

## Part C Project Overview

Project Title (in English):

**Enhancing learning in pharmaceutical care services with e-platform support**

Project Title (in Chinese):

網上支援以提升藥學服務的學習

### Executive Summary

*(Please provide, within this page, an executive summary of the project.)*

#### Background

Dispensers play a vital supporting role in pharmaceutical care service in Hong Kong. In the pharmacies under Hospital Authority (HA) alone, there are over 1800 dispensers. With an aging population and influx of mainland patients, the need for high quality dispenser service has become even more acute. Dispensers must possess a comprehensive drug knowledge base and be capable of manually performing highly specialized techniques in preparing different drug products. Dispensers carry out highly technical and professional functions, ensuring product safety in dispensed medications. The profession of dispenser has been included as one of the fifteen healthcare professionals targeted for accredited registration (AR) initiated by the Government of HKSAR in December 2016. The 2-year program of Higher Diploma (HD) in Dispensing Studies (formerly the 3-year program of HD in Pharmaceutical Technology (Western medicine) from the era of pre-education reform) at the Chai Wan campus of Hong Kong Institute of Vocational Education (HKIVE) of Vocational Training Council (VTC) is a pioneer and flagship program in Hong Kong for training qualified dispensers. The program has a 23-year history working closely with the Chief Pharmacist's Office of the HA and pharmacies of private hospitals; our pharmaceutical teaching team is committed to providing quality vocational professional education in order to meet the dispenser need in Hong Kong.

#### Addressing the learning needs of students after the education reform in Hong Kong

With the new "3+3+4" academic structure in place, our program has been revamped to a 2-year program to fit within the new education framework with the first cohort of students who had the qualification of Hong Kong Diploma of Secondary Education (HKDSE) in 2012. The academic background of the students applying to our program has become more diverse. Senior secondary students are no longer divided clearly into science and humanities streams; our students may not study a full set of science subjects in secondary school. Also many of them come from schools which employ Chinese as the medium of instruction (CMI). The curriculum of HD in Dispensing Studies is demanding. Since 2012 the teaching team has noticed students are struggling more due to a weak science and English foundation. Some students required additional time beyond the expected two-year program schedule. In addition, less favorable feedback of students has been received from industrial attachment partners and employers. Without lowering our academic standards, our teaching team has been exploring ways to help students with different levels of learning needs within the shortened 2-year program. In-house audio-video teaching and learning materials of "amateur" quality have been prepared with some success in facilitating learning by the students. We see a need of developing a more comprehensive set of teaching and learning materials that are multimedia in nature, appealing to young people in terms of design and usefulness, and easily accessible on mobile phone or tablets. The materials can be accessible online, allowing self-learning beyond the campus and outside the school timetable. Two major areas identified for remedial help include concepts in basic science for learning professional knowledge in pharmaceutical service and acquisition of a large vocabulary of drug names and medical terms.

This proposed project will benefit an estimate of about 1000 full-time students annually studying in self-financed programs of pharmaceutical care and related health sciences at HKIVE as well as Caritas Bianchi College of Careers, Tung Wah College, HKU SPACE, etc.

Key activities in the project period of 2 years are as follows:

1. Needs assessment based on surveys and consultations with pharmacy-related stakeholders, teaching colleagues in related fields, technical external advisors
2. Preparation of teaching and learning materials
3. The design and development of interactive, multimedia teaching and learning materials (such as video lessons with sound clips, video recording, etc.) with exercises and assessments
4. The design and development of a project website and a project mobile app.
5. Uploading the multimedia teaching and learning materials to VTC Moodle, project website, and project mobile app
6. Collection of feedback and evaluation to gauge the usefulness of materials and effectiveness of the e-platforms
7. The sharing of project experience for vocational professional education training

## Part D Problems Identified

*(Please provide your assessments to the problems / needs identified.)*

With the “3+3+4” education reform in place, many Diploma of Secondary Education (DSE) students now enrolled to our 2-year program of Higher Diploma (HD) in Dispensing Studies at Chai Wan campus of Hong Kong Institute of Vocational Education (HKIVE(CW)) of Vocational Training Council (VTC) face new study challenges as they have not studied a full set of science subjects, and many of them come from secondary schools which employ Chinese as the medium of instruction (CMI). Previously, a passing grade for Chemistry in HKCEE was a pre-requisite for entry to our previous 3-year program of HD in Pharmaceutical Technology (Western medicine). Since the new academic structure has been implemented, we are no longer in a position to set such a pre-requisite.

