

VOCATIONAL EDUCATION AND TRAINING (VET) OF QUANTITY SURVEYING IN HONG KONG

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Abstract

Vocational education and training (VET) in Hong Kong has long been regarded as non-mainstream and second-tier education for students who failed in academic education (Lim, 2008, 2010). The government of HKSAR and some non-government organizations are offering education programmes for these students in concerning with social injustice. In Hong Kong, VET has acquired a stigma and is automatically seen as second-class education. (Lim, 2008).

This assertion is tested on quantity surveying education in this study. Quantity surveying education originated as part time day-release programmes which allowed students to receive academic and practical training at the same time. It was then developed into full time sandwich or part-time degrees which are provided by mainstream universities. University education emphasizes more on the training of mind and all-rounded knowledge and general surveying programmes are popular.

In Hong Kong, quantity surveying programmes are provided by local universities as general surveying degrees and also by Vocational Training Council (VTC), through its branch, the Hong Kong Institute of Vocational Education (IVE), as higher diploma programme which focuses on quantity surveying and building surveying. VTC, being the largest vocational education and training provider in Hong Kong, is also the largest VET provider on quantity surveying in Hong Kong.

The curriculum design, pedagogy, professional accreditation, articulation and career path of the higher diploma programme are studied to examine the effectiveness of the VET of quantity surveying in Hong Kong. These will be summarized as the overall VET strategies on quantity surveying, which can provide significant references for professional bodies and industry stakeholders, to set the level of recognition on VET graduates.

Keywords: quantity surveying, vocational education and training, the Vocational Training Council of Hong Kong.

Introduction

Vocational education and training (VET) in Hong Kong has long been regarded as non-mainstream and second-tier education for students who failed in academic education (Lim, 2008, 2010). The reasons for students entering VET are different. Some may find it difficult to cope with the demanding academic programmes, some develop late and some may be expunged by mainstream education by poor academic performance or low social-economic status (Ross and Gray, 2005). In Hong Kong, the mainstream education is provided through six years of compulsory primary education (P1 to P6), three years of lower secondary education (S1 to S3) and three years of upper secondary education (S4 to S6). Students will then sit in one public examination (Hong Kong Diploma in Secondary Education, HKDSE), before they enter into four years of tertiary education in local universities.

Non-mainstream education and vocational education and training

For those who are expunged by mainstream education in S3 or S6, there are four major groups of education institutions providing the second-education chances. These four groups are ranging from the continuous education branches of local universities, charitable organizations such as Caritas and Tung Wah Group of Hospitals, commercial organizations such as the Hong Kong College of Technology and the Vocational Training Council (VTC), which was established in 1982 by the government to provide vocational education and training.

These second-education chances consist of Associate Degree (AD) programmes, which are usually broad-based and designed to articulate to degree programmes and Higher Diploma (HD) programmes, which are more vocational based and career oriented. AD programmes are usually provided by the local universities or their branches while VTC operates the largest number of HD programmes in Hong Kong. These HD programmes are divided into seven academic disciplines and provided by its two branches, namely the Hong Kong Institute of Vocational Education (IVE) and Hong Kong Design Institute (HKDI).

Vocational education and training (VET) on Quantity Surveying

This paper studies how VET is applied to quantity surveying in Hong Kong. HD in Surveying provided by VTC is used as a case study. The reasons are as follows:

- (1) It is the largest VET programme in surveying in terms of student number in Hong Kong;

- (2) It receives professional and qualification framework accreditation;
- (3) Its curriculum contains the major elements of quantity surveying;
- (4) It is the only surveying programme in Hong Kong which embeds “industrial attachment” in the curriculum

The aim of this study is to examine the effectiveness of VET in quantity surveying, by case study of the HD in Surveying provided by VTC.

The objectives of this study are:

- (1) To discuss how VET is embedded in the curriculum design of the programme;
- (2) To examine how the core knowledge of quantity surveying is provided;
- (3) To examine how career development and articulation pathway are prepared;
- (4) To analyze the future development of VET in quantity surveying.

