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From Reading to Browsing : A Study on Obstacles for Information Technology Learning in Education for the Students of Hong Kong

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SUMMARY REPORT

1 Introduction

The exponential growth in the use of Internet communication and information technology (IT) in the past decade or so has had a tremendous impact on the form and medium of knowledge. Learning, traditionally acquired through the medium of print, has now migrated towards the use of multimedia, including the Internet, video, audio and other graphical approaches. In November 1998, the SAR Government issued a document "Information Technology for Learning in a New Era: Five-Year Strategy --- 1998/99 to 2002/03" which outlined a blueprint for IT reform. What and where the obstacles of IT learning in education for the students of Hong Kong, has given rise to much controversy and expressions of deep concern. Through this exploratory study, we hope to increase our understanding of the issue. Only then can we make suitable directions for the formulation of policies and services in the future.

2. Methodology

Both a qualitative study of teachers and a quantitative opinion survey of students are employed for this study. The qualitative study was conducted through in-depth focused-group interviews of teachers that are involved in information technology in their schools. An interview guideline with open-ended questions was directed to solicit respondents' opinions towards the experience of using information technology in teaching. Two focused-group interviews were conducted for teachers from different districts between September and October 1999. The quantitative survey was conducted by telephone over five evenings from 18 to 28 September 1999. A total of 507 students, from secondary Form 1

to Form 5, were successfully interviewed. The success rate is 59.0 per cent, whereas the standard error is within 2.3%. The analysis contains a synthesis of both the qualitative in-depth focused-group interviews of teachers and the quantitative data from the students, as well as an extensive review of the literature.

3. A typical picture of information technology education for secondary students in Hong Kong

As revealed by the survey data, over the past year, the majority of teachers either never or seldom use multimedia for teaching their subjects (Chinese 92.1%; English 90.1%; Mathematics 92.8%; Integrated Science 83.9%; Geography 86.6%; Economics/EPA 91.1%; History 92.4%). Only in teaching computer-related subjects is multimedia frequently or sometimes used (83.8%). At the same time, only around one-fifth of the teachers frequently or sometimes assign homework that requires the use of computers (21.1%) or the Internet (15.1%).

What are the reasons for this? More than two-fifth (41.2%) of the students said that inadequate computer facilities inside the classrooms accounted for this. Similarly, 39.8% of the respondents believed that teachers choose not to use information technology in teaching as a major cause. Some students (13.6%) thought that the lack of teaching materials was the main reason. Teachers from the in-depth focused-group interviews also shared this opinion.

However, what is the present environment and ability of students in using information technology? More than three-quarters (76.9%) of the students have personal computers at home and nearly half (49.3%) of these computers have access to the Internet. A significant portion of the students also use I.T. multimedia for leisure purposes through CDROM games (52.8%), for browsing web sites (45.2%), using ICQ or chatrooms (33.8%), for reading Internet newspapers or magazines (27.4%) or for joining newsgroups (11.0%). Small portions (8.1%) of students even have their own personal homepage. Using the Internet for learning is also popular among students. More than two-thirds (67.9%) of students claimed that they knew how to search for information through web sites. Nearly half (48.5%) of the respondents knew how to use email for the transfer of files. Further, a significant portion (41.6%) of students knew how to use search engines on the Internet.

In spite of only a very few (7.1%) students using computers for doing homework, their attitude towards using I.T. for learning were positive. A majority (80.1%) of students indicated that they were interested to learn more I.T. and 73.0% of students agreed that I.T. was indispensable for learning in today's society. More than two-thirds (67.7%) of the respondents were confident that their abilities in using I.T. would improve within a year's time.

The findings of the survey also revealed that more than two-thirds (68.0%) of respondents' parents had no knowledge of computers. A majority (79.2%) of students indicated that their parents provided little if any help in assisting their learning by the Internet or computers.

In short, a typical picture of students' I.T. learning in the educational system can be summarised as follows: Most Hong Kong students have access to computers and the Internet and are familiar with its use for leisure and entertainment. In spite of students being ready, motivated and confident to learn new skills in I.T., they were not really given many opportunities in schools either to make use of I.T. for homework or to be taught in classrooms by teachers through multimedia. Also, a relatively small number of teachers were familiar with using multimedia in teaching their subjects. Inadequate hardware facilities in classrooms, as well as the lack of appropriate software as teaching aids were the top two reasons which accounted for this situation.

4 Discussion

4.1 The Five-Year Strategy of information technology for learning in a new era has shown the commitment of the SAR Government in IT education. However, much has to be done if the key components of the Strategy, namely access and connectivity, teacher enablement, curriculum and resource support and community-wide culture, are to be realised.

