

## Development of Generic Skills of Associate Degree Students in Hong Kong

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### Abstract

*This study aims to identify potential factors influencing the development of generic skills of the cohort of associate degree students admitted to Hong Kong Community College in 2010/11 academic year. Self-reported generic skills were collected from two random samples on admission (Entry) and graduation (Exit). The collected data were then analyzed using a repeated measures model. The results indicated that different genders have significant difference in perceiving their generic skills. The exposure to student development activities was found to have positive effect on some generic skills. In addition, we observed large variation in the improvements of generic skills across different academic disciplines.*

*Keywords: generic skills, associate degree students, Hong Kong.*

### Introduction

This study aims at understanding the factors influencing the development of generic skills over time among associate degree students in Hong Kong Community College (HKCC), a self-financed unit of The Hong Kong Polytechnic University (PolyU). Based on the results, we will suggest possible steps forward for the improvement of generic skills of associate degree students. In recent decades, it is increasingly popular for educators and employers to evaluate students not only by their subject-specific knowledge, but also their generic competences or generic skills. In education literatures, there are many variations in the definition of generic skills. For example, Fung et al. (2007) described generic skills as "transferable, multifunctional knowledge, skills and attitudes" that could be developed in multiple ways and applied to various real life situations. However, the set of generic skills being considered by various organizations and studies can be quite different. Hambur (2002) enumerated several lists of generic skills in their report, for instance, the Mayer competencies and employability skills by ACNielsen. In our study, we will look at 14 different generic skills as defined by Fung et al. (2007) and we will discuss that further in the second section of this paper.

Numerous researches were devoted to the development of generic skills from different perspectives (Tait & Godfrey 1999; Crebert et al. 2004; Chamorro-Premuzic et al. 2010). One of the goals of these studies is to provide insights on how to promote the

development of students' generic skills in various environments and countries. In Hong Kong, generic skills of students are getting more attention in recent years. Using HKCC as an example, generic skills are part of the learning outcomes of all academic disciplines. Generic skills like "problem solving", "interpersonal communication", "critical thinking" and etc. can be found in almost all the curricula in HKCC. These generic skills are not only of interest to the college itself but also the college's articulation partners, including universities and employers. These articulation partners do evaluate HKCC's graduates in terms of their generic skills in addition to their professional knowledge. It is therefore important to study how students develop their generic skills in our college and determine the factors influencing such development.

In our study, we are interested in finding out whether gender, exposure to student development activities and academic disciplines will have any effects on the development of various generic skills. These factors are selected because they are found to be affecting the development of generic skills in various researches. In addition, they will provide easy to deploy intervention points should they have significant effects on generic skills.

Among factors affecting generic skills, gender is one that comes up frequently in education literature. For instance, Rhee & Kim (2012) found that male and female react differently to formal and informal learning, meaning that students of the two genders will take different routes in the development of their generic skills. Furthermore, the gender differences can be different for various generic skills. In the study conducted by Badcock et al. (2010), gender is found to have significant effect on interpersonal understandings but not on other generic skills for a cohort of students in Australia. Another study by Hambur et al. (2002) also observed possible effect of gender on interpersonal skill and problem solving skill. Such gender differences will have policy implications for college administrators who need to develop activities and learning environments catering to the learning needs of the two genders.

The second factor that is of interest in the development of generic skills is the exposure to student development activities. It is widely accepted that education is not limited to classroom teaching. Patterson & Bell (2001) suggested that "theoretical" learning like regular lecture can be complemented by "experiential" learning in real-world environment. Activities outside classroom are also referred to as leisure education by educational researchers. Leisure education is found to be useful in enhancing sense of community, sense of self and active learning, and consequently, enhancing the sense of engagement of their institutes (Evans et al., 2013). However, quantitative analysis as in Rhee et al. (2012) didn't find association between extracurricular activities with development of analytical thinking and problem-solving skills in either male or female students. In HKCC, the goal of co-curricular activities is precisely the enhancement of generic skills. It is therefore important to evaluate and quantify the effectiveness of these activities. Our results will provide guidance on the planning of future activities in HKCC.

