired from non-discipline specific training. In an early study in the 1970's, the United States had a 42 percent job-qualification mismatch rate, and more recently it has been reported that approximately 60 percent of college graduates hold jobs unrelated to their majors of study (Crotty, 2012). In a different report, only 27 percent of college graduates were able to find jobs related to their majors (Plumer, 2013). For science and engineering graduates, this number is less than 50 percent (Basken, 2011). Although there are discrepancies among these figures, the message is clear that a great proportion of graduates are working in jobs unrelated to the subjects they majored in at university. This phenomenon is widespread in many OECD countries (Quintini, 2011), and skills mismatch has been recognized as a worldwide issue (World Economic Forum, 2014).

Against this backdrop, it may not be difficult to understand why employers in different parts of the world have consistently been found to rate generic skills as more important than discipline-specific skills (American Management Association, 2010; Australian Government, 2008; Education Bureau, 2010; Li, 2015; OECD, 2001; The Conference Board of Canada, 2000;). Employers often complain about employees' lack of soft skills (Garcia, 2014; Nguyen, 2016; Williams, 2015).

The situation may be perplexing and discouraging for college students, who tend to perceive employability skills differently from employers. Williams (2015) points out that students perceive employability skills as vocational and technical skills. They believe as long as they earn good grades in their major core courses, they possess the employability skills of their study area. In contrast, employers perceive employability skills as technical skills and different soft skills such as communication and interpersonal skills. Students' ignorance of the importance of soft skills results in a lack of effort in

developing such skills, which has hindered some graduates from finding employment.

In addition to enhancing employability, general education may help with their career development in the long run. Seraphin (2013) points out that students may not be aware of the benefits when they are at college of taking different general education courses. They will however find the benefits once they graduate and enter the job market. General education provides a wide spectrum of knowledge and skills and prepares students for the unknown, such as the unforeseeable changes in their career paths. It has also been found that there is a positive association between generic skills and academic performance, labor productivity and income (Garcia, 2014). Employees in the top 20 percent of writing ability earn on average 3 times as much as those in the bottom 20 percent (Locker and Kaczmarek, 2014).

In view of the growing importance of generic skills as shown in the review above, general education has been made an indispensable component of the curricula in many universities across the globe. It seems however, that students, and perhaps even teachers themselves, are often unconvinced of its importance as discussed above. More hard evidence may therefore need to be gathered in order to sufficiently reflect this reality and more importantly make it more visible to the stakeholders.

The Hong Kong Situation

Unlike in the United States and other OECD countries, the issue of major-job relevancy has not yet been researched in Hong Kong, though the growing demand for employees with strong generic skills has been evident in recent years. Existing research has shown that employers in Hong Kong also put much emphasis on the generic competencies of their potential employees. In Hong Kong in April 2010, the Education Bureau (“EDB”) published a report on a survey titled “Opinions of Employers on Major Aspects of Performance of Graduates” conducted among 1,972 employers in year 2006 (Education Bureau, 2010). Nine graduate attributes were ranked by the employers in descending order as follows: work attitude; inter-personal skills; analytical and problem-solving skills; English language proficiency; Chinese language proficiency; technical skills required for the job; numerical competency; information technology literacy; and management skills. From the employers’ perspectives, technical skills required for the job, the only attribute related to discipline-specific knowledge among all the nine, only ranked the sixth, while the generic attributes, work attitude and inter-personal skills, topped the list. A later study (Li, 2015) concerning the relative importance of graduate attributes has found similar results. These studies show that employers in Hong Kong value their employees’

generic skills as much as their overseas counterparts do. As the Federation for Self-Financing Tertiary Education ("FSTE") alleges, having only acquired discipline-specific knowledge is insufficient in the 21st century workplace.

However, tertiary students in Hong Kong, like their counterparts in other countries, tend to resist, refuse, or feel upset about having to take non-discipline specific, general education courses (FSTE, 2013; Fuess & Mitchell, 2011; Seraphin, 2013). Faculty members deployed to teach general education courses also do not believe in their importance (FSTE, 2013). Contradictions in the belief of the importance of general education courses versus the actual delivery of them always exist (Jones, 2009).

