What Happened to Sub-degree Engineering Students Under Education Reform In Hong Kong?

Alan Ming-lun FONG¹,a,*

¹Division of Building Science and Technology, City University of Hong Kong
Tat Chee Avenue, Kowloon, Hong Kong
*aEmail: alanfong@cityu.edu.hk
*Corresponding author

Keywords: Higher education, Hong Kong, Education reform, Sub-degree engineering students.

Abstract. The recent 3-3-4 education reform changed both secondary and tertiary education structures in Hong Kong. Most undergraduate programmes had the new curriculum extended from 3 years to 4 years and admitted students from senior secondary 3 (equivalent of S6) starting from September 2012. On the contrary, a number of publicly-funded sub-degree programmes continued to provide a 2-year curriculum while admitting both Form 7 students (under the previous curricular system) and S6 students to the same 2012 cohort of study. The present article aims to study this unique situation by comparing the academic performance of these two groups of students enrolled to the same engineering programme, as well as studying the findings from a programme-wide questionnaire survey to identify the factors affecting students’ selection of major and the challenges that sub-degree engineering students experience after the 3-3-4 transition. The article concludes by discussing the ways to help maintain the academic performance of students at a high level after programme restructuring and the results of the study can be used to form part of a review of the sub-degree education in Hong Kong.

Introduction

The 3-3-4 education reform implemented a new academic structure for senior secondary education and higher education in Hong Kong. Students under this new system are supposed to receive three years of junior secondary, three years of senior secondary and four years of undergraduate university education. The new curriculum began at senior secondary level and undergraduate level in 2009 and 2012 respectively. As part of the education reform, the original public examinations, namely the Hong Kong Certificate of Education Examination (HKCEE) and the Hong Kong Advanced Level Examination (HKALE), were replaced by the Hong Kong Diploma of Secondary Education (HKDSE) [1]. The 4 core subjects of the HKDSE are Chinese language, English Language, Mathematics, and Liberal Studies; besides, there is a wide range of elective subjects covering different key learning areas [2]. Comparing with the original education system established under British colonial rule (a 3-2-2-3 curriculum with three-year junior secondary, two-year senior secondary, plus two-year advanced level secondary education, and three-year university education), this new scheme can align with a more internationalized senior secondary and higher education system such as the one in China, North America, Australia and most countries in Europe. Besides, with only one public examination, the post-secondary admissions process for students can be simplified and the added stress of having to prepare for two public examinations, HKCEE and HKALE, can be
alleviated. No doubt the incorporation of the new core subject Liberal Studies and the cross selection of elective subjects from different key learning areas could give the HKDSE students a broader academic experience as well as enhance their critical mind set and awareness to local and global issues that shapes our society. However, the HKDSE students may not have enough exposure to disciplines related to their major field of tertiary education comparing to most of the HKALE students who focused their studies on only one key learning area.

Figure 1. Comparison with 3-year and 4-year Undergraduate Degree academic structures in Hong Kong.

For most of the undergraduate programmes under the new 3-3-4 curriculum, apart from some professional programmes such as Medicine, intake entrants have to study at the university for 4 years instead of 3. With an extra year of university study, relevant introductory courses, such as the general science courses for students who wish to choose science or engineering related subjects as their majors, can be provided in the first year of study so as to secure the HKDSE students with solid academic foundations for their subsequent specialized majors. For sub-degree programmes during this 3-3-4 transition, they continue their roles in offering the senior secondary leavers a second opportunity in pursuing a recognized qualification either for articulation to local or overseas undergraduate programmes or for entering the skilled and trained workplace of relevant industries. A number of publicly-funded sub-degree programmes kept providing a 2-year curriculum and admitted both HKALE and HKDSE students to the same cohort of study while most undergraduate programmes had a double cohort arrangement (i.e. HKALE students enrolled in 3-year and HKDSE students enrolled in 4-year undergraduate programmes) in the academic year 2012 [3]. This article represents an attempt to study the unique situation of these sub-degree programmes in the City University of Hong Kong. By reviewing the new admission requirement and the new curriculum of a 2-year sub-degree engineering programme, as well as analyzing the academic performance of the two groups of students (HKDSE entry and HKALE entry) studying the same programme, the article seeks to identify the challenges that sub-degree engineering students experience after the 3-3-4 transition. The discussions also form part of a review of the sub-degree education in Hong Kong.

