

For information on 25 November 1999

Legislative Council Panel on Manpower

Vocational Training Council

Enhancement of Information Technology Infrastructure and Services

Purpose

This paper presents the Vocational Training Council (VTC)'s proposal to enhance its information technology (IT) infrastructure and services through a \$176 million strategy. Subject to Members' comments, the Administration will make a formal funding proposal to the Finance Committee.

Justifications

2. The existing IT facilities and applications of the VTC are inadequate to meet the modern day needs of vocational education. Its management also requires the support of a more comprehensive and sophisticated Management Information System (MIS).

(i) Use of IT for quality vocational education

3. Similar to other streams of education, the trend of vocational education is to make a fuller and wider use of IT to assist both teaching and learning. Students are expected to use IT as a medium of self-learning and will have to acquire a high level of IT skills before they enter the job market. The teaching process is also changing from being teacher-oriented to student-oriented through a more independent, self-paced and multi-media mode of learning.

4. In view of these developments, the VTC plans to deliver teaching and learning materials on the Internet/intranet in a lively and interactive manner (lecture on demand) so that students can access them at any time during the day and even from outside of the VTC. It intends to encourage more frequent use of multi-media equipment in the teaching process, to provide students with ample opportunities to use computers and have wider access to the Internet.

5. However, these initiatives cannot readily be supported by the VTC's existing IT infrastructure. Multi-media equipment, for instance, is available only in a limited number of lecture halls and classrooms. Connectivity to the Internet is available only on a limited basis. Moreover, advanced technologies to enable lecture on demand is beyond the capability of the existing IT system.

6. To take advantage of IT in the delivery of vocational education, these shortcomings must be addressed. The VTC, therefore, proposes to -

- (a) launch a lecture on demand service by installing the necessary systems;
- (b) connect all student PCs to campus networks for wider access to the Internet and remote access to the VTC's network. By the 1999/2000 academic year, each full time student at technician level and above will be provided with a free Internet account. This means opening over 17 000 additional accounts;
- (c) install around 1 200 computers in classrooms, lecture halls, and common areas of the VTC's nine vocational education campuses. This is to facilitate the use of IT in the teaching and learning process;
- (d) enhance the existing Dynix Library System with new services like reserved collection and self-check circulation, and to expand the electronic library system to allow online access to more journals/video databases to facilitate teaching and learning;
- (e) install video-conferencing facilities so that one lecturer can address more than one class at one time. This will enable the VTC to optimise the use of its limited space;
- (f) provide facilities to enable students to access their academic and personal information pertinent to their studies;
- (g) launch a virtual help desk service which will enable

end-users such as teachers, students and staff to access IT related help services;

- (h) install a time-tabling system to optimize the use of physical resources to support the teaching and learning process and to improve course provision; and
- (i) replace outmoded IT facilities to enable modern software to be run and to improve the level of services provided.

(ii) MIS and user services enhancement

7. The VTC's existing MIS provides basic administrative and management functions such as finance, student administration, basic personnel and leave record, course information and planning. However, there is no linkage between different databases. The analytical functions of these databases also fall short of the needs for comprehensive and sophisticated analysis of the data now required by different levels of management within the VTC.

8. The VTC's current MIS does not provide information for human resource management and resource inventories. This has hindered the management of the VTC in optimising its use of resources. The availability of these functions will enable the VTC to rationalise the use and allocation of its resources. The current system is also unable to cope with new operating requirements such as Mandatory Provident Fund (MPF).

9. Furthermore, there is limited accessibility for frontline users (other than operational staff) like teaching staff performing online student assessments. This has inhibited the efficiency of information dissemination. The web-based deployment of IT facilities will be the best solution to enhance information dissemination.

10. To reinforce its management capabilities in terms of strategic planning, decision making, resource allocation and co-ordination of activities, the VTC proposes to -

- (a) integrate all of its individual databases into a coherent system with full compatibility and to make available to management the information it requires to satisfy management needs. Analytical functions will also be enhanced by providing cross-functional data analysis facilities to give the best possible support to management planning;
- (b) develop/acquire various application systems, including human resource management and resource inventories to strengthen its management capabilities, and AA&I works and MPF function to meet operation needs;
- (c) upgrade the interface of its MIS to enable deployment in a web-based environment. This will enhance the user-friendliness and accessibility of the MIS substantially. This will also lower client software cost and reduce training and support requirements;
- (d) provide facilities to ease and speed up information exchange between the Council and government bureaux, universities and trusted employers, and
- (e) enhance the hardware of its MIS to accommodate the improvements described above.