It was believed that an investigation into the relevance of the subject a graduate majored in at college to the person's current job could help illuminate the general situation in the employment market and provide the necessary evidence to help present the need for general education clearly to the various stakeholders, from students to policy makers. This led us to our research questions.

Research Methodology

Research Questions

To gain a more thorough understanding of the situation, we proposed three research questions. The first research question was asked to explore the match or mismatch of qualifications and job requirements within the overall population: What is the proportion of university graduates holding jobs related to their majors of studies in Hong Kong?

The second research question set out to further investigate whether such match or mismatch of qualifications and job requirements is related to demographic factors: Are there differences in the degree of match between qualifications and job requirements across different groups of graduates in Hong Kong, in terms of their majors, industries or professions, education levels, income levels, and genders?

Also, although it has been established that generic skills are essential in seeking employment, few studies have explored the relative importance of various generic skills in affecting the employability of graduates on different jobs and at different career levels. This led to the third research question: What types of generic skills are the most important for employees in different industrial sectors, and at different career levels in Hong Kong?

Data Collection and Method

The first and the second research questions are about the proportion of degree/sub-degree holders who work in jobs related to their major of studies and the difference in major-job relevancy across different groups of degree/sub-degree graduates. The population includes all working degree/sub-degree holders in Hong Kong. As for the third research question, since it seeks to find out what types of skills are the most important for different groups of employees in Hong Kong, the population for it is not limited to degree/sub-degree holders but includes employees at all education levels.

Data were collected through telephone interviews with subjects randomly selected from the phone directory in Hong Kong, and from social media. To answer the first research question, the following formula adopted from Lind, Marchal, and Wathen (2015) was used to determine the minimum required sample size.

$$n = p(1-p)\left(\frac{Z}{E}\right)^2$$

where,

$n =$ the minimum sample size

$p =$ the population proportion (set as 0.5 for being the most conservative)

$z =$ 1.96 (for the 95% confidence)

$E =$ the margin of error (set as 0.05)

Following the formula, the minimum sample size was set at 385. This allowed a 95% confidence interval of proportion with margin of errors within 5%. A one-tailed *Z*-test was performed to determine the minimum proportion of degree/sub-degree holders (with at most 5% sampling error, at 5% significance level) who hold jobs related to their major of studies.

To answer the second research question, the sample was further classified according to their majors, occupations, industries, education levels, countries where the degree was earned, income levels, and genders. Similar to the first research question, one sample *Z*-tests were performed to estimate the proportions of different groups of graduates who work in jobs related to their major of studies.

The third research question involves studies on employees at all education levels. The sample was used to estimate the proportion of employees who ranked professional skills as the most, or one of the top three most important for their jobs, with 95% confidence level.

Results and Discussion

Among the 1,202 respondents, 63 of did not report their highest education level completed. Therefore, these were treated as invalid responses. This makes a total of 1,139 valid responses with 490 (43 percent) of them having received sub-degree or above education. It is higher than the overall Hong Kong figure of 30 percent (Education Bureau, 2015). This is not surprising because some questionnaires were collected through social media via the contacts of the researchers.

To answer the first research question, respondents were asked to provide an answer on a Likert scale: "how is your major of study related to your current job (1 = totally unrelated; 2 = less than one-half related; 3 = half-and-half related; 4 = more than one-half related; 5 = totally related)". This question relates their major of studies and jobs. This relationship is termed as 'major-job relevancy" in this paper as previously mentioned.

Among the 490 responses, 3 were invalid. Based on the sample of 487 valid responses, 53.8 percent of them said that their major of study was half-and-half related, less than one-half, or even totally unrelated to their current jobs. Using Normal Distribution *Z*-test, it can be estimated that more than 49 percent of employees believe that their major of study is 50 percent or less related to their job, and the result is significant ($p = 0.0191$). These figures are largely comparable with similar previous reports (Basken, 2011; Crotty, 2012; Plumer, 2013).

With only around half of the respondents on jobs perceived to be relevant to their major of study, the finding provides a strong signal to curriculum designers and students that acquiring generic, non-technical skills is crucial to survival and competiveness in the 21st century workplace; this is especially true for majors in Business and Management, Sciences, and Social Sciences as will be discussed. World Economic Forum (2014) emphasizes that "action is needed to reduce the gap between knowledge generated in the educational system and the skills demanded by employers" (p. 5). If the need to equip graduates with the generic skills that employers generally expect is not addressed, the issues of skills mismatch and over-qualification will be aggravated.