Traditionally, education on quantity surveying was more based on technical training with less theoretical knowledge (Ashworth, 1994). Programmes of study were carried out on a day-release basis, while students were able to receive academic education and practical training at the same time.

Starting from 1960s, the professional institutions started to realize that university type full-time programmes would be required, and degree programmes for quantity surveying were mainly vocational degree programmes. In 1970s, there was growing concern that the education institutions should provide broad education, while professional training was provided in the year out of sandwich programmes or after graduation. To be in line with this, the professional institutions (RICS/IQS) introduced the Test of Professional Competence (TPC) which required a period of approved professional training after graduations for those seeking the “Chartered Surveyors” qualifications.

The change of thought as well as the TPC requirements had triggered the emergence of many full time sandwich surveying programmes and part-time surveying programmes, in providing more efficient and effective pathways, both in cost and time considerations, to meet the changing needs.

The current provisions of surveying programmes were principally shaped from the 1980s, where some universities offering programmes in the three major surveying disciplines, including quantity surveying, building surveying and general practice surveying.

In Hong Kong, VET in quantity surveying was modelled from United Kingdom. A dual system is provided for surveying programmes. At the lower end, the Vocational Education Council (VTC),

through its branch Hong Kong Institute of Vocational Education (IVE), provides Higher Diploma in Surveying. The Hong Kong Polytechnic University (PolyU) and City University of Hong Kong (CityU) also provide sub-degree surveying programmes. Table 1 shows the list of sub-degree programmes provided in Hong Kong.

Table 1: List of institutes in Hong Kong conducting quantity surveying sub-degree programme

No.	Institutes	Programme
1	Hong Kong Institute of Vocational Education	Higher Diploma in Surveying
2	The Hong Kong Polytechnic University	Higher Diploma in Building Technology and Management (Surveying)
3	The City University of Hong Kong	Associate of Science in Surveying

At degree level, three general surveying degree programmes are provided by local universities under the University Grants Committee fund (UGC-funded). On the other hand, VTC, through its another branch Technological and Higher Education Institute of Hong Kong (THEi), will launch a self-financed general surveying degree in September 2016.

Table 2: List of UGC-funded institutes in Hong Kong conducting quantity surveying degree programmes

No.	UGC-funded institutes	Programme
1	The University of Hong Kong	Bachelor of Science (Honours) in Surveying
2	The Hong Kong Polytechnic University	Bachelor of Science (Honours) in Surveying
3	The City University of Hong Kong	Bachelor of Science (Honours) in Surveying

Table 3: List of non UGC-funded institute in Hong Kong conducting quantity surveying degree programme

No.	Non UGC-funded institute	Programme
1	Technological and Higher Education Institute of Hong Kong	Bachelor of Science (Honours) in Surveying

There are also a number of top-up degrees in quantity surveying or related areas which are provided by overseas universities and operated by local education institutions in Hong Kong. They are registered as “Non-local Higher and Professional Education Programmes” under statute.

Elements of VET in VTC HD in Surveying programme

The VTC HD in Surveying is designed with the objectives to incorporate a large component of vocational elements. The modules of the curriculum can be broadly divided into three types, namely (1) vocational modules, (2) generic modules and (3) enrichment modules. The vocational module list is shown in Table 4.

Table 4: Vocational Module list of VTC HD in Surveying programme

Mathematics for construction	Building services
Construction drawing and computer aided drafting	Construction technology and green structure design
Engineering science for construction B	Measurement of building works
Construction materials	Tendering and contractual procedures
Land surveying	Building inspection and maintenance
Principles of measurement	Construction industry in mainland China
Construction technology and temporary work	Property and facilities management
Construction project management	Construction contract management
Building information modelling for surveying	Property investment and construction economics
Real estate maintenance and management	Measurement for civil engineering and E&M works
Building regulations and codes of practice	Cost estimating
Practical Training (A)	Practical Training (B)
Integrated Project on building surveying	Integrated project on quantity surveying
Industrial attachment	Industry-based student project

Table 5 and Table 6 summarize the number of the above three types of modules and their respective curriculum hours. In terms of module number, 65% in the curriculum are vocational modules. However, if counted in curriculum hours, the ratio becomes 77%. The vocational modules are not only confined to lecture type, but also include practical training, integrated project workshop, industrial attachment and industry-based student project.