The last factor being considered in this study is the effect of academic discipline on the development of generic skills. Students from different academic disciplines often exhibit large variations in the same generic skill. One such example can be found in the study by Badcock et al. (2010), in which significant interdisciplinary variations in generic skills were observed in a group of university students in Australia. In the study conducted by Hambur (2002), significant variations were also observed in the generic skill profiles across 9 different academic disciplines. Similarly, variations in generic skill profiles across different academic disciplines also have implication for college administrators in the development of curriculum as well as discipline specific co-curricular activities.

Despite of the numerous researches about development of generic skills, our study can still bring new insights to the area. Associate degree sector in Hong Kong is fairly new and the students often have a lower esteem than those who are able to enter into four-year universities. Hence, it is worthwhile to study the factors driving the development of generic skills in such a cohort of students.

### The Study and the Data

Our study was carried out in two phases. In Phase I (Entry), a random sample of 1377 incoming associated degree students of HKCC in 2010/11 academic year was selected. The selected students were asked to complete a self-administered questionnaire about their perceived generic skills. The data indicates that broad academic disciplines (science & non-science) and gender have associations with some of the generic skills among freshman for 2010/11 academic year (So et al., 2011).

Phase II (Exit) of the study was carried out at the end of 2011/12 academic year when the students completed their two-year studies in HKCC. In Phase II, another random sample of 564 students was selected. Due to the overlapping nature of the samples, we only have 1727 unique students in the combined sample, among which 214 had responded to both surveys. The selected students were asked to complete the same questionnaire used in the Phase I. A breakdown of the samples by academic disciplines and gender is shown in Table 1.

**Table 1: A Breakdown of the Samples in Phase I and II**

Academic Discipline	Gender	Phase I(Entry)	Phase II(Exit)
Applied Social Sciences (AD-APSS)	Male	37	68
	Female	37	29
Business (AD-BUS)	Male	354	185
	Female	227	94
Design (AD-DSG)	Male	1	5
	Female	0	0
Humanities & Communication (AD-H&C)	Male	53	58
	Female	13	22
Health Studies (AD-HS)	Male	85	37
	Female	38	9
Science & Technology (AD-S&T)	Male	121	12
	Female	411	45
Total	Male	651	365
	Female	726	199

The questionnaire being used in both phases is the Self-Assessment of All-Round Development (SAARD) Questionnaire developed by PolyU for assessing generic skills of college students (Fung et al., 2006, 2007). There are 56 questions in the questionnaire covering 14 generic skills: communications; creative thinking; critical thinking; cultural appreciation; entrepreneurship; EQ & psychological wellness; global outlook; healthy lifestyle; interpersonal effectiveness; leadership; lifelong learning; problem solving; social and national responsibility; and teamwork. Each generic skill is covered by 4 questions using a 7-point Likert scale (1 point = not well, 7 point = very well). A score will be computed for each generic skill by summing up the responses of questions under that generic skill. At the end, we come up with 14 generic skill scores with a range of 4 to 28.

Since we are interested in the effect of gender, academic disciplines and student development activities participation, the required information was extracted from the college's administrative database and merged with the survey data collected in the two phases. The 6 academic disciplines listed in Table 1 are the academic "scheme" of the college. It can actually be broken down further into "programmes" but we choose not to do so because of the lack of observations at programme level.

As for the exposure to student development participation, it is based on the activities logged under a student's Co-curricular Achievement Transcript (CAT). We name activities being tracked under this scheme as "CAT activities". These activities cover a wide variety of areas including leadership trainings, study tours, language enhancements, complementary studies and many more. The exposure to CAT activities is measured in terms of number of hours logged on the student's CAT. For freshmen on entry, they all have zero exposure to CAT activities. By the time they graduate from HKCC, students should have exposed to different levels of CAT activities. Among the 564 students contacted on exit, 421 of them had participations in CAT activities. A summary of CAT activities exposure of the participants is shown in Table 2 and Table 3.