Skills mismatch occurs when the skills possessed by employees acquired through education do not match with skills required by employers. Over-qualification refers to the situation when people working for jobs that require a lower qualification (Quintini, 2011; World Economic Forum, 2014). This occurs when the growth of skilled jobs does not keep pace with the growth of graduates; it creates excess supply of graduates. Over-

qualification can also be a result of heterogeneity of graduates (Chevalier & Lindley, 2006) or heterogeneity of skills (Mateos-Romero & Salinas-Jimenez, 2016). An “A” today is not the same as an “A” in the old days (Goodwin, 2011). Education attainment does not necessarily align with the stated outcomes.

To answer the second research question concerning differences in this major-job relevancy across different groups of graduates, comparisons were conducted among them in terms of their majors, occupations, industries, education levels, locations of degree earned, income levels, and genders. Results of these comparisons are given below.

When respondents of different majors were compared, those who were from Medicine, Dentistry and Health related disciplines reported the highest major-job relevancy (n = 32; mean = 4.16), followed by those from Education (n = 30; mean = 4.10), and those from Engineering and Technology (n = 92; mean = 3.46), while the Social Sciences group experienced the lowest major-relevancy (n = 49; mean = 2.86).

In terms of the estimated proportion of employees who experience high major-job relevancy (i.e., proportion of employees whose major is more than half-half related to their job), there are variations across groups of different majors. Education is estimated to be the group with the highest percentage of employees holding jobs that are relevant to their degrees (proportion > 62%; p = 0.0490), followed by the group from Medicine, Dentistry and Health related disciplines (proportion > 57%; p = 0.0446). The Social Science group is projected to experience the lowest major-job relevancy (proportion > 23%; p = 0.0359), and the Sciences group come the second lowest (proportion > 24%; p = 0.0377). The corresponding 95% confidence interval estimation is available upon request for interested readers. Difference among the different groups of majors was found to be significant (F = 4.386; p = 0.000), suggesting that there were differences among employees graduating with different majors.

These results are not surprising. Health-related, education, engineering and technology jobs tend to be professional and technical. Students having chosen, for example, medicine as their majors have an intention to work in the industry, and most of them do. Medical industry requires very professional and technical knowledge.

The respondents were also categorized by their occupations for comparison. The group of graduates with occupations as plant and machine operators and assemblers scored highest in major-job relevance (n = 7, mean = 4.29), followed by the group of professionals (n = 134, mean = 4.02). The group of craft and related workers (n = 5,

mean = 3.80) and associate professionals (n = 56; mean = 3.73) followed, with means higher than the sample average (N = 486; mean = 3.33). General administrative and unskilled occupations tended to have lower major-job relevancy.

When the proportion of each employee group experiencing high major-job relevancy is estimated, of all the groups, professionals are most likely to have jobs that are related to their studies (proportion > 60%; p = 0.0308), followed by associate professionals (proportion > 51%; p = 0.0426). Service and sales workers have the least chance to find jobs relevant to their academic qualifications (proportion > 13%; p = 0.037). Difference among different occupations was found to be significant (F = 10.72; p = 0.000). Therefore, differences are expected to exist among graduates working in different occupations.

These results are expected. Professionals, such as accountants, lawyers, medical practitioners have to be specially trained. Their jobs require a lot of knowledge and skills acquired from their studies. Machine operators and assemblers, craft and related workers need a lot of technical skills learned from school.

Comparisons were also made among respondents from different industries. Graduates working in industries such as education (n = 53, mean = 4.25); professional, scientific and technical industries (n = 22, mean = 4.00); human health and social work (n = 37, mean = 3.95), and construction (n = 24; mean = 3.67) tended to report higher major-job relevancy than others. Arts, entertainment and recreation (n = 14; mean = 2.86) as well as public administration (n = 11; mean = 2.55) were fields where lower major-job relevancy was found.