Table 5: Summary table of modules in VTC HD in Surveying programme

Total numbers of modules	38
Total numbers of vocational modules	25
Total numbers of generic modules	12
Total numbers of enrichment module	1

Table 6: Summary table of curriculum hours in VTC HD in Surveying programme

Total curriculum hours	1378
Total curriculum hours of vocational modules	1066
Total curriculum hours of generic modules	286
Total curriculum hours of enrichment module	26

Curriculum design

The curriculum of VTC HD in Surveying programme is designed to provide all-round education and training to prepare students for their career development. The curriculum does not only provide vocational knowledge, but also incorporates generic skills training such as language, IT application and whole person development. It aims to enhance the employability of the students and also prepare them for articulation opportunities.

More specifically, an “industrial attachment” is provided to students in their last semester of study, to relate their learned knowledge and skills to practical working environment. The introduction of mandatory “industrial attachment” is an innovative approach by VTC in all its higher diploma programmes and is the only surveying programme in Hong Kong to provide with. In addition to industrial attachment, students are also required to complete the “industry-based student project” at the same semester to reflect what they have learned during the industrial attachment period.

An outcome-based teaching and learning (OBTL) approach is adopted in curriculum design, with its implementation involving three major steps. The first is setting objectives for the higher diploma programme and the learning outcomes that would contribute to the objectives. The essential question to be addressed here is what students should understand, know and be able to do on completing the programme. The second step is designing relevant assessments to evaluate student learning, where the essential question is what constitutes evidence that students have achieved the programme learning outcomes. The third step is adopting pedagogical strategies that help students to attain the intended learning outcomes and with the expected graduate attitudes. The essential question here is what learning experiences and instruction will contribute to the development of this desired capability.

VTC adopts a rigorous mechanism in curriculum planning and development, in which the stakeholders’ interest and feedbacks are well examined and reflected. For example, in the programme initiation stage, market demand must be fully justified. Industrial practitioners, representatives of professional bodies and academicians are invited to contribute their comments on

drafting the curriculum syllabus. Programme validation is conducted in VTC before the HD is launched, with external members are invited to sit in the validation panel.

Essentially, the curriculum design of VTC HD in Surveying programme enables the vocational modules to be highly relevant to practical needs. Also, the outcome-based learning objectives specify clearly the level of achievements the students will attend when they complete the HD. The curriculum is under continuous review to meet the changing market requirements.

Relevance to quantity surveying profession

VTC is proactive in seeking professional and academic qualification accreditations for its higher diploma programmes. Under the qualification framework (QF) introduced by the Hong Kong government since 2008, higher diploma programmes are pegged to QF level 4. The general level descriptor of QF level 4 describes that the outcomes of this level should enable students to develop its own approach in solving unfamiliar problems, and to exercise appropriate judgement in manipulating information and resources.

For VTC HD in Surveying programme, professional accreditations have been obtained from the Hong Kong Institute of Surveyors (HKIS) and the Royal Institution of Chartered Surveyors (RICS), in fulfilling the academic requirements to enter into the assessment of associate membership. To attain to full membership under these two professional institutions, higher diploma graduates are required either to undergo further years of training period or pursue a higher degree, before entering the professional examination.

The relevance of the curriculum syllabus to quantity surveying profession is tested by mapping the HD curriculum to the core services and competencies outlined by HKIS. The competencies listed by HKIS are chosen as they are relevant and more specific to the local quantity surveying practice.