Our program aims to prepare students for a career as a dispenser in a pharmacy, resulting in an individual equipped with a wealth of medical and drug knowledge, capable of performing highly technical skills in dispensing medications upon medical practitioner’s orders and manual compounding of drug products not available commercially, including aseptic admixing of ready-to-use parenteral drug products. The curriculum of the current program is academically demanding, including basic science subjects, such as chemistry and human physiology; medical science subjects, such as human disease, and professional science subjects, such as pharmaceutics (studying the physicochemical principles in drug product design), pharmacology, drug therapeutics, dispensing and pharmacy practices, patient education and counselling, and pharmaceutical microbiology and infectious disease. A sound foundation in basic science, especially in chemistry and biology; a possession of basic laboratory skills and techniques; and a good command of English are essential to success in the program. Our pharmaceutical science teaching team noticed increasingly a significant knowledge and skill gap among many of our DSE students. Compared to our previous 3-year program graduates, employer feedback on the work performance of our 2-year program graduates is, in general, relatively less favorable.

Presently, there is no suitable local textbook or training materials available that can fulfill the learning needs of our students in pharmaceutical- and healthcare-related fields. Moreover, there is no focused bridging and remedial teaching and learning materials for these students. Since many students are lacking a sound foundation in science, coupled with a CMI secondary school background, the students encounter substantial hardships when trying to catch up within the duration of the program. There are at least three major barriers to students for effective studying in our program. First, these students have to master a sizeable vocabulary in scientific and medical terms within a short time after the commencement of their study; subject-specific glossaries have proved ineffective as students must learn each word (many of which are more than 15-letter long) individually. The ability to break down a scientific or medical term into its constituent parts (from Greek or Latin) with understanding of the meaning of the parts is essential when studying professional terms. In turn, that facilitates reading comprehension. Secondly, students will need to memorize hundreds of generic drug names and classify them according to their drug class. Proper memorization without the ability to pronounce names is an extremely daunting task. Knowledge in phonetics and availability of audio clips can address this problem.

Thirdly, students with a weak science background have trouble with lectures requiring a solid science foundation. Moreover, they display errors when carrying out basic lab techniques, which can be traced to a weak understanding of core underlying scientific concepts. In the area of technical skills, they often mimic techniques and are less able to solve problems when faced with unfamiliar situations.

It is imperative that we develop innovative teaching and learning materials to allow scaffolding, sequencing, and pacing of professional knowledge that will more closely address the level of understanding of vocational students with a weak foundation in English and science and supporting all of them who are expected to carry out professional duties and functions in their future career. Therefore, we are proposing a project, titled “Enhancing learning in pharmaceutical care services with e-platform support”.

<b>Part E Project Objectives and Deliverables</b>	
<b>Measurable Objectives</b>	<b>How it can be achieved</b>
<p>1. To identify the knowledge gaps that affect learning of our target students</p>	<ul style="list-style-type: none"> <li>• To assess and identify the specific study needs of students from diverse academic backgrounds in our dispensing and other healthcare programs by conducting cross-sector studies, consultations, and hosting focus group forums. The professional forums and consultations may include:                             <ul style="list-style-type: none"> <li>➤ Current pharmacy managers (including both public and private hospitals, both public and private medical clinics, and residential care homes) providing industrial attachment to students in Higher Diploma in Dispensing Studies</li> <li>➤ Dispenser groups, such as Hong Kong Pharmaceutical Technician Association, Hong Kong Registered Dispensers Society</li> <li>➤ Pharmacist groups, such as Hong Kong Society of Hospital Pharmacists, Hong Kong Pharmaceutical Care Foundation</li> </ul> </li> </ul>