As for the proportion of employees from different industries estimated to attain high major-job relevancy, graduates working in education can expect the highest major-job relevancy (proportion > 68%; p = 0.0396), followed by those from the human health and social work category (proportion > 51%; p = 0.0458). Graduates working in arts, entertainment and recreation claim the lowest relevancy (proportion > 13%; p = 0.0416). Difference among different industries was also found to be significant (F = 3.257; p = 0.000) and so it is projected that there are differences among graduates working in different industries. The comparisons by industries and by occupations interestingly yield consistent results.

Fourth, when education levels are compared, graduates with higher education level tend to claim higher major-job relevancy: master’s degree and above (n = 98, mean = 3.65); postgraduate certificate or diploma (n = 42, mean = 3.40); undergraduate (n = 285,

mean = 3.25), and sub-degree (n = 62; mean = 3.13). Although differences among different education levels exist, they are insignificant (F = 2.44, p = 0.064). Therefore, we cannot conclude that differences in major-job relevancy exist among employees with different education attainments. The data reveal one thing though – the higher the education, the more the major-job relevancy.

Fifth, when locations of degree earned were compared, the difference among degrees earned in Hong Kong (n = 211; mean = 3.45), overseas (n = 95; mean = 3.62), or through distance learning (n = 15; mean = 3.93) was insignificant (F = 1.033; p = 0.357).

Sixth, when income levels were compared, an interesting pattern was found as shown in Figure 1.