Sub-degree Programme

During the 3-3-4 transition in 2012, the Joint University Programmes Admissions System (JUPAS) kept serving as the platform for both HKALE and HKDSE students to apply for admission to full-time publicly-funded Bachelor’s Degree, Associate Degree and
Higher Diploma programmes. The sub-degree engineering programme under review in this article (refer as Programme A) is one of the six programmes offered by the same department under the same JUPAS admission code. These six programmes had the general entrance requirement for HKDSE entry being level 2 in five subjects including Chinese Language and English Language and for HKALE entry being the same as previous [4]. All admitted students of the 2012 cohort were required to study same core-curriculum courses, English and/or Chinese languages and Gateway Education (GE) courses [5] in their first semester (or known as “common semester”) before entering into one of the six programmes. This new curriculum provided students flexibility to decide which discipline they wish to major in after the first semester of study. Since there was admission quota for each programme, the allocation of major of students’ choice was subject to various selection criteria set by the department such as students’ interest and preference, availability of places, as well as students’ academic performance in the three common core courses in the first semester.

The restructuring of sub-degree programmes also involved course retitling, changing of credit unit size, addition of common required courses, and replacement and combination of courses. Under the Credit Unit System, the structure of the new curriculum included a series of courses covering both university requirements and programmes core courses. In order to implement GE courses and enrich the language requirements, the number of programme core was reduced from 67 to 54 credits. It gives students an opportunity to have a greater flexibility in their studies by means of broadening and enriching their intellectual experience in multi-disciplines. For the Programme A, students are required to accumulate a minimum of 69 credits, including 9 credits of GE requirements, 6-9 credits of language requirements and 54 credits of programme core. The students are expected to equip not only with the professional knowledge of their specialized area, but also with a multi-disciplinary exposure.

**Case Study**

The study involved tracking the experiences of students from the same sub-degree engineering programme during their two years (2012-2014) at the City University of Hong Kong. Quantitative and qualitative analysis by questionnaires was designed for this special cohort. Whole class of 90 students was cordially invited to conduct a 12-question survey after their first year study in the new 3-3-4 curriculum. Four types of on-line survey [6] are formed as: (1) Quantitative question 1-3 for evaluating the relationship between students’ achieved academic performance and their background of secondary education; (2) Quantitative question 4-7 is for evaluating students’ concerns in programme selection during different stages (including JUPAS and/or non-JUPAS path, and streaming exercise in the first semester of study); (3) Quantitative question 8-10 is for evaluating the level of satisfaction in students’ public and university academic results; (4) Qualitative question 11-12 to collect students’ feedback about the difficulties encountered during the first year university study. 82 questionnaires, which equal to 90% of total student number of Programme A students, were collected for analysis. The outlook of the on-line questionaire is shown in Appendix A.
Academic Performance of HKDSE and HKALE Students

The percentage of HKDSE and HKALE students studied in Programme A in 2012-2014 is 17% and 83% respectively. In general, the HKALE students achieved a better academic performance. The average Cumulative Grade Point Average (CGPA) of HKDSE and HKALE students were 2.77 and 3.00 respectively as at the end of semester B in their first year study. The detailed distributions are tabulated below. Quantitatively, the HKALE students with an extra year of senior secondary science education were having a better academic performance than the HKDSE students with a difference of 0.3 CGPA which is equivalent to one Grade Point according to the Credit Unit System of the university.

Table 1. Comparison of academic result for HKDSE and HKALE student in Year 1 & 2.

<table>
<thead>
<tr>
<th></th>
<th>HKDSE + HKALE</th>
<th>HKDSE</th>
<th>HKALE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year 1</td>
<td>Year 2</td>
<td>Year 1</td>
</tr>
<tr>
<td>Range of CGPA</td>
<td>1.62-3.72</td>
<td>2.04-3.66</td>
<td>2.00-3.65</td>
</tr>
<tr>
<td>Average CGPA</td>
<td>2.96</td>
<td>3.04↑(0.08)</td>
<td>2.77</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>0.39</td>
<td>0.32</td>
<td>0.39</td>
</tr>
</tbody>
</table>