Quantity surveying professionals are trained to contribute in financial and contract management of construction projects, whether it is on behalf of the client or the contractor. In the past, quantity surveyors were employed to prepare bills of quantities for building projects (Seeley, 1997). The work of quantity surveyors was then gradually extended to cover a wider range of services. The Hong Kong Institute of Surveyors has specified the fourteen core services of quantity surveyors as listed in Table 7.

Table 7: Core services of professional quantity surveyors

- | | |
|------------------------------|--|
| (1) Cost planning | (2) Contractual advice |
| (3) Life cycle costing | (4) Tendering |
| (5) Value management | (6) Valuation of construction work |
| (7) Facilities management | (8) Cost control and financial management |
| (9) Project management | (10) Financial claims and programme analysis |
| (11) Preliminary cost advice | (12) Dispute resolution |
| (13) Procurement methods | (14) Insurance advice |

Another reference for core competencies of professional quantity surveyors can be made on the professional examination guideline issued by HKIS. Since the professional services of quantity surveying is widening, some optional competencies have also been introduced (HKIS, 2007). The core competencies and optional competencies are included and listed in Table 8.

Table 8: Core and optional competencies of professional quantity surveyors

Core competencies

- | | |
|-----------------------------|--|
| (1) Measurement and billing | (2) Pre-contract cost data handling |
| (3) Pricing | (4) Pre-contract cost planning, estimating and control |
| (5) Procurement | (6) Contractor's tendering and cost control |
| (7) Contract administration | |

Optional competencies

- | | |
|---|-------------------------------------|
| (1) Dispute resolution | (2) Project Management |
| (3) Facilities management | (4) Risk management |
| (5) Value management | (6) Advanced information technology |
| (7) Insurances and warranties | (8) Green building or construction |
| (9) Third party technical or professional audits | |
| (10) Bankruptcy, liquidation, determination and termination | |

Table 9: Mapping of core services/competencies and optional competencies of quantity surveyors

Core Service	Core/Optional Competency	HD in Surveying Module
(1) Cost planning	Pre-contract cost data handling; Pre-contract cost planning, estimating and control	Cost estimating
(2) Contractual advice	Contract administration	Construction contract

		management
(3) Life cycle costing	Contractor's tendering and cost control	Property investment and construction economics
(4) Tendering	Contractor's tendering and cost control	Tendering and contractual procedures
(5) Value management	Value Management	Property investment and construction economics
(6) Valuation of construction work	Measurement and billing; Pricing	Measurement of building works
(7) Facilities management	Facilities management	Property and facilities management
(8) Cost control and financial management	Contractor's tendering and cost control	Cost estimating
(9) Project management	Project management	Construction project management
(10) Financial claims and programme analysis	Project management	Construction project management
(11) Preliminary cost advice	Pre-contract cost planning, estimating and control	Cost estimating
(12) Dispute resolutions	Dispute resolutions	Construction contract management
(13) Procurement methods	Procurement	Tendering and contractual procedures
(14) Insurance advice	Insurances and warranties	Construction contract management

The mapping analysis shows that the core services identified by HKIS are not fully covered by the HD curriculum, but there still shows a high relevance to the quantity surveying knowledge. For instance, the HD provides good coverage on contract management and procurement, cost estimating and project management. These service areas are fundamental to quantity surveying professional works and the knowledge provided in the HD programme well prepares the students to develop their professional career.

On the other hand, the HD curriculum shows a generally weak coverage on some extended core services of quantity surveying, such as value management, programme analysis and insurance advice. One reason is that these service areas involve complicated issues, which require practical knowledge and experiences to handle, and are difficult to provide in HD level.

It is interesting to note that the HD curriculum has covered most of the optional competencies of HKIS professional examination. Among those, innovative topics like “advanced information technology” and “green building or construction” are covered by corresponding modules. This shows that the curriculum design has embraced the latest development of the quantity surveying profession and is highly vocational oriented.