Figure 1: Mean Relevancy Scores and Income Levels

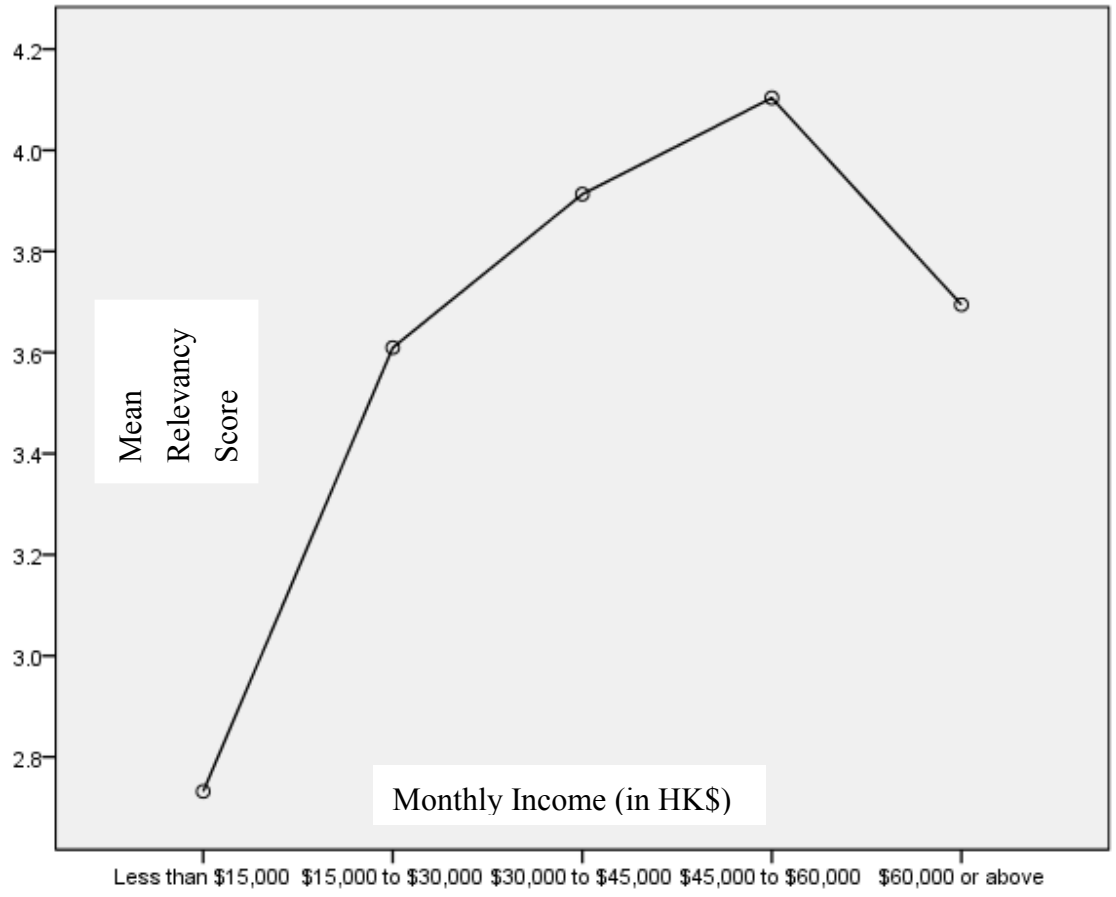

Figure 1 shows that in general, there is a positive correlation between income level and major-job relevancy graduates. Graduates with higher income tend to find that their jobs are more related to their major of study. Among all the income groups, the group with income in the range of $45,000 to $59,999 per month reported strongest major-job relevancy (n = 29; mean = 4.10). However, it should be noted that beyond this income

level, the trend reverses. For respondents from the highest income group ($60,000 or above), their major-job relevancy was not as high as that perceived by groups with slightly lower income.

The proportion of employees experiencing highest major-job relevancy of different income groups is therefore estimated to be highest among graduates in the monthly income group $45,000 to $60,000 (proportion > 53%; p = 0.0425), while graduates earning monthly income of less than $15,000 have the lowest relevancy (proportion > 22%; p = 0.0318).

One way to explain why people with higher incomes tend not to report as high major-job relevancy is by the nature of their jobs as reflected by their salaries. People earning a monthly income in the range of $45,000 to $60,000 are mostly employees in middle management positions, and those earning above $60,000 are more likely to be in more senior positions. This may suggest the importance of disciplinary knowledge in middle management – middle-management employees are required to possess higher subject expertise knowledge. As employees move higher up the ladder, the need for subject expertise knowledge tends to decline. They need other knowledge and skills such as management and, perhaps budgeting. For instance, novice teachers need a lot of subject knowledge. When the teacher is promoted to become a subject panel chair, more knowledge in the subject area is needed. However, when the teacher is promoted to become a school principal, subject knowledge will become less important.

The ANOVA result revealed that the difference between groups was significant (F = 8.578; p = 0.000). However, the test of multiple comparisons found that this significant difference only occurred between the lowest income group (monthly income less than $15,000) and other income groups. The differences among other income groups of above $15,000 per month were insignificant.

Graduate employees earning less than $15,000 a month include fresh graduates, those who are unable to find jobs matching with their majors (skills mismatch), and those who are unable to find jobs matching with their qualifications (qualification mismatch). Skills and qualification mismatch, as discussed earlier, are common structural problems among advanced economies. Affected by either of these issues, employees may earn less than those who have their skills and qualifications matched with their jobs (World Economic Forum, 2014).

Seventh, when gender is compared among graduates, male graduates (n = 234; mean = 3.39) and female graduates (n = 251; mean = 3.27) have similar mean score. The

difference is insignificant ($F = 0.883$, $p = 0.348$). It can therefore be concluded that there is no difference between genders in major-job relevancy.

Having done the above analysis, we have to admit that quantifying the percentage of major-job relevancy is difficult. The results were obtained purely on the ground of respondents' own claim and subjective estimation. What is important though is that mere possession of technical skills is insufficient to compete in today's job market.

To answer the third research question concerning the relative importance of different skills for different employee groups in Hong Kong, respondents were asked to list the three most important skills required for their job. Among the 475 valid responses from employees with sub-degree or above education, 136 respondents (28.6 percent) chose professional skills as the most important skill, 129 (27.2 percent) for interpersonal communication skills and 108 (22.7 percent) for English. For all education levels, among the 1,071 responses, 333 respondents (31.3 percent) chose interpersonal communication skills as the most important skill, 195 (18.2 percent) for English, and 129 (12.0 percent) for professional skills.

These results reinforce findings from previous studies in the Hong Kong context (Education Bureau, 2010; Li, 2015) and elsewhere in the world (Garcia, 2014; Nguyen, 2016; Walker, Roberts, & Mehlhorn, 2015; Williams, 2015; World Economic Forum, 2014). While there is no doubt that professional knowledge and skills are important, the present study and other previous studies all provide strong evidence that generic skills such as interpersonal communication skills and English language skills are equally important, if not more so.

