# The Singapore Teacher as Software Evaluator

Cheah Yin Mee &
Cheung Wing Sum

## INTRODUCTION

The goal of education in Singapore has long been associated with that of economic development that it comes as no surprise when initiatives in education are launched with economic objectives in mind. As early as 1985, the government has already forecasted that the growth of information technology (IT) will have a direct impact on 30 per cent of the world GDP (National IT Plan 1995:1). The report further identified that " IT will be a key technology in improving business efficiency and labour productivity, and generating new business"(ibid.). Singapore's survival relies on its ability to remain competitive in the world economy, and the need to restructure, to move upstream into high-skilled, high value-added and technology-intensive industries is inevitable. It is also inevitable that the outcome of education has to be reoriented towards developing a more IT-oriented workforce and population. The launch of *A Vision of an Intelligent Island* by the National Computer Board in 1992 represents the country's goal to consciously plan for more pervasive application of IT to improve business performance and the quality of life.

The Ministry of Education (MOE) followed this earlier initiative with the announcement of a S$2 billion IT master plan in April 1997 aimed at educating all schools in the use of computers for teaching and learning. This master plan is made possible by the substantial IT capability that has been developed over the decade. The IT master plan in education outlines four key dimensions where IT in education will be introduced. These include curriculum and assessment, learning resources, teacher development and technological infrastructure. The introduction of IT is expected to bring about dramatic changes to the teaching and learning cultures of Singapore schools. For instance, IT-based learning will "seek to develop pupils' ability to think innovatively, to cooperate with one another and to make sound value judgements" (p.1). Learning will no longer be the finding of relevant information but is instead "learning to apply information to solve problems and communicate ideas effectively"(p.2). Much of this is

expected to come about through the "rich, interactive capability of IT-based learning resources", and one of these is through the use of CD-ROM software. The master plan states that the "development and commercialization of a full range of educational software relevant our local curriculum is a critical component of the plan". This trend was recently confirmed by the Minister of Education, when he announced that the Ministry and the Economic Development Board will launch a new programme to develop new software titles especially "in areas where suitable titles are not currently available to meet our curriculum needs" (*Sunday Times*, 5 April 1998). We can, therefore, expect that the use of software would be an important component of IT-based lessons. Primary and secondary schools are currently given an annual budget of between S$20,000 and S$30,000 to purchase software. In addition, a help list of new titles is distributed quarterly to aid teachers in selecting software.

These initiatives will mean that teachers will need to learn new skills to keep up with the changes. The Ministry has already anticipated this in their master plan:

> *Teachers will be trained to evaluate software.... As a perfect fit between software and curricula requirements is rarely possible, teachers will also have to be trained to adapt available software to their needs*

> *Ministry of Education 1997:3*

The new approach to using IT in education also means that teachers cannot remain "presenters of ready-made knowledge" (OECD/CERI 1989). Instead, they have to be the "guide and the manager of learning resources designed to serve the learner" (Banathy 1993). Indeed, success in the computerization of Singapore schools will depend very much on the effective use of software, as "educational software lies at the very heart of the new technologies used in the classroom" (Vachon 1992). In the Singapore context, the teacher will have to play a central role in operationalising this goal. .

## WHAT DOES SOFTWARE EVALUATION INVOLVE?

The use of software in the language classroom adds a new dimension to the traditional classroom where print, chalk and talk have long dominated. However, the effectiveness of this technology is dependent

on teachers' ability to select the right software to match the curriculum and the students. Software selection and presentation will present a whole new challenge because the new medium through which it is presented is still new to teachers.