Table 10: Mapping of optional competencies of quantity surveyors to HD curriculum

Optional Competency	HD Module
(1) Dispute resolution	Construction contract management
(2) Project Management	Construction project management
(3) Facilities management	Property and facilities management
(4) Risk management	Not covered
(5) Value management	Not covered
(6) Advanced information technology	Building information modelling for surveying
(7) Insurances and warranties	Construction contract management
(8) Green building or construction	Construction technology and green structure design
(9) Third party technical or professional audits	Not covered
(10) Bankruptcy, liquidation, determination and termination	Construction contract management

Industrial attachment

The HD curriculum contains a mandatory industrial attachment module. The industrial attachment is arranged in the last semester of the HD programme, with the objectives to allow students to apply their learned knowledge in practical working environment so as to identify their own strengths and weaknesses. In addition, the design of the industrial attachment enhances the employability of the students and also allows the attachment employers to evaluate the abilities of the HD students.

The industrial attachment under the HD programme is the only provision of its kind among all

surveying programmes in Hong Kong. Students are attached in private companies or public organizations that provide quantity surveying services and often take the positions as student interns or trainees.

During the industrial attachment period, a VTC supervisor and an industrial supervisor would be invited and assigned to each student. Both supervisors communicate frequently to monitor the progress of the student. Programme team has set a number of assessments to ensure students to meet the intended learning outcomes of industrial attachment. Students are required to develop work plans for their works and record all working tasks on a weekly basis. At the end of industrial attachment period, students would give a presentation to share their working experiences and what they have learned.

VTC evaluates the effectiveness of industrial attachment in a number of ways. Firstly, an extensive employer survey is conducted with all its industrial attachment partners, mainly focus on students' performance, areas for improvement and identifies the latest market needs. Students' feedbacks are also important in the operation of industrial attachment. For example, if students opine that the industrial attachment experiences are not useful, the programme team will investigate whether it is because of the nature of company works, tasks given or personal reasons. VTC supervisors also frequently visit the industrial attachment partners to understand the working environment and identify training needs. All of the feedbacks above will be analyzed for future planning and implementation of industrial attachment

This is not easy to maintain mandatory industrial attachment in every academic year. VTC strives to secure the training opportunities by its established connections with the industry. In the quantity surveying profession, industrial connections are built up with alumni network, reputations of VTC graduates, strong relationships with public organizations and professional bodies and personal network developed by teaching staffs through their working experiences or services in professional bodies.

Since the implementation of industrial attachment, the VTC HD in Surveying students have had the opportunities to work in leading quantity surveying consultants, building main contractors and sub-contractors. Many of them were retained by their employers after graduations. The industrial attachment arrangement creates a 'win-win' situation to employers and students, where 'work-ready' students can join the industry seamlessly once they graduate and students have better intention to perform well during the attachment period.