**Table 2: Exposure to CAT Activities by Gender on Exit**

Gender	Exposure to CAT Activities (in Hours)		
	25 <sup>th</sup> Percentile	50 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile
Male	4.0	9.5	22.0
Female	7.0	16.5	31.0
Overall	6.0	13.5	28.5

**Table 3: Exposure to CAT Activities by Academic Discipline on Exit**

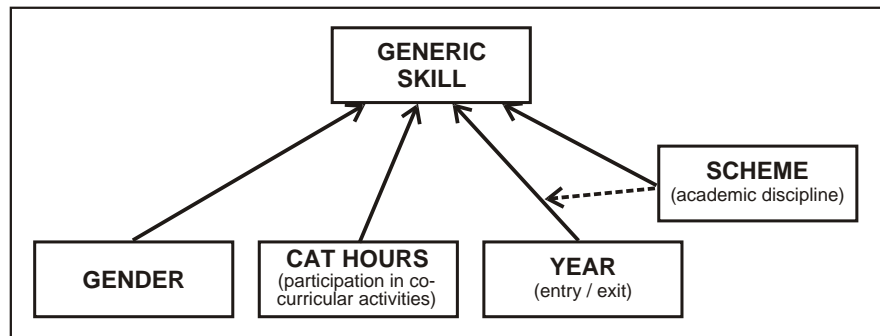
Academic Discipline	Exposure to CAT Activities (in Hours)		
	25 <sup>th</sup> Percentile	50 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile
Applied Social Sciences (AD-APSS)	6.0	18.3	37.3
Business (AD-BUS)	6.1	12.8	24.5
Design (AD-DSG)	10.8	20.0	42.3
Humanities & Communication (AD-H&C)	4.5	19.5	31.5
Health Studies (AD-HS)	3.0	8.8	25.1
Science & Technology (AD-S&T)	4.1	9.0	24.1
Total	6.0	13.5	28.5

### The Model

Since we have collected our data using two separated random samples at two different times, they constitute a pair of overlapping samples. Instead of using t-tests for overlapping samples, we will use a repeated measures model to study the factors affecting self-reported generic skills. A formal introduction to this type of model can be found, for example, in (Singer & Willett, 2003). Repeated measures model is essentially a type of regression models for modeling the repeated measurements of a cohort of subjects over time, or so-called longitudinal study. It can account for the potential correlations of repeated measurements collected from the same group of subjects and missing measurements at one or more time points. Similar to multiple linear regression models, it can be used to study the effects of multiple factors on the dependent variable.

Our study can be viewed as a longitudinal study with two time points: (1) the beginning of 2010/11 academic year (Entry), and (2) the end of 2011/12 academic year (Exit). The two time points are denoted by the YEAR variable in our model and the measurements being made at these two time points are the scores of the 14 generic skills. In addition to the generic skills, we also have the gender (GENDER), academic discipline (SCHEME) and exposure to student development activities (CAT HOURS) as our independent variables.

Figure 1: Path Diagram of Variables in the Model



The relationships between variables in our model are summarized in Figure 1. In our model, YEAR, GENDER, SCHEME and CAT HOURS are considered as having direct effect on self-perceived generic skills. Therefore, all of them are included as the main effects in the model. An additional interaction effect between SCHEME and YEAR is included to account for possible disparity of YEAR effect in different academic disciplines. In the model, YEAR effect can be interpreted as the effect of maturity of a student on the development of generic skills. However, we conjecture that such effect may be different for students with different backgrounds. In our case, the background of students is best captured by their academic disciplines (SCHEME) because the choices of academic discipline are often driven by their personal interests and secondary school performances. In the model, the SCHEME variable can be viewed as a modifier of the YEAR effect. As we have 14 different generic skills

(dependent variables), 14 repeated measures models are fitted using the same set of independent variables.

The proposed model will express a generic skill of  $i$ -th ( $i = 1, \dots, n$ ) student at time  $t$  ( $t = 1, 2$ ) using the following equation.

$$\begin{aligned}
 \text{Generic Skill}_{it} = & \beta_0 + \beta_1 \times I(\text{Gender}_i = F) + \beta_2 \times I(\text{Year}_{it} = 1) \\
 & + \beta_3 \times (\text{CAT\_Hours}_{it}) + \beta_{4,k} I(\text{SCHEME}_i = k) \\
 & + \beta_{5,kt} \times I(\text{Academic Discipline}_i = k) \times I(\text{Year}_{it} = t) \\
 & + \epsilon_{it}
 \end{aligned}$$