	<ul style="list-style-type: none"><li>➤ Pharmacy Schools of the Hong Kong University and the Chinese University of Hong Kong</li><li>➤ Institutes offering self-financed pharmaceutical dispensing, nursing, and other healthcare-related programs, such as i) the Department of Health Science of Caritas Bianchi College of Careers and ii) School of Health Sciences of Caritas Institute of Higher Education, iii) School of Medical and Health Science and School of Nursing of Tung Wah College, iv) Department of Food and Health Sciences of Technological and Higher Education Institute of Hong Kong (THEi), v) Division of Nursing and Health Studies of The Open University of Hong Kong, and vi) Pharmaceutical Studies of HKU SPACE</li></ul> <ul style="list-style-type: none"><li>● To design and develop teaching and learning content based on feedbacks from some of the key stakeholders above.</li></ul>
<p>2. To design tailor-made teaching and learning materials addressing the study needs of students with a weak science background with special attention to CMI students</p>	<ul style="list-style-type: none"><li>● To implement a <b>bridging</b> program for students. The program is furnished with audio-video lessons and demonstrations, exercises, and assessments that may be supplemented by face-to-face sessions with instructors</li><li>● To educate students with special attention to CMI students, especially those whose background in biology, chemistry, or professional science-based subjects required strengthening. Two levels of program will be developed:</li></ul>

	<ul style="list-style-type: none"><li>➤ Level 1 comprises content related to basic chemistry, cell biology, and basic biochemistry that are relevant to pharmacy as well as a revision of basic sentence structure that is helpful to reading comprehension and writing skill. Students entering the dispensing program should go through the materials within the first 2 to 3 weeks of the first semester. At the end they are required to take an online test to demonstrate their understanding of the materials. Passing the Level 1 test is a pre-requisite to advance to the next level.</li><li>➤ Level 2 includes more advanced materials related to pathophysiology and pharmaceutical microbiology that are useful in understanding the causes and risk factors of human diseases. Students should learn the contents thoroughly within the first 3 to 4 weeks of the first semester. At the end they are required to take an online test to demonstrate their understanding of the materials. Passing the Level 2 test is a pre-requisite to advance to the next level.</li></ul>
<p>3. To identify and address the advanced study needs of students through the design and development of <b>complementary</b> and <b>remedial</b> modules for self-study</p>	<ul style="list-style-type: none"><li>• Students who needs extra helps will be offered:</li><li>• Complementary and Remedial modules will be developed. Possible module topics include:<ul style="list-style-type: none"><li>➤ English phonetics (Within the first 5 – 6 weeks of Semester 1)</li><li>➤ Pronunciation of drugs names as well as medical terms (Within the first 5 – 10 weeks of Semester 1; Accessible till the graduation)</li></ul></li></ul>

	<ul style="list-style-type: none"><li>➤ Medical and scientific terminology as well as medical abbreviations (within the first 5 – 10 weeks of Semester 1)</li><li>➤ Drugs as chemicals with unique physicochemical properties that are relevant in drug product design and drug actions (Within the first 5 – 10 weeks of Semester 1)</li><li>➤ Unit conversion and Calculations in pharmaceutical sciences (Within the first week of Semester 2; Accessible until graduation)</li><li>➤ Laboratory safety and laboratory equipment handling and techniques (Within the first 1 – 2 weeks of Semester 2)</li><li>➤ Dispensing skills and techniques for safe and efficient dispensing practices (Within the first 1 – 4 weeks of Semester 2)</li><li>➤ Nonsterile compounding skills and techniques (Within the first 1 – 4 weeks of Semester 2)</li><li>➤ Basic aseptic compounding skills and techniques (Completion of the last written examination of Semester 2 to the first week of Semester 3)</li><li>➤ Aseptic compounding skills and techniques of Total parenteral nutrition (Within the first 1 – 2 weeks of Semester 4)</li><li>➤ Aseptic compounding skills and techniques of biohazardous parenteral products (Within the first 1 – 2 weeks of Semester 5)</li><li>➤ Depending on the topic, supplementary learning materials for explanation of the underlying scientific facts and concepts to facilitate understanding, instead of mere memorization and mimicking of techniques</li></ul>
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4. To integrate multimedia content in the developed learning and teaching materials for the VTC Moodle platform, the project website, and the project mobile app