It was revealed by the findings of the teachers' focused-group interviews that the launch of the "Information Technology for Learning in a New Era: Five-Year Strategy 1998/99 to 2002/03" policy document by the SAR Government points the path to I.T. education for a knowledge-based society. Much has been changed in schools for hardware facilities and software training materials since November 1998. However, as far as the mission and vision of the Government in I.T. education are concerned, much has to be done if the key components of the Strategy, namely access and connectivity, teacher enablement, curriculum and resource support, as well as a community-wide culture, are to be realised. At present, opinions from the teachers show that there is a lack of consensus in both definition and operation in I.T. education. Some school principals believed that the abandonment of "white chalk and black boards" means I.T. education, while other teachers thought extensive use of PowerPoint presentations in classroom were equivalent to I.T. education. While the provision of adequate IT facilities has made a smooth start over the last year, further resource support and forward planning are needed for better development of IT learning in education for Hong Kong students.

4.2 Most of Hong Kong students have access to computers and the Internet. They are familiar with the use of IT for leisure and entertainment purposes, but not for acquiring new knowledge. In spite of students being ready, motivated and confident to learn new skills in IT, school environments fail to provide them with opportunities either in the active use of IT for doing homework or being taught in classrooms by teachers through multimedia.

The findings of the survey revealed that more than three-quarters (76.9%) of the students have personal computers at home and nearly half

(49.3%) of these computers are already Internet accessible. It seems that the issue of accessibility will diminish as time goes by. The survey also showed that a significant portion of the students are frequently or sometimes use I.T. multimedia for leisure purposes through CDROM games (52.8%), for browsing web sites (45.2%), using ICQ or chatrooms (33.8%), for reading Internet newspapers or magazines (27.4%) or joining newsgroups (11.0%). A small portion (8.1%) of students even had their own personal homepage. This shows that many Hong Kong students have already acquired the general abilities of using the Internet through entertainment or games.

The findings of the survey also revealed that attitudes of students towards using I.T. in learning are, in general, positive. A majority (80.1%) of students indicated they were interested to learn I.T. and 73.0% of the students agreed that I.T. was indispensable for learning in today's society. More than two-thirds (67.7%) of the respondents were confident that their abilities would improve within a year's time.

In spite of the fact that students are ready, motivated and confident to learn new skills in IT, the school environments fail to provide them opportunities in the active use of IT skills in doing homework or being taught in classrooms by teachers through I.T. multimedia. This was explained by teachers not requiring students to use computers (49.5%) or the lack of computer facilities in classrooms (48.5%).

The findings of the survey also discovered the differential impact of the availability of computers in families. When asked about their knowledge of using some common Internet tools for learning purposes, it was revealed that students from families without personal computers had huge limitations when compared with their counterparts who did have computers. More than two-fifths (42.9%) of these students claimed that they did not know how to search for information through web sites. More than two-thirds (71.4%) of these respondents did not know how to send files through emails. A similar portion (72.1%) of these students did not know how to use search engines on the Internet. This shows that special attention has to be made to low-income families, so that the poor or the disadvantaged can be provided with equal opportunities in acquiring new abilities needed for the knowledge society.

4.3 IT facilities, both for computer hardware and teaching materials, are far from adequate which has discouraged teachers in using this technology in classrooms. Technical support from the SAR Government for network maintenance and educational software development are both unsatisfactory. Teachers are slow when adjusting to the demand of the proposed "paradigm shift" in teaching.

Throughout the focused-group interviews, teachers expressed their concern over the inadequacy of IT facilities in classrooms and the lack of sufficient teaching software for education IT. The major complaints regarding hardware centred on the fact that most computers in the schools are centralised in one or two computer rooms. In most schools, thirty to forty classes have to move in rotation to the computer rooms to take their lessons. Comparably, white chalk and black boards are still important teaching tools in classrooms. If teachers wish to use IT facilities, they have to use the computers and projectors in a mobile rack. These facilities are of insufficient quantity when compared with the classroom ratio. They are also inaccessible to the Internet. At present, very few classrooms in their schools, as expressed by most teachers of the focused-group interviews, are fully equipped as fixtures with basic IT facilities, which include computers, projectors, display screens, cassette or video players as well as points of connectivity to the Internet. This inadequacy of IT facilities in each classroom has greatly discouraged teachers from using IT in education.

Almost all teachers interviewed indicated that technical support from the SAR Government to network maintenance and educational software development were equally unsatisfactory. While the Government pledged to arrange contract technical service for all primary and secondary schools, many teachers said that their schools had not been unsuccessful in obtaining these support resources, despite having applied for them. The average teacher therefore is bound to avoid using IT in education under these circumstances. Even teachers with greater motivation felt the workload for preparing multimedia-teaching materials was unbearable in addition to their normal teaching work. A typical example is that a teacher has to work for a week to prepare a three-minute PowerPoint presentation. It is evident that it may not be very cost-effective for teachers to produce IT teaching materials without the support of the SAR Government.