(iii) Network infrastructure enhancement

11. To extend the use of IT to the delivery of vocational education and to support the above improvements of the MIS, the VTC will need to enhance its network infrastructure. This involves -

- (a) expanding the current campus network and upgrading the linkage between the Council's campuses to facilitate new applications and services such as video conferencing and lecture on demand;

- (b) upgrading its Internet facilities, servers and some of its desktop computers to provide a better service and increase the connectivity within the VTC and to policy bureaux, government departments and external bodies such as universities and other educational/training providers; and
- (c) reinforcing the security of its network to facilitate remote access and transmission of information to and from the VTC.

COST AND BENEFIT ANALYSIS

12. The successful completion of proposed enhancements on “Use of IT for quality vocational education” and “Network infrastructure enhancement” will deliver benefits as follows -

- (a) the use of IT as a medium of teaching and learning will improve course provision by enabling a move from teacher-oriented activities to student-oriented activities;
- (b) the use of IT will improve cost efficiency by increasing the student through-put. This will be brought about through an improvement to the quality of course provision by providing a modern, interesting and interactive learning environment, which will enhance teaching and learning effectiveness. As a result, students will be able to better assimilate course materials and experience a richer learning environment. In effect, a higher through-put rate will result by making the whole learning experience much more interesting and interactive;
- (c) the quality of education will be improved by enabling students to access teaching materials 24 hours a day. Students can get “just in time” online assistance from course abstracts/teaching packages;

- (d) IT will improve ties and communication with the industry, universities, other educational/training providers, government departments and policy bureaux thereby encouraging fruitful academic exchanges and improving administrative efficiency;
- (e) the flexibility of video-conferencing teaching will in the future save costs on the building of large lecture halls; and
- (f) enhanced IT services will cultivate an IT culture for both students and staff for life-long learning.

13. The MIS enhancement proposed by the VTC aims at providing efficient and quality services. Most of the enhancements are new services and cost saving in dollar terms may be difficult to quantify. Nevertheless, the VTC estimates that an annual cost saving of \$7,000,000¹ will be achieved upon full implementation of the proposed MIS enhancement. The enhancement will also provide the following benefits:

- (a) an enhanced MIS to help all teaching, administrative and management staff to increase their efficiency and make more informed and better decisions. This will lead to improved planning capabilities and a more efficient use of resources;
- (b) lower client software cost and reduced training and support requirements. Web-based applications require less development time and can be made available on local campus networks, Council wide area network, intranet, or the World Wide Web;
- (c) an Executive Information System to enable analysis

¹ The \$7,000,000 annual savings projected by the VTC comprises \$5,400,000 staff cost saving for temporary clerical/support staff and overtime works and \$1,600,000 cost saving in operating expenses. These savings will be returned to the Government.

of cross-functional data that is not possible on existing uni-functional systems;

- (d) storing data in common data repository simplifies data security strategy. Security policy can be formulated more clearly and procedures be followed more easily;
- (e) enhanced information exchange between the VTC and government bureaux, universities and trusted employers will lead to significant gain in operation efficiency and better designed courses matching the needs of local labour market;
- (f) the use of IT will reduce the time lecturers have to spend on administrative tasks enabling them to devote time to teaching activities.

IMPLEMENTATION PLAN

Encl. 1 14. The VTC plans to implement the proposal in phases in 1999-2000 for completion by 2002-03. A phased implementation plan is at Enclosure 1, the progress of which will be closely monitored and managed by the VTC's IT Steering Committee².

FINANCIAL IMPLICATIONS

(i) Non-recurrent expenditure

15. We estimate that the proposal will incur a non-recurrent expenditure of \$176,830,000, broken down as follows -

1999- 2000	2000-01 (\$'000)	2001-02 (\$'000)	2002-03 (\$'000)	Total (\$'000)
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² The Committee comprises Deputy Executive Director (Academic) and a team of 10 senior staff of the VTC.

	(\$'000)				
(a) Use of IT for quality vocational education	12,483	29,037	28,757	19,146	89,423
(b) MIS and user services enhancement	585	28,459	26,005	5,919	60,968
(c) Network infrastructure enhancement	<u>9,426</u>	<u>6,676</u>	<u>10,337</u>	<u>0</u>	<u>26,439</u>
Total	<u>22,494</u>	<u>64,172</u>	<u>65,099</u>	<u>25,065</u>	<u>176,830</u>

16. On paragraph 15(a), the expenditure is for the procurement of around 1 200 additional personal computers, replacement of outmoded IT facilities, enhancement of the VTC's Internet servers and access facilities, upgrading of the library system, and installation of a lecture on demand system, remote access service and video conferencing facilities.

17. On paragraph 15(b), the expenditure is for the establishment of data warehouses to capture the VTC's management information, enhancement of its MIS system, upgrading of its MIS interface from client-server based to web-based environment, setting up of an Executive Information System and development of new MIS applications such as the Human Resources Management System.