- Once core teaching and learning content for the bridging program and complementary and remedial modules are identified and decided, the materials will be put into digital and multimedia formats with input from IT experts from within VTC as well as external IT experts with experience in IT applications for pharmaceutical services.
- Two versions are prepared for uploading. The version for VTC students will be uploaded to VTC Moodle, which is accessible only to VTC students and the contents are specific to the curriculum of HD in Dispensing Studies. A second version to be uploaded to the project website contains less curriculum-specific contents.
- Key examples of multimedia formats for the **bridging** program include:
  - Animations on drugs as chemicals and their behaviour under different conditions, such as acid-base properties and hydrophilicity/lipophilicity
  - Interactive infographics with both English and Chinese captions for topics, such as the four basic biochemical classes, cell structures, cell division, or gene expression, etc.
  - Video lessons on disturbances of homeostasis as a basis of human disease, different types of microorganisms and their relevance in pharmaceutical products, and drugs for restoration of body function.
- Key examples of multimedia formats for the **complementary** and **remedial** program include:

	<ul style="list-style-type: none"> <li>➤ Video lessons on basic phonetics with sound clips for drug names and selected common medical terms; construction and understanding of scientific and medical terms; drug physicochemical properties in relation to pharmacokinetics and pharmacodynamics of drugs; drug physicochemical properties;</li> <li>➤ Video lessons with live demonstration of various compounding techniques supplemented by corresponding explanatory animations for the underlying scientific concepts</li> <li>➤ Video lessons with live demonstration for aseptic dispensing of ready-for-use parenteral products under different controlled clean environments</li> </ul>
<p>5. To promote the use of the teaching and learning materials on VTC Moodle, the project website, and the project mobile app</p>	<ul style="list-style-type: none"> <li>• Promotional and training workshops will be organized for the teachers and students regarding online access and use of the teaching and learning materials</li> <li>• Training workshops may include instructional strategies to help teachers make the most of the multimedia materials.</li> </ul>
<p>6. To share the developed teaching and learning materials as well as the experience of curriculum development of vocational professional education (VPE) with other institutions</p>	<ul style="list-style-type: none"> <li>• The online materials will be shared with other institutions and dispenser associations upon request via the project website and the project mobile app.</li> <li>• Feedback may be collected for analysis of suitability and effectiveness of the project as well as for future follow-up development.</li> </ul>
<p>7. To collect feedback for development and evaluation of the project</p>	<ul style="list-style-type: none"> <li>• Feedback will be collected and analysed at different stages of the project for fine tuning of the teaching and learning materials.</li> <li>• Feedback from students about the usefulness and teachers about the effectiveness of the teaching and learning materials.</li> </ul>

	<ul style="list-style-type: none"> <li>[A post-project survey from the employers can be a litmus test for effectiveness of the project to facilitate vocational professional education training.]</li> </ul>
8. To share the experience of the use of multimedia to facilitate vocational professional education training (VPET)	<ul style="list-style-type: none"> <li>A sharing session at the close of the project.</li> </ul>

**Project Deliverables**

*(Please list out all the deliverables to be achieved and how they can be shared with, if possible, other institutions.)*

<b>Deliverables</b>	<b>Sharing mechanism</b>
1. A report on the different study needs of the students based on their diverse academic backgrounds along with the views of the relevant teachers and employers as well as the working dispensers on what teaching and learning contents that should be included in the current dispensing and health care program.	An abridged version of the report to be uploaded onto the project website
2. A project website for announcing the progress of the project, for sharing of teaching and learning materials, and for collecting feedback.	The project website accessible to all
3. Core teaching and learning materials for the 2-level bridging program focusing on students who would benefit from the information on basic science.	Outline of the teaching and learning materials to be uploaded onto the project website
4. Core complementary and remedial teaching and learning materials for all students.	Outline of the teaching and learning materials to be uploaded onto the project website
5. Teaching and learning materials in multimedia formats, including audio-video clips, infographics, and animations	Selected multimedia files will be released on the project website upon request for sharing.
6. An evaluation report about the overall achievement or shortcomings of the project	A summary report to be uploaded onto the project website
7. Training workshops to promote the use of Moodle, the project website, and the project mobile app	PowerPoint slides for training to be uploaded onto the project website

