

**For discussion
On 4 December 2020**

Legislative Council Panel on Education

The Implementation of the Smart Technology Applications and Mobile Platform by the Vocational Training Council to Promote its Vocational and Professional Education and Training

Purpose

This paper seeks Members' views on the proposal of the Vocational Training Council (VTC) to implement the Smart Technology Applications and Mobile Platform (STAMP) to further promote its provision of vocational and professional education and training (VPET).

Background

2. Established in 1982 in pursuance of the Vocational Training Council Ordinance (Cap. 1130), the VTC is the largest VPET provider in Hong Kong, offering diversified full-time and part-time VPET courses which award formal qualifications ranging from Secondary three to the degree level, and provides students with multiple progression pathways. Through a total of 13 member institutions, the VTC provides about 200 000 places each year through a full range of pre-employment and in-service programmes.

3. The continuous advancement in technology has brought about new possibilities in enhancing the provision of VPET. On the other hand, the adoption of technology has become a vital part of VPET in the era of digital transformation, such as the use and application of virtual reality (VR) / augmented reality (AR) technologies. Furthermore, the COVID-19 pandemic has brought unprecedented changes in the workplace as well as to the modes of teaching and learning. To provide quality VPET that meets the fast-changing manpower needs and working environments of different professions, in addition to the updating and replacements of expiring and outdated systems to ensure the smooth and effective delivery of its core services, it is crucial for the VTC to maintain up-to-date information technology (IT) infrastructure, in order to provide a secure and sufficient platform for a variety of training and education tools which are essential to enabling students to acquire work skills for the future, applied knowledge in innovation and technology, and critical soft skills for career progression in the

new digital age.

4. The VTC has therefore proposed to implement the STAMP under which a package of IT related enhancement measures will be carried out on 30 of its campuses where its subvented programmes are provided, in order to facilitate the VTC's planning, execution, and development of VPET programmes to support the manpower requirements of various industries in Hong Kong. The proposal will incur a non-recurrent expenditure of \$76.993 million.

The STAMP

5. The STAMP implements IT related enhancement measures in the following two aspects –

- (a) smart campus infrastructure and security protection to support technology-enabled teaching and learning activities; and
- (b) adoption of and enhancements to IT applications to support new programmes and pedagogies for the provision of quality VPET.

6. The introduction of smart campus infrastructure lays the foundation for a secure and innovative study environment for students, enabling a wider adoption of various IT solutions and applications to enhance the quality of VPET and promote transformation to digital teaching and learning. The key elements of the STAMP are summarised as follows.

Smart campus infrastructure

7. A key purpose of the STAMP is to enable the VTC to step up its IT infrastructure to support the development of a smart campus, which will, through providing a high-speed, cloud-based and secure network as well as accessible and convenient IT services, create a solid foundation for the VTC to provide a technology-enabled VPET teaching and learning experience.

8. To achieve the objective, an important measure of the STAMP is to upgrade the VTC's backbone network infrastructure and wide area network (WAN) equipment from hundred megabits to multi-gigabit level by the installation of high-speed WAN switch and other relevant equipment, which would be capable to support the extensive use of smart mobile devices and bandwidth-demanding applications in teaching and learning, such as broadcasting, live-streaming, as well as application of VR/AR technologies. In addition, to

support the enhanced network, the VTC intends to install 800 high density 'WiFi 6' wireless routers to strengthen the internet access and coverage on its 30 campuses, enabling its delivery of real-time and interactive technology-aided teaching and learning in different VPET programmes it operates.

9. The STAMP would enhance the VTC's existing servers and storage platforms, which are found inadequate in handling a number of critical high-volume application systems of the VTC, such as its student admission system, student records database, class attendance systems (CAS), etc.. Moreover, the support services for the relevant Core Storage system and servers are expiring, and replacements are required to ensure that the relevant systems would be adequately supported and maintained. The STAMP would upgrade the storage system to all-flash array storage and adopt cloud-based and virtualisation services further, including the latest generation of hyper-converged infrastructure, with a view to improving the storage performance, and improving the flexibility and scalability of the IT infrastructure.

10. The STAMP would also centralise the management and the usage of licensed software essential to teaching and learning by adopting the virtual desktop infrastructure technology, which has the benefits of securing data patching in a cost-effective, timely, and flexible manner. The VTC aims to deploy around 700 virtual desktops, allowing students to access applications and resources anywhere and anytime with their mobile devices in a secure manner.

11. Furthermore, the STAMP addresses the heightening level of cybersecurity threat facing the VTC. In 2018-19, the VTC network recorded over 16 million network threats, nine million network intrusions, 67 million email threats, and 300 distributed denial of service attack incidents. The threat of cyberattacks and information theft is also expected to be rising. In tandem with the growing reliance on IT in teaching and learning, the VTC proposes to include a number of measures under the STAMP to provide stronger security for the networks and end-to-end protection for users' mobile devices to ensure the protection of IT assets and confidential information of students and staff of the VTC. Specifically, prevention and protection solutions would be adopted, including artificial intelligence insider threats protection system, intrusion prevention system, information protection system with advanced encryption technology, analytics-driven security information and event correction and management system, and security sandboxing system.

12. To further strengthen information security and mitigate potential threats amid the widespread use of mobile devices and the proliferation of mobile applications, the STAMP also introduces the enterprise mobile device and application management system to manage the access of mobile devices and

avoid data leakage. Authorised mobile applications and IT resources will be managed and consolidated under the centralised enterprise application store to facilitate users in accessing useful and secure services through official VTC applications. Users will not be allowed to access critical internal networks and sensitive systems with unauthorised or insecure mobile devices.