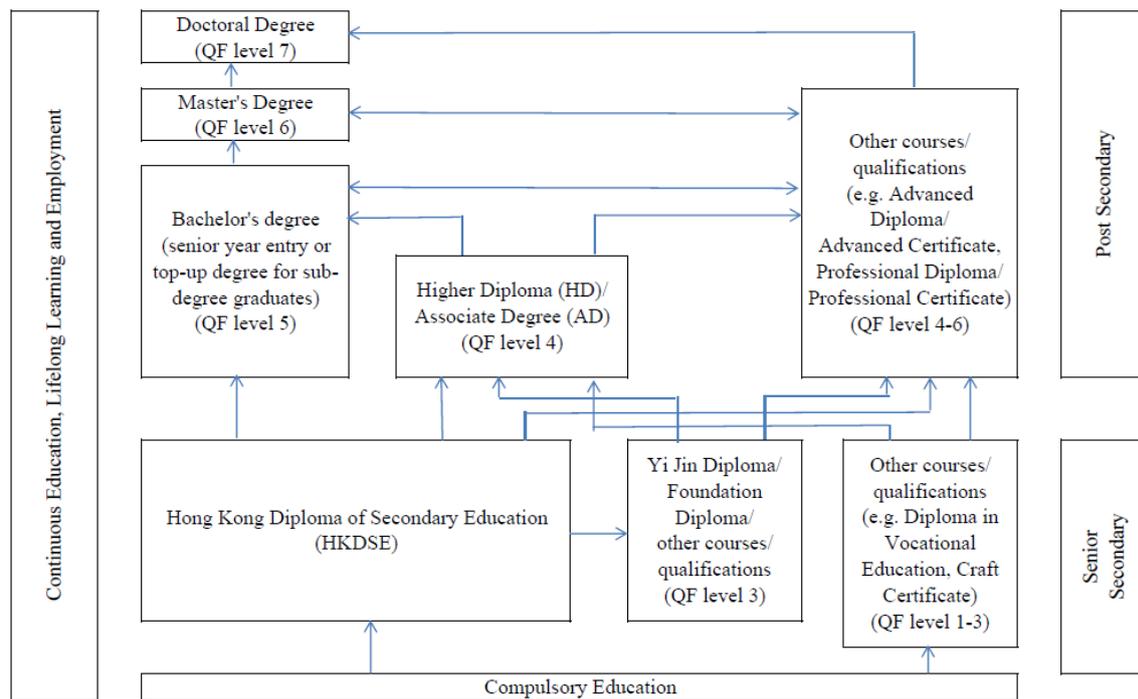
Career development and articulation pathway

As the leading provider of VET in Hong Kong, VTC is devoted to provide quality manpower support to the industry. Support in career development and enhancement in articulation opportunities are included in VTC mission and strategic plan. At the same time, lifelong learning is also emphasized. Career development and articulation have no inherent conflict, which can be achieved in parallel after the completion of vocational education and training.

The quantity surveying profession in Hong Kong is largely supported by VET. On the employers' side, vocational qualifications are largely recognized and they are willing to employ fresh graduates from VTC and other VET providers. Professional organizations, such as HKIS and RICS have also established a clear pathway leading to professionals under their policies to attract VET graduates. The fact that VET is highly recognized by local quantity surveying industry is also reflected in the high employment rate of graduates. VET graduates in quantity surveying are mainly starting from the technician level, and gradually promoted to professional/technologist level. According to the Manpower Survey Report of Building and Civil Engineering Industry conducted by the Building and Civil Engineering Training Board under VTC in 2013, the employment statistics of professional/technologist and technician categories in surveying and construction-related jobs have been on an increasing trend in both the manpower number and vacancies (VTC, 2013).

VET students are not necessarily joining the vocational career immediately upon graduation. Instead, they can choose to re-enter the mainstream education or pursue further study to strengthen their knowledge. A task force was set up by the Hong Kong government in 2014 to map out a strategy and proposals of vocational education and rebranded VET to VPET ("vocational and professional education and training"). The rebranding means that the design of vocational education in Hong Kong is up to degree level which contains a high proportion of vocational and professional knowledge. Under the report published by the task force, VET students are able to articulate to mainstream education through the qualification framework that was launched in 2008. Under the qualification framework, higher diploma is pegged at qualification framework (QF) level 4 which is recognized to articulate to bachelor degree at QF level 5. An overview of VET articulation pathways in Hong Kong is shown in the diagram below.

Figure 1: An overview of VET articulation pathways in Hong Kong



In Hong Kong, students in VET quantity surveying programmes are also provided with various kinds of articulation opportunities. If they satisfy the entry requirements, they can join UGC funded university degree programmes through non JUPAS (“Joint University Programme Admission System”) category. From 2016 academic year, the Technological and Higher Education Institute (THEI) under VTC will launch a bachelor degree in surveying which is vocational oriented and contains a “work-integrated learning” module. HD graduates are eligible to direct entry to senior year of the degree programme. Students may also choose to study in part-time mode, either joining overseas degrees, local part time degrees or overseas top-up degrees operated by local institutions.