8. Discussion session for experience sharing	Discussion summary to be uploaded onto the project website
<i>(Please indicate the information that can be uploaded onto relevant EDB websites during and after the project period.)</i>	
<ul style="list-style-type: none"> <li>• An abridged version of the project proposal</li> <li>• An abridged version of the needs assessment report</li> <li>• A link of the website address of the project</li> <li>• Outline of teaching and learning materials available</li> <li>• Sample multimedia content</li> <li>• PowerPoint slides used in the training workshops for teachers can be uploaded</li> <li>• Discussion summary on experience sharing upon completion of project</li> </ul>	
<b>Beneficiaries</b>	
Expected type and number of beneficiaries of the project	Self-financing post-secondary students: 1000
<i>(Please provide justification to support the above estimation and explain how they can be benefited from the project.)</i>	
Primary beneficiaries:	Self-financing higher diploma students majoring in dispensing-related studies of at least 500 students per year, including around 220 IVE students, and 280 Caritas and HKU SPACE students.
Other beneficiaries:	Other self-financing healthcare students of 500 per year via project website in other institutions. Current dispensers working with the Hospital Authority, private hospitals, medical clinics, residential care homes of around 2400 (including 1200 past IVE graduates)

<b>Implementation Schedule</b>	
<i>(Please list out the implementation schedule and key milestones to be achieved on a half-yearly basis.)</i>	
Estimated start date of the project (month/year)	09/2017
Estimated end date of the project (month/year)	08/2019
Project duration (months)	24

Month	Key milestones	
	In terms of project activities and deliverables	In terms of monitoring and evaluation
1 - 6	<p>The Project Implementation Team (PIT) of the project will:</p> <ul style="list-style-type: none"> <li>• determine the scope, contents, and schedule of the project</li> <li>• assess the study needs of the students (through surveys and consultation sessions) to collect feedback from students, employers, dispenser graduates, and teachers so that the teaching and learning materials will meet the specific study needs of all learners and satisfy the demands of all the stakeholders.</li> <li>• invite IT and multiple service providers for tenders for development of the project website, the project mobile app, and creation of multimedia materials</li> <li>• appoint external advisors with expertise in multimedia and e-learning to review the development of the teaching and learning materials as well as the project e-platforms</li> </ul>	<ul style="list-style-type: none"> <li>• Feedback from internal and external stakeholders - advisors, colleagues, past graduates, and students</li> <li>• Feedback from the Project Evaluation Team (PET) which will convene regularly to monitor the progress of the project</li> </ul>
7-12	<p>The PIT will:</p> <ul style="list-style-type: none"> <li>• finalize contents for the bridging program and the complementary and remedial modules</li> <li>• develop multimedia contents</li> </ul>	<ul style="list-style-type: none"> <li>• The PET will monitor the progress of the development and selection of the curriculum content and the multimedia materials</li> </ul>
13-15	<p>The PIT will</p> <ul style="list-style-type: none"> <li>• launch the project website and mobile app for students and other outsiders</li> <li>• upload multimedia materials onto Moodle</li> <li>• develop assessments for monitoring the students' learning progress</li> <li>• develop instruments for evaluation</li> </ul>	<p>The PET will monitor</p> <ul style="list-style-type: none"> <li>• the evaluation survey on the effectiveness of the e-platforms</li> <li>• the assessment results after self-learning</li> </ul>

15-18	<p>The PIT will</p> <ul style="list-style-type: none"> <li>• evaluate the overall effectiveness of the project such as through utilisation rates and evaluation surveys from stakeholders</li> </ul>	<p>The PET will oversee</p> <ul style="list-style-type: none"> <li>• the writing of the project evaluation report with analysis of student and staff data and comments from external advisers</li> </ul>
19-24	<p>The PIT will</p> <ul style="list-style-type: none"> <li>• update and revise the teaching and learning materials</li> </ul>	<p>The PET will oversee</p> <ul style="list-style-type: none"> <li>• the revision of the learning materials after the survey analysis</li> <li>• monitor the usage of the learning platforms</li> </ul>