In the equation,  $I(\cdot)$  are indicator functions that evaluate to 1 if the condition is satisfied, 0 otherwise. The  $\beta$ 's are the regression coefficients to be estimated. As gender and year are both binary variables, only one regression coefficient will be associated with each of the two effects. For academic discipline effect, we have 6 associate degree schemes, therefore 5 non-redundant parameters are associated with the academic discipline effect ( $\beta_{4,k}$ ). Similarly, there will only be a total of 5 non-redundant parameters associated with the academic discipline by year interaction ( $\beta_{5,kt}$ ). The error term for  $i$ -th student  $(\epsilon_{i1}, \epsilon_{i2})^T$  is assumed to have a bivariate normal distribution with zero means and an unknown 2 by 2 covariance matrix  $\Sigma$ .

### Results

The models are fitted using the MIXED procedure in IBM SPSS Statistics Version 21. The importance of the effects in the models is assessed by their Type III sum of squares. The p-values of each effect under each model are summarized in Table 4. Selected regression coefficients are also reported in Table 5.

Table 4: p-values of Type III Tests of Model Effects

Generic Skill (Dependent Variable)	CAT HOURS	GENDER	YEAR	SCHEME	SCHEME BY YEAR
Communication	0.12	0.03**	0.16	0.00**	0.04**
Creative Thinking	0.31	0.00**	0.16	0.00**	0.06*
Critical Thinking	0.47	0.00**	0.90	0.00**	0.00**
Cultural Appreciation	0.52	0.09*	0.16	0.00**	0.07*
Entrepreneurship	0.02**	0.00**	0.91	0.04**	0.06*
EQ & Psychological Wellness	0.35	0.00**	0.31	0.10*	0.05**
Global Outlook	0.03**	0.00**	0.36	0.00**	0.33
Healthy Lifestyle	0.17	0.00**	0.54	0.04**	0.56
Interpersonal Effectiveness	0.06*	0.07*	0.43	0.00**	0.00**
Leadership	0.02**	0.66	0.30	0.00**	0.01**
Lifelong Learning	0.05**	0.00**	0.23	0.00**	0.00**
Problem Solving	0.11	0.00**	0.65	0.00**	0.00**
Social and National Responsibility	0.01**	0.84	0.37	0.12	0.93
Teamwork	0.01**	0.18	0.39	0.00**	0.01**

\* The effect is significant at level 0.1.

\*\* The effect is significant at level 0.05.

**Table 5<sup>§</sup> : Regression Coefficients of CAT HOURS, GENDER and YEAR**

Generic Skill (Dependent Variable)	CAT HOURS		GENDER (Female) <sup>#</sup>		YEAR (Entry) <sup>##</sup>	
	Regression Coefficient	Standard Error	Regression Coefficient	Standard Error	Regression Coefficient	Standard Error
Communication	0.009	0.006	-0.358**	0.166	-0.314	0.437
Creative Thinking	0.006	0.005	-1.092**	0.163	-0.563	0.393
Critical Thinking	0.004	0.005	-0.994**	0.150	-0.726*	0.375
Cultural Appreciation	0.005	0.007	0.359*	0.212	-0.072	0.533
Entrepreneurship	0.016**	0.007	-1.057**	0.185	-0.136	0.475
EQ & Psychological Wellness	0.006	0.006	-0.539**	0.185	0.262	0.467
Global Outlook	0.014**	0.006	-0.615**	0.184	-0.149	0.463
Healthy Lifestyle	0.010	0.007	-1.074**	0.196	0.472	0.516
Interpersonal Effectiveness	0.012*	0.006	0.325*	0.177	0.405	0.438
Leadership	0.014**	0.006	-0.075	0.168	0.240	0.429
Lifelong Learning	0.011**	0.005	-0.630**	0.157	-0.337	0.407
Problem Solving	0.008	0.005	-0.904**	0.155	-0.238	0.369
Social and National Responsibility	0.016**	0.006	-0.036	0.178	-0.297	0.451
Teamwork	0.014**	0.005	-0.209	0.158	-0.158	0.405

§ Regression coefficients of Academic Discipline and interaction terms are suppressed because of the large number of coefficients involved.