In the qualitative findings from students’ self-evaluation, only 16% of students satisfied with their first year performance when they were asked to vote their satisfaction in their own academic performance and to address the difficulties encountered in their study. With reference to students’ performance on particular subjects, the reason of the low satisfaction rate seems to be related to students having difficulties in handling mathematics related subjects. Students without advanced mathematics training from their senior education through M1 or M2 in HKDSE, or pure mathematics in HKALE would need to put extra effort to handle some engineering topics. Students did need more support to help them fill in the gaps; for instance, by having senior students offering supplemental instructions for intakes who did not learn relevant mathematical skills. While various kinds of support could be provided to help students make up the gap, a lot depends on the how much time and effort a student can devote to improve his/her performance, given the heavy workload of the programme. The average results were improved in comparison with the result of average CGPA in their first year study as tabulated in Table 1. Their improvement rate is much better than that of students of HKALE entry. Although the sample included students from a limited range of academic field, the analysis can be a good reference in revealing and comparing student performance with different levels of academic foundation. Nevertheless, three sub-conclusions can be drawn: (1) students of HKDSE entry may not have a good enough knowledge in areas like mathematics and physics for handling engineering related topics; (2) sub-degree engineering programmes, without any extra year to teach students the basics, should provide additional supports to help students fill in the gaps; (3) although secondary education background of a student could affect his/her academic performance at the beginning of the tertiary education, contribution of his/her own effort and support from the programme could help a student catch up.

Streaming Exercise

Students’ experiences of programme selection in both first semester major selection stage and JUPAS admission stage were investigated by means of a programme-wide survey conducted in 2013. After studying the common core courses for weeks and
getting to know more about the six programmes they could choose from, students from both HKDSE and HKALE entries selected their major out of six during their first semester study in the department. 91% of participants selected the Programme A as their first preference during this streaming exercise from their reply on question 4. However, when back to the JUPAS application stage and asked them about their preferences on the 6 programmes offered under the same JUPAS admission code, 54% of participants showed their interested in the Programme A while 13% preferred the other five, and 33% had no preference. Nevertheless, it is also necessary to understand what factors were considered by students when they were selecting their major. Another survey question is to reveal whether students’ decision during the streaming exercise is influenced by others. 25% of participants selected their major without being affected by others. For the remaining 75%, they made up their minds with reference to the different recommendations as shown in Figure 2a. Figure 2b indicates the main four factors considered by the sub-degree students during the streaming stage are personal interest (27%), good career prospect (18%), more opportunity in further study (16%) and academic ability (13%).

Discussion and Conclusion

The most important factor considered by students was personal interest, which is 27% during streaming exercise stage. At the end of the first semester, 91% of participants selected Programme A as their first choice under this streaming mechanism and based on their interests while they achieve a satisfactory academic performance of three common courses study in semester A. In comparison with their preference during JUPAU application, only 54% decided to select this engineering programme out of the six programmes. It was found that the current students were interested in this subject. This revealed that students developed a more clear direction about what they wanted to study after entering the university. It also matched with the main factor considered by students about selecting programme. After first semester study, students did not only obtain a broader base of education in developing generic skills, but also reinforced their interests in various majors before streaming.

Although the overall academic performance of HKDSE students was not good enough comparing with the HKALE students in their year 1 study, their final CGPA could still be caught up with significant improvement in the second year study. This
improvement may be come from their commitment in joining the following well-organized co-curricular activities in summer term after year-1 study, as well as during their year-2 study.

Teaching and learning strategy shall be continuously developed in whole education reform is not only to meet the higher demands of an industry workforce and challenge of a fast-changing job market entrepreneurial spirit requirement driven by economic growth, environmental concerns and technology transform, but also adopt an diversified and optimized support for each educational bodies, teaching staff and students from Government during this 3-3-4 education reform impact. The author believes that the above said integration of student quality nurtured by this educational reform, new curriculum structure and an innovative pedagogical approach with co-curricular activities in Programme A, our graduate can experience the inner synergy that ignites the fire within and gives vision, passion, and a spirit of adventure life.” [9]

To conclude, secondary education background of a student could affect his/her academic performance at the beginning of the tertiary education, the HKDSE student can contribution of his/her own effort & joining co-curricular activities to catch up the similar CGPA with the HKALE student. Teaching could not be only done by lectures and tutorials, but also by exemplifying how to realize the long-life knowledge and how to tackle different engineering design through what the student have learnt. The author believed that education is not merely about imparting knowledge. It should be more than feeding students the most updated information and it is certainly not just about helping students pass examinations and getting good grades, to find a lucrative job or to make a fortune. It should be showing passion for life integrated with knowledge and talent of each student. Our world can be improved by our graduate with passion, knowledge and talent.

References


[4] Webpage of City University of Hong Kong on new admission requirement of Government-Funded Associate Degree Programme by Hong Kong Diploma of Secondary Education (HKDSE) Students: http://www.admo.cityu.edu.hk/jupas_hkdse/entreq/ad/#hkdse6