### Publicity Plan

*(Please describe all the publicity activities to be organised and materials to be produced to acknowledge the support of Quality Enhancement Support Scheme. Please suitably reflect the publicity activities as key milestones in the implementation schedule above.)*

#### Public survey and consultations for needs assessment

- Invitations by direct email and mail will be sent to all the relevant teachers and students
- Announcement by direct email and mail about the launching of the project, invitation and the subsequent multimedia materials on Moodle, the mobile app and the project website. All the above content will acknowledge the QESS as appropriate.
- Specific healthcare related departments will be invited to assist in the promotion. Acknowledgement of the support of the QESS will be made.

## Part F Cash Flow and Budget

### Project Expenditure

Period	Amount in HK\$			
	Year 1	Year 2	Year 3	Total
Manpower	\$315,610	\$ 331,390		\$647,000
Equipment / Facilities	\$31,000	\$15,000		\$46,000
Services	\$625,000	\$225,000		\$850,000
General Expenses	\$17,000	\$17,000		\$34,000
Others (e.g. auditor's fee)	\$29,220	\$41,745		\$70,965
<b>Total</b>	<b>\$1,017,830</b>	<b>\$630,135</b>		<b>\$1,647,965</b>

<b>Project Income</b> (if any, e.g. fees received)				
	<b>Amount in HK\$</b>			
<b>Period</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Total</b>
<b>Total</b>				
<i>(Please provide a detailed breakdown of the project budget by completing the following Excel file.)</i>				
Grant Sought under the Quality Enhancement Support Scheme			\$1,647,965	
Funding from the Applicant			\$0	
Funding from Other Sources			\$0	
<b>Total Project Value</b>			<b>\$1,647,965</b>	
<i>(Please specify the amount to be funded by each funding source (e.g. donations, contributions from applicant / its parent organisation) and whether the funding has been secured. If not, please provide the plan to obtain the funding.)</i>				
<i>(Please provide the duty lists of manpower to be funded by this project.)</i>				
<b>Post</b>	<b>Duties</b>			
Assistant Project officer (APO)	<ul style="list-style-type: none"> <li>• Liaise with external and internal advisors and teachers about the teaching and learning content</li> <li>• Organise the needs assessment survey and consultation sessions, training workshops, publicity events, and the evaluation surveys</li> <li>• Invite tenders for the development of the multimedia materials, the project website, and the project mobile app</li> <li>• Assist in tailor-making the teaching and learning content for the e-platforms -- VTC Moodle, the project website, and the project mobile app</li> <li>• Ensure the quality of the multimedia materials</li> <li>• Upload multimedia files to the e-platforms</li> <li>• Monitor the website and platform performance and project progress</li> </ul>			
Part-time Student Helpers	<ul style="list-style-type: none"> <li>• Enter evaluation data into the statistical programme for analysis;</li> <li>• To assist in data cleaning</li> </ul>			
<b>Project Sustainability</b>				
<i>(Please estimate the amount of recurrent expenditure and describe how you will commit the resources to ensure sustainability of the project. Please put supplementary information (e.g. proof of financial support) at appendix.)</i>				

- Once the multimedia teaching and learning materials are created and uploaded onto the various e-platforms, the assistant project officer (APO) will teach the teaching staff on how to maintain and update the content of the e-platforms. It should be relatively economical to sustain the results of the project with the existing manpower.
- The program is aimed at filling a knowledge gap of the existing programs, the resources developed are unlikely to be outdated quickly and will remain useful for the next few years.
- Evaluation surveys have been built into the project to ensure that the program will fulfil the proposed objectives and that the materials are tailored to the needs of various stakeholders including students, employers and teaching staff. This ensures the program will be of high quality at the end of the project period and will be useful well beyond the initial two-year period.