# Regression coefficient of Male is the baseline, which is fixed at zero.

## Regression coefficient of Exit is the baseline, which is fixed at zero.

\* The regression coefficient is significant at level 0.1.

\*\* The regression coefficient is significant at level 0.05.

In Table 4, we can see that GENDER has significant associations with majority of the generic skills. Only three of the generic skills are not significant, namely Leadership, Social and National Responsibility and Teamwork. The regression coefficient of female group in Table 5 indicates female students tend to report lower generic skills scores than their male counterparts, with the exception of Interpersonal Effectiveness and Cultural Appreciation.

Exposure to CAT activities also has significant association with 6 of the generic skills. The corresponding regression coefficients of CAT HOURS in Table 5 indicate that increased exposure to CAT activities is associated with higher self-reported generic skills.

In the models, YEAR is not significant for any generic skills but SCHEME is significant in almost all of the models. This means on average there are no significant differences in the self-reported generic skills between Entry and Exit, however there are significant variations in self-reported generic skills scores across different academic disciplines. In addition, we see significant SCHEME by YEAR interaction effect in 11 models, meaning that there are significant changes in self-reported generic skills within different academic disciplines and such changes are not homogeneous across academic disciplines. This interaction effect is also evident in the predicted changes in generic skills presented in Table 6 and Table 7.

To understand how changes in generic skills over a two-year period are associated with the exposure to CAT activities and students' academic discipline, we constructed post hoc tests for comparing the generic skills on Entry and Exit under two different scenarios. In the first scenario, we looked at the changes in generic skills across academic disciplines if students do not participate in any CAT activities (i.e. CAT HOURS = 0). The results are summarized in Table 6. The second scenario studies the changes in generic skills of students participated in 13.5 hours of CAT activities by the time they graduate. This level of CAT activities participation is chosen for analysis because it is the median level of exposure among CAT activities participants in the cohort.

Since the CAT HOURS is a main effect in our model and we assume no exposure to CAT activities on Entry and Exit in the first scenario, the changes we observed in Table 6 is driven entirely by the interaction between YEAR and SCHEME. Although YEAR is not significant as a main effect, we can see that significant changes in majority of generic skills are observed among students in Business Scheme and Health Studies Scheme. The positive changes observed in these two schemes imply that their students are showing improvements in self-reported generic skills after their two-year studies in HKCC. On the other hand, there are some anomalies observed in Table 6. The first one is the significant drop in Interpersonal Effectiveness of Applied Social Science students and Humanities & Communication students. The other one is the significant drop in EQ & Psychological Wellness of Humanities & Communication students.

**Table 6: Predicted<sup>§</sup> Changes in Generic Skills for CAT Non-participants**

Generic Skill	SCHEME (Academic Discipline)											
	AD-APSS		AD-BUSS		AD-DSG		AD-H&C		AD-HS		AD-S&T	
	Entry	Predicted Change on Exit	Entry	Predicted Change on Exit	Entry	Predicted Change on Exit	Entry	Predicted Change on Exit	Entry	Predicted Change on Exit	Entry	Predicted Change on Exit
Communication	19.62	0.11	19.16	0.81**	17.31	2.96	20.94	-0.60	19.30	1.64**	19.06	0.31
Creative Thinking	20.58	0.11	18.97	0.72**	20.62	1.46	20.17	0.16	19.03	2.05**	19.04	0.56
Critical Thinking	20.29	-0.06	19.12	0.83**	23.55	-3.69	20.14	0.21	19.19	2.41**	19.10	0.73
Cultural Appreciation	19.66	0.02	18.73	-0.04	17.89	4.48	20.38	0.01	18.94	2.10**	18.88	0.07
Entrepreneurship	19.87	-0.09	19.59	0.46*	19.74	-0.60	20.54	-0.96	19.91	1.55**	19.22	0.14
EQ & Psychological Wellness	20.42	-0.65	19.18	0.25	19.35	-3.75	20.05	-1.03*	18.99	1.19**	19.25	-0.26
Global Outlook	19.30	0.16	18.98	0.04	19.49	1.46	19.91	0.44	19.23	1.49**	18.50	0.15
Healthy Lifestyle	18.69	-0.55	18.74	0.04	20.67	-1.85	18.47	-0.59	19.28	0.72	18.77	-0.47
Interpersonal Effectiveness	21.24	-1.52**	19.65	0.52**	18.99	-1.69	21.32	-1.08*	19.88	1.02*	19.48	-0.41
Leadership	20.57	0.10	19.91	0.52**	18.22	2.46	21.34	-0.74	19.85	1.86**	19.79	-0.24
Lifelong Learning	20.52	-0.39	19.23	0.83**	19.46	1.93	20.77	-0.37	19.37	1.99**	19.38	0.34
Problem Solving	20.73	-0.62	19.30	0.82**	22.56	-0.21	20.77	-0.67	19.37	2.00**	19.26	0.24
Social and National Responsibility	19.91	0.24	19.45	0.19	17.24	1.99	19.18	0.10	19.80	0.82	19.41	0.30
Teamwork	20.33	-0.10	19.61	0.56**	18.29	1.05	21.37	-0.56	19.44	1.97**	19.56	0.16