The findings of the study also revealed that teachers are moving slowly to adjust to the demand of the proposed "paradigm shift" in teaching. It is quite understandable that without sufficient professional support or mechanisms for teacher enablement, the proposed change will not happen naturally.

4.4 "To provide IT facilities to a level with Internet accessibility into classrooms for teachers to use" is the necessary consideration for developing strategies of IT in education.

The above findings reveal that teachers were determined not to use IT in education due to insufficient resource and inconvenience. At present, the SAR Government has successfully provided IT facilities to a school level. However, evidence shows that merely providing IT facilities to a school is neither sufficient nor efficient. Centralising most hardware resources into one or two computer rooms is only the starting point. To further the visions of the Five-Year Strategy, it is crucial to provide IT facilities to a classroom level. Only when all classrooms are fully equipped with basic IT fixtures, including computers, projectors, display screens, cassette or video players, as well as points of connectivity to the Internet, will a breakthrough in IT education happen.

4.5 Teaching materials and software in IT education are either grossly inadequate or are only of moderate quality. The present mechanism of assessment of new textbooks by the Education Department seems unable to cope with the rapid change. The issues of support resources for software development, new guidelines for assessment of teaching materials, as well as intellectual property rights need to be addressed.

At present, the lack of available teaching materials or interactive multimedia software for IT education discourages teachers from getting involved. Even the software developed by commercial enterprises are far from satisfactory, claimed the teachers interviewed. In spite of this, some motivated teachers have started to compile and develop IT materials for their own use. However, they are very reluctant to share this with other teachers. This may due to the following reasons: (1) their intellectual property rights may not be recognised; (2) the quality of their product may not good enough for sharing; (3) uncertainty on legal

liabilities when scripts, photos, articles, graphics or video from other sources are being used in the materials.

The concern of intellectual property rights and liabilities for the illegal use of registered products are crucial for software development in IT teaching materials. It affects not only teachers in schools, but also those commercial enterprises that develop IT software for sale. A clear guideline in handling the issue of intellectual property rights, together with an updated directive on the appropriateness of materials to be included for education in IT in the curriculum needs to be developed. How to encourage publishers to invest more in developing educational software in IT, and how to assist teachers to avoid the infringement of others' intellectual property rights when compiling teaching materials need to be addressed.

Furthermore, the present mechanism for assessment on new textbooks by the Education Department seems unable to cope with the rapid change. It is not uncommon for the Department to take one to two years to assess and approve a new textbook for publishing. It is also not uncommon that while a textbook obtains its approval from the Education Department, the content of the textbook has already been updated or is even incorrect. It is difficult to imagine how the existing mechanism of assessing teaching materials will be able to cope with the exponential growth in the use of communication and information technology in education. An urgent need for an overhaul of this existing mechanism seems evident when education in IT has been put on the agenda of the education curriculum.

5. Recommendations

In view of the above discussion, the Federation will recommend:

5.1 Since the Five-Year Strategy of Information Technology for Learning in a New Era, the SAR Government has successfully provided IT facilities at a Hong Kong wide level. The initiative and commitment of investing huge resources into IT education by the SAR Government will undoubtedly benefit the whole next generation. We fully recognize the direction and effort paid by the Government in this respect and believe that it will create a better future for the society.

5.2 However, the IT education should go beyond "teaching IT means teaching computer classes". The present practice of most schools by centralising computers inside one or two computer rooms has resulted in a bottleneck for education in IT. Teachers, in spite of being motivated to participate, are still greatly discouraged under these circumstances. The Federation recommends that IT facilities should be provided beyond a school level and go down at a classroom level. All classrooms should be equipped with basic IT facilities, which include computers, projectors, display screens, cassette or video players as well as points of connectivity to the Internet or Intranet which teachers can use.

5.3 The concern of how to encourage publishers to invest more in developing educational software in IT, as well as how to assist teachers to avoid the infringement of intellectual property rights when compiling teaching materials, needs to be addressed. The Federation recommends the Government to play a more active role in developing the quantities of quality educational materials. Besides, we also recommends that a thorough study on the issue of intellectual properties in relation to the development of teaching materials and interactive software be implemented. Furthermore, the present mechanism of using an average of one to two years' time on the assessment of new textbooks by the Education Department is unlikely to be able to cope with the

rapid change of education in IT. The Federation recommends that an overhaul of the existing mechanism on the assessment of teaching materials be implemented.

5.4 To facilitate and motivate initiatives from schools, resource support in technical aspects should be sufficiently provided by the Administration. This is not only important to ensure the schools' proper functioning of the newly acquired computer equipment, but also to foster the emergence of a school-wide atmosphere conducive to the "paradigm shift" in the school environment.