Our analysis continues to classify the skills into 2 groups - professional skills and generic skills. All skills except professional are generic. A 95% confidence interval in the percentage of graduates who have chosen professional skills as the most important, and one of the top three important skills, was estimated across different groups of graduates in terms of their majors, occupations, and industries.

A comparison among different majors of professional skills, as the most important, and one of the top three important skills, was made. Given the data collected, it is estimated at 95% confidence interval that the proportion of employees with medicine, dentistry and health related majors who find professional skills as the most important skill for their jobs falls between 32.7% and 67.3%. The proportion of employees who find professional skills as one of the top three most important skills falls between 67.7% and 94.8%. For employees in education, these proportions are 16.5% to 50.2% and 32.1% to 67.9%

respectively. Professional skills are less important for business and management, arts and humanities, and social sciences majors.

The results are reasonably expected. Students in medicine, dentistry and health related majors tend to pursue their careers in the related field. Jobs in these fields require very specialized knowledge and skills. The education sector shows a similar trend. Therefore, these graduates find higher major-job relevancy. For work in business and management, arts and humanities, and social sciences, works can be less specialized. For example, a non-accounting business graduate can become a book-keeper or junior accountant. The major-job relevancy is limited to the accounting courses that he/she has taken in his/her studies.

A similar comparison among different occupations was done. The proportion of plant and machine operators and assemblers who find professional skills as the most important skill for their jobs falls between 17.9% and 41.7%. The proportion of plant and machine operators and assemblers who find professional skills as one of the top three most important skills falls between 56.4% and 80.5%. For professionals, these proportions are 33.1% to 48.7% and 60.1% to 74.9% respectively. Professional skills are less important for managers and administrators.

There is no doubt that plant and machine operators and assemblers need specialized, technical skills to perform their jobs. Professionals certainly require technical skills. Therefore, their major-job relevancy has to be higher. To perform duties as a manager or an administrator, field specialized knowledge may not be required as much as general management or administration knowledge. For example, if a medical doctor becomes the head of a hospital, his/her job will involve him/her more in management and administration than seeing patients or medical operation.

For the comparison among different industries, the proportion of graduate employees in construction industry who find professional skills as the most important skill for their jobs falls between 40.6% and 66.3%. The proportion that these employees find professional skills as one of the top three most important skills falls between 66.9% and 88.3%. For professional, scientific and technical activities industry, these proportions are 29.9% to 62% and 55.5% to 85% respectively. Professional skills are less important for industries such as transportation, storage, postal, and courier services, accommodation and food services activities, and administrative and support service activities.

The construction industry requires graduates with more professional (and technical) skills. It also makes sense for industries of professional, scientific and technical activities.

For other industries such as accommodation and food service, graduate employees working in these industries could reflect qualification mismatch. It may not be necessary for employees to hold a bachelor's degree to work in accommodation and food service industry. A degree may not be necessary either for those working in industries such as transportation, storage, postal, and courier services although there are institutions offering undergraduate programs in logistics.

Conclusion

All in all, general education that teaches students non-technical, generic or soft skills is crucial to prepare students for the 21st century workplace. Professional skills are just insufficient (Education Bureau, 2010; Federation for Self-Financing Tertiary Education, 2013; Li, 2015).

Graduate employees not well-prepared for the workplace are unable to secure jobs matching their qualification. Skills or qualification mismatch costs employers, workers and society at large (World Economic Forum, 2014). Higher education institutes must review the curricular structures of their programs to make sure that they meet the needs of employers. Otherwise, a lot of resources will be spent on producing skills-mismatched employees. Narrowing the gap between the skills graduates are trained in and those that employers' demand is urgently needed.

The result of this study provides a reference to local higher education institutes in their design of general education courses. It should also help to change the view of faculty members deployed to teach general education courses, reduce resistance and resentment from students having to take general education courses, and promote the importance of a well-rounded education in university stemming from the general education curriculum. This study also opens the door for future research to identify the kind of generic skills needed, in addition to professional, major-related skills, in the job market in Hong Kong. One limitation of this study is the sample size. With more money budgeted for research in this area, a larger sample to be collected through random telephone interviews will produce a more comprehensive result. A larger scale study on the relative importance of skills possessed by employees and expected by employers can also be conducted.

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