§ The computation of the predicted generic skills and changes assumes a balanced male and female population and CATHours are set to zero at both entry and exit.

\* The predicted change is significant at level 0.1.

\*\* The predicted change is significant at level 0.05.

In the second scenario, we looked at the changes in generic skills of students who participated in 13.5 hours of CAT activities, which is the median participation level among CAT activities participants. The results are summarized in Table 7. The pattern we see is similar to the first scenario. However, we should point out that all generic skills show bigger improvements than in first scenario because of the positive relationship between CAT activities exposure and generic skills.

**Table 7: Predicted<sup>§</sup> Changes in Generic Skills for Participants with 13.5 Hours of Exposure**

Generic Skill	SCHEME (Academic Discipline)											
	AD-APSS		AD-BUSS		AD-DSG		AD-H&C		AD-HS		AD-S&T	
	Entry	Predicted Change on Exit	Entry	Predicted Change on Exit	Entry	Predicted Change on Exit	Entry	Predicted Change on Exit	Entry	Predicted Change on Exit	Entry	Predicted Change on Exit
Communication	19.62	0.23	19.16	0.94**	17.31	3.09	20.94	-0.48	19.30	1.77**	19.06	0.44
Creative Thinking	20.58	0.19	18.97	0.79**	20.62	1.54	20.17	0.24	19.03	2.13**	19.04	0.64*
Critical Thinking	20.29	-0.02	19.12	0.88**	23.55	-3.64	20.14	0.26	19.19	2.46**	19.10	0.78**
Cultural Appreciation	19.66	0.09	18.73	0.03	17.89	4.54	20.38	0.08	18.94	2.16**	18.88	0.14
Entrepreneurship	19.87	0.12	19.59	0.67**	19.74	-0.39	20.54	-0.74	19.91	1.76**	19.22	0.35
EQ & Psychological Wellness	20.42	-0.57	19.18	0.33	19.35	-3.67	20.05	-0.94*	18.99	1.27**	19.25	-0.18
Global Outlook	19.30	0.34	18.98	0.22	19.49	1.64	19.91	0.63	19.23	1.68**	18.50	0.33
Healthy Lifestyle	18.69	-0.42	18.74	0.18	20.67	-1.71	18.47	-0.45	19.28	0.85	18.77	-0.34
Interpersonal Effectiveness	21.24	-1.36**	19.65	0.67**	18.99	-1.54	21.32	-0.92*	19.88	1.18**	19.48	-0.25
Leadership	20.57	0.29	19.91	0.70**	18.22	2.64	21.34	-0.56	19.85	2.04**	19.79	-0.06
Lifelong Learning	20.52	-0.25	19.23	0.98**	19.46	2.07	20.77	-0.23	19.37	2.13**	19.38	0.48
Problem Solving	20.73	-0.51	19.30	0.93**	22.56	-0.10	20.77	-0.56	19.37	2.12**	19.26	0.35
Social and National Responsibility	19.91	0.46	19.45	0.41*	17.24	2.21	19.18	0.32	19.80	1.03*	19.41	0.52
Teamwork	20.33	0.08	19.61	0.74**	18.29	1.24	21.37	-0.37	19.44	2.16**	19.56	0.34

§ The computation of the predicted generic skills and changes assumes a balanced male and female population and CATHours is zero on entry and 13.5 hours on exit.