13. The above mentioned upgraded information network infrastructure would enable the STAMP to enhance the functionalities of the existing smart student mobile application and introduce self-service kiosks across the VTC's campuses, which would further improve students' personalised learning experience. The service enhancements would include electronic student cards, location-based information delivery, enhanced facilities booking, and in-class student response system.

Adoption of and enhancements to IT applications

14. The STAMP comprises enhancements to a number of support systems which are essential for the delivery of its core services and are conducive to the long-term development of quality VPET programmes through enhancing student administration, facilitating cross-discipline collaboration, and providing new articulation pathways.

15. The STAMP would introduce upgrades to the student management system which would enable the VTC to enhance its provision of VPET. At present, the VTC's student administration is underpinned by separate systems responsible for functions such as admission, enrolment, assessments, and retention. The rapid development of the VTC's VPET programmes in recent years, including the introduction of diverse articulation pathways such as varied study modes and new cross-disciplinary programmes, as well as the different support measures introduced by the Government, such as the various subsidy schemes, have created surging demands to synchronise the various student administration systems with the programme-specific systems. To improve the overall efficiency and reduce the need for manual administrative work which is prone to error, the STAMP would modify the processing, reporting and application submission functions of the admission support system, which include a simplified qualification screening system for staff, and improved navigation and information searching system for applicants. The student records-related systems will also be upgraded to incorporate new features such as automating tuition or instalment fee calculations.

16. The STAMP would also support new programme curriculum design and cross-disciplinary operation by upgrading the programme quality review

system. A student information repository and a collaborative software platform with workflow functionalities would be established, with a view to facilitating the development of data-driven programmes, and allowing campuses and disciplines to synergise in co-developing VPET programmes. Moreover, the STAMP would introduce wider applications of e-forms and workflow management systems with structured access controls, which would streamline procedures, expedite document sharing, and automate the workflow during curriculum development, quality assurance, and programme validation processes. The STAMP would also revamp the timetabling system by adopting cloud-based architecture with an upgraded CAS function in order to more effectively assist staff in managing and planning for the use of teaching space and facilities in real time.

17. To enhance students' self-service experience in managing their studies, the STAMP would upgrade the existing one-stop student portal with the application of container-based technology, enabling it to provide a holistic view of the students' profiles, including academic, financial, and other related information, helping students make informed decisions with regards to their studies.

18. Lastly, the STAMP would implement technology-augmented learning platforms, including the Learning Management System with cloud storage for sharing and downloading learning materials, a massive open online course platform with performance analytical tools, e-resource platform for teaching materials, and upgraded video lecture software supporting automatic speech recognition and interactive video quizzes. It would enrich the teaching and learning experience of VPET and would be conducive to enhancing the quality of teaching and learning while keeping pace with the development in educational technology.

Implementation Plan

19. Subject to funding approval by the Legislative Council in the 2020-21 FY, the VTC plans to commence the implementation of the enhancement works under the STAMP project from 2021-22, which will be completed by Q1 2024 tentatively. A detailed implementation plan is at **Annex**.

Financial Implications

Non-recurrent Expenditure

20. The proposal will incur non-recurrent expenditure of \$76.993 million, covering the relevant hardware and software costs, as well as the fees for the development and professional services. The estimated cashflow requirements from the 2021-22 to 2023-24 FYs are shown in the table below –

	2021-22 (\$ million)	2022-23 (\$ million)	2023-24 (\$ million)	Total (\$ million)
(a) Smart Campus Infrastructure	9.020	24.345	12.285	45.650
(b) Adoption of and Enhancements to IT Applications	5.226	14.766	11.351	31.343
Total	14.246	39.111	23.636	76.993

21. The VTC will absorb the manpower costs required to implement the proposal from within its own resources. Depending on the implementation progress, adjustments may be made to the distribution of the funding between the two categories and the cashflow requirements across the relevant financial years.

Recurrent Expenditure

22. The VTC estimates that the proposal will incur additional annual recurrent expenditure of \$6.2 million for the maintenance and operation upon full implementation, which will be absorbed by the VTC from within its own resources.

Advice Sought

23. Members are invited to comment on the above proposal.

Education Bureau
November 2020

**Implementation Plan of
the Smart Technology Applications and Mobile Platform**

		Tentative Start Date*	Tentative End Date*
Major Enhancement works			
<i>(a) Smart campus infrastructure</i>			
1	Installation of a campus high-speed network	Q2 2021	Q1 2024
2	Installation of intelligent enterprise infrastructure	Q2 2021	Q1 2024
3	Enhancement of the cybersecurity environment	Q2 2021	Q1 2024
4	Installation of virtual desktops	Q2 2021	Q4 2023
5	Centralised management of mobile devices and applications	Q3 2021	Q1 2023
6	Establishment of smart student applications and services	Q4 2021	Q3 2023
<i>(b) IT to support quality VPET</i>			
7	Enhancement of the admission support systems	Q3 2021	Q1 2024
8	Enhancement of the student data management system for new programmes	Q2 2021	Q1 2024
9	Implementation of an integrated platform for student services	Q3 2021	Q1 2024
10	Enhancement of the Timetabling System and Class Attendance System	Q3 2021	Q1 2024
11	Upgrade of existing technology systems for learning	Q3 2021	Q1 2024
12	Establishment of the data analysis system for admission planning and student performance improvement	Q3 2021	Q1 2024
13	Establishment of a collaborative platform for programme development and validation	Q3 2021	Q1 2024

*Implementation timetable may change depending on a host of factors, including for example the time needed to secure funding approval, actual implementation progress, etc.