Future development of VET on quantity surveying

The development of VET on quantity surveying is largely based on the industry needs and is market driven. Wong, J. et al. (2007) performed a structured questionnaire survey to find out the training needs of higher education in surveying and skill requirements for quantity surveyors. The survey finding showed that quantity surveyors should more focus on project management, dispute resolution and project financing. In particular, information technology application and understanding of Chinese construction industry are the two important development foci of quantity surveyors.

Another indicative survey was the Manpower Survey Report of Building and Civil Engineering

Industry conducted by the Building and Civil Engineering Training Board under VTC in 2013. It recommended that emphasis should be put on safety procedures, professional ethics, environmental protection and Building Information Modeling. (VTC, 2013)

To formulate the direction of VET development on quantity surveying, four parties are critical to contribute at different capacities, namely the government, stakeholders from the industry, professional organizations and VET providers.

- (1) Government – it supports VET through policy setting, financial assistance to VET providers and promotion of image of VET. For example, the government previously launched the “Study Subsidy Scheme for Designated Professions/Sectors” to subsidize the students in a number of self-financed full time undergraduate programmes, which include VET programmes offered by local institutions. The list is renewable in every academic year and it may include surveying related VET programme in future.

The task force on promotion of vocational education set up by the Education Bureau of the government will continue to promote the image of VPET through a variety of ways.

- (2) Industry – supports from industry include participation in industrial attachment scheme, employing VET graduates, providing feedback to programme design and development. Industrial representatives can act as external examiners of VET programmes, or members of advisory boards in different VET providers. They can provide the latest information to the VET providers for the refinement of programme contents which are adapted to market needs.
- (3) Professional organizations – they recognize and accredit a number of surveying VET programmes, contribute in programme development and quality assurance and admit VET students as “student members”. For example, the Hong Kong Institute of Surveyors (HKIS) accredits the VTC HD in Surveying in that graduates can fulfill the academic requirements to the assessment of associate membership/membership. The Board of Education of HKIS also monitors annually the performance of the programme in terms of quality assurance, programme development, facilities provision and academic results as the accreditation requirement.
- (4) VET providers – they develop VET programmes according to market needs, with the support of government, feedback from industrial stakeholders and professional bodies. For example, VTC has established a rigorous academic structure for programme validation, advisory and management. It ensures programmes are developed and operated with quality assurance procedures, where external feedback and advice are discussed and analyzed.

Apart from award-bearing VET programmes, VET providers are also providing in-service training courses to uplift professional knowledge or for the purpose of continuous professional development. Although these programmes are not within the qualification framework for articulation, they may help students in career development and advancement. Another advantage of in-service training courses is its flexibility, the course duration, contents and learning outcomes can be timely adjusted to respond to professional needs.

Conclusion

VET has for some time a stigma of second-tier education, especially in Hong Kong where its recognition is limited. With the effort of the government and VET providers, VET is more chosen by secondary school leavers now. The launching of the qualification framework also means that VET programmes can articulate to higher education by pegging with qualification level.

In this study, the current provision of VET in quantity surveying in Hong Kong is examined. Quantity surveying is a professional subject with a number of core skills and services, where practical and theoretical knowledge are equally important. University education often trains students with board sense of thinking and knowledge, while VET focuses more on vocational skills. VTC HD in Surveying is selected as a case study to illustrate the effectiveness of VET in quantity surveying. It can be concluded that the programme is effective in most aspects, such as relevance to quantity surveying, employment rate, articulation opportunities, accreditations received and quality assurance. Future development of VET in quantity surveying will be market driven and its effectiveness will largely depend on the continuous efforts by various parties.

For future study, one suggested key area will be the development and application of applied research in VET. It will focus on solving practical problems that are encountered by that industry, and will require further collaboration between the industry and the VET providers.

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