18. As regards paragraph 15(c), the expenditure is for the enhancement of VTC's network infrastructure, upgrading of its Internet servers and access facilities, and improvement to its network security system.

19. A detailed cost breakdown for estimated cash flow and for individual IT programmes is at Enclosure 2.

(ii) Recurrent expenditure

20. Recurrent expenditure is expected to be increasing in line with implementation of IT programmes. The VTC estimates that the IT infrastructure enhancement project will require an additional recurrent expenditure of \$14,287,000 per annum at the end of implementation period. This amount will

include -

- (a) \$12,348,000 for maintenance charges of computer equipment (including hardware and software) and necessary annual licensing fees, and
- (b) \$1,939,000 for maintenance and rental charges of communication equipment (including hardware and software) and data communication lines.

21. The VTC will absorb these costs within its existing level of subvention from Government.

BACKGROUND INFORMATION

22. The last major improvements to the VTC's IT infrastructure were carried out two years ago with funds amounting to \$31.967 million approved by the Finance Committee in October 1997. Progress of these improvements is at Enclosure 3.

Encl. 3

23. However, the improvements in 1997 only enabled the VTC to build up a basic network, conduct vocational education with moderate assistance through the use of IT, and make enhancement to its existing MIS. To fully cater for the latest needs of vocational education and the information needs of the VTC's management, substantial improvements to the VTC's IT infrastructure and services are required as set out in paragraphs 3 to 11 above.

Vocational Training Council
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**Detailed breakdown of costs
of VTC's IT Infrastructure Enhancement Project**

IT Programme	Manpower cost	Hardware & software solution cost (including implementation services)	Total cost
	<i>\$'000</i>	<i>\$'000</i>	<i>\$'000</i>
<u>(I) Use of IT for quality vocational education</u>			
Additional PCs for students (3 phases)	-	20,637	20,637
Lecture-on-demand service	3,930	10,558	14,488
Upgrading of Library Dynix System and enhancement of the Information Technology Training and Development Centre	323	9,824	10,147
Virtual help desk service	3,543	4,533	8,076
Time-tabling system and automatic software distribution and upgrade	1,332	6,466	7,798
Remote dial-up and mobile PC access service	2,296	4,552	6,848
Data warehousing of student data (2 phases)	1,572	6,929	8,501
Video conferencing services	1,048	4,450	5,498
Replacement of outmoded IT facilities	396	3,892	4,288
Increased Internet access and server enhancement	683	2,459	3,142
<i>Sub-total</i>	<i>15,123</i>	<i>74,300</i>	<i>89,423</i>

(II) MIS and user services enhancement

Enhancement of MIS infrastructure (2 phases)	2,065	11,298	13,363
Data warehousing of VTC data (3 phases)	2,452	10,831	13,283
New MIS Applications (2 phases)	2,139	9,954	12,093
Executive Information System (3 phases)	3,023	8,841	11,864
Web-based MIS and Extranet - online survey	3,185	7,180	10,365
<i>Sub-total</i>	<i>12,864</i>	<i>48,104</i>	<i>60,968</i>

(III) Network infrastructure enhancement

Campus network backbone/server/desktop performance enhancement (2 phases)	727	10,300	11,027
Internet upgrade (2 phases), enhancement of VTC network and electronic library upgrade	605	7,210	7,815
Training Centre Complex Networks	417	4,500	4,917
Network security - virtual private network	480	2,200	2,680
<i>Sub-total</i>	<i>2,229</i>	<i>24,210</i>	<i>26,439</i>
<i>Grand total</i>	<i>30,216</i>	<i>146,614</i>	<i>176,830</i>

**Progress of IT Improvement Project Approved by Finance Committee of
the Provisional Legislative Council in October 1997**

The progress of the various deliverables of the project approved in October 1997 is as follows -

Campus Network

- (a) All campus networks for the seven technical institutes, VTC headquarters and local area networks for the three training centre complexes have been set up and linked together with the existing campus networks at the two technical colleges to form a Council-wide internal network.

Management Information System

- (a) The Dynix Library System has been upgraded. Basic Electronic book processing/borrowing/returning system was implemented [*See Para. 6(d) for additional information*];
- (b) The Financial Information System (FIS) Phase I comprising General Ledger, Accounts Payable and a Purchasing system, has been implemented;
- (c) Development of FIS Phase II for operational units and the Full-time Payroll System is in progress;
- (d) A Student Admission System has been implemented;
- (e) A student registration module for the Student Records System has been implemented. Development of other modules including term-start, pre-examination, post-examination, and term-end processing is in progress.

Client Server System

- (a) The replacement of an old mini-computer with a new server system for the Tuen Mun Technical Institute and Kwai Chung Technical Institute has been completed.