\* The predicted change is significant at level 0.1.

\*\* The predicted change is significant at level 0.05.

## Discussion and Conclusion

From the analysis in previous section, it is evident that student development activities play a positive role in the development of generic skills of associate degree students. Exposure to student development activities is most beneficial to Entrepreneurship, Social & National Responsibility, followed by Global Outlook and Leadership. When comparing to the study of Rhee et al. (2012), we are in line with their conclusions that extra-curricular activities do not have association with the development of generic skills in analytical thinking and problem solving. However, we do complement their results by revealing positive role of student development activities on generic skills other than the two generic skills studied by Rhee et al. (2012).

With the evidence of effectiveness of student development activities on generic skills, a logical step forward is to understand the type of student development activities that are effective in improving specific type of generic skill. Currently, student development activities in HKCC are often proposed by teachers as they see fit. Being able to identify activities that are effective to certain generic skill, the college can better allocate resources to strengthen the weaker areas of the students.

Another observation is the differences in generic skills between the two genders. Only three of the generic skills show no significant differences between the two genders, namely Leadership, Social & National Responsibility and Teamwork. Among the other generic skills showing gender differences, male students tend to rate themselves higher than the females, with the exception of Cultural Appreciation and Interpersonal Effectiveness. Comparing to the study by Hambur et al. (2002), the gender differences observed by them are similar to our results. For example, female is better at Interpersonal Effectiveness while male is better at Problem Solving. Similar patterns were also found in Rhee et al. (2012). Male students tend to rate their improvements in analytical thinking and problem-solving skills higher than their female counterparts. With such findings, a planner of student activities should take into account of the possible needs of male and female students when an activity is being designed.

A somewhat surprising result of this analysis is the disparity of generic skills improvements across different academic disciplines. Marked improvements are seen in most of the generic skills for students in Business and Health Studies Scheme. On the surface, it is contrary to what was observed in Badcock et al. (2010), in which they did not find strong evidence of improvement in students' generic skills as they progress through their studies. They attributed the lack of effect to the omission of interactions of length of study and other variables important to development of generic skills. However our model addresses that particular issue by treating SCHEME as a modifier of the YEAR effect. This confirms the conjecture of Badcock et al. (2010) about interactions between length of study and other external factors. On the practical side, the significant improvements we observed in Business and Health Studies schemes may lead us to conclude that these two schemes outperformed other schemes in nurturing the generic skills of their students. However, we have to bear in mind that the academic discipline of a student is a personal choice made under the influence of one's academic performance in secondary school. Both Hambur et al. (2002) and Badcock et al. (2010) share the view that differences in generic skills may due to differences in individual characteristics of students, such as academic ability, tertiary entrance score and possible self-selection mechanism in course selection. These individual characteristics are all potential confounders with academic discipline. In our case, Business and Health Studies are two highly competitive disciplines and their students tend to have higher admission results. If this is the case, the result we see in our analysis implies possible existence of interaction between academic performance on entry and improvement in generic skills. In other words, students with higher academic performance will have bigger improvements in generic skills over a two-year period. If we do want to evaluate the effectiveness of an academic programme on generic skills, we have to quantify and adjust for the academic performance on entry.

Another aspect worth further research is the significant drops in Interpersonal Effectiveness and EQ & Psychological Wellness observed among Applied Social Science and Humanities & Communication students. It seems difficult to perceive a drop in these two generic skills as the students become more mature. One possible

explanation may be the students have better understanding of themselves as they grew up, hence, evaluating their generic skills differently.

In summary, our study reveals that gender and academic disciplines will influence the generic skills of associate degree students in HKCC and confirms the positive role of student development activities in the acquisition of generic skills. These findings provide some opportunities for the college to design activities focusing on the weakness of the students and allocate resources in a more effective way. Due to the continuous nature of this study, we will be able to further the research by comparing the generic skills of this cohort of graduates to future graduates. The issues raised in this study can also serve as a starting point for other teachers and researchers who are interested in studying the development of generic skills of associate degree students in Hong Kong.

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