The OECD Centre for Educational Research and Innovation (1989) makes a distinction between software review and software evaluation. Software evaluation is a process where an individual or a group of individuals uses some criteria to measure the software and then makes a value judgement about the product. Software evaluation may be biased by an individual's background, experience and ability, and often times teachers who feel that they lack the technical know-how are only too willing to accept these 'expert' opinions. Software review and evaluation can be thought of as a continuum with various shades of meaning and interpretation depending on the methodologies used, and consequently with various levels of objectivity and usefulness. At one extreme of the continuum are factual descriptions of the software without any evaluative comments; at the other are the evaluations which are the outcomes of studies by academic researchers adhering to rigorous norms of scientific inquiry.

Cheung (1994) suggested that based on this statement, one could argue that there are three major components in the process of software evaluation — software description, software review and software evaluation.

A description is 'an objective and informative description of a piece of software' (OECD/CERI 1989) and may constitute the first step in the evaluation process because it gives a clear picture of the package being evaluated. Currently, descriptions are readily available to teachers in the form of articles in newspapers, magazines, journals, and on the boxes of software packages. However, these descriptions are limited in their use, and teachers cannot rely on descriptions to help them choose their software.

A review includes 'a critical appraisal by one or more persons of the educational value of a software package as a teaching or learning tool' (OECD/CERI 1989). It gives value judgement about the features, functions, content, instructional methods and other components of software. Most software reviews do not make explicit the reasons why a certain judgement is reached, and this subjectivity tends to be its greatest drawback. Independent reviewers in the MOE's Educational Technology Division (ETD) currently produce reviews of software, and

the software packages which are well received are placed on a list of recommended materials. In most cases, teachers tend to take the ETD recommended list as their guide for software selection. However, the reviews themselves are rarely available to teachers.

An evaluation will require the reviewers to say if the package will benefit students in their learning. Gill, Dick, Reiser & Zahner (1992) argued that software evaluation should have a one-on-one evaluation followed by small group evaluations. They suggest that one high-ability, one average-ability and one low-ability student should be chosen to try out the software on a one-to-one basis. While this may be the most desirable situation as it provides information as to whether students will benefit from using the package, it is also the most time-consuming. Teachers are unlikely to want to do this before using the software.

Selecting software can be equivalent to selecting appropriate learning tools or tutors because most software packages are used to improve the learning environment for students. However, software selection and evaluation is only the preliminary step. After the selection comes the effective use and integration of the software into the existing curriculum, and this must be accompanied by effective management of learning situation. These issues are unavoidable in any classroom context, and have to be addressed in relation to those of software selection and evaluation.

## FACTORS INFLUENCING TEACHERS IN SOFTWARE EVALUATION

If teachers have to select software, they need to be equipped with the right set of skills and attitudes. Unlike traditional selection and evaluation of print texts, software evaluation poses a new challenge in the form of the technology within which the software is to be used. The business of software selection and evaluation is a more complex process that involves more time compared to textbook evaluation (Vachon 1992). Cheung (1994) described a five-stage process that includes the following:

• getting input about the choice of software from sources like magazines, journals, etc.

• understanding the software description given

• doing a review of the software selected

- testing software on a one-to-one basis among students of high, average and low ability

- using a small group of students as a sample to test whether the software package helps in student learning

Despite ETD's attempts to shorten the process by providing a list of approved software, teachers are still required to go through each package to select the right software for their own students. In addition, time is needed to develop activities to match the software chosen. Testing out the software with their students only takes place in the context of an actual lesson instead of before it, although teachers do recognize that the trying out of these packages with students will give a better assessment of the educational value of the software.

Time is but one factor influencing teachers' successful selection and evaluation of software; other factors include skills and attitude towards computer technology. Evaluating software requires teachers to acquire a new set of skills the most fundamental of which are computer skills. This itself, is often a stumbling block for many teachers, and they have to overcome this anxiety first before they can be ready to look at software. Such a problem does not exist with other media. In addition, teachers may have to update their content knowledge and instructional skills because the new technology brings with it new teaching and learning theories as well as a flood of new information.

Pelgrum(1993) suggested that " the amount of information teachers received in training courses about pedagogical /instructional aspects of using computers is quite strongly associated with their attitudes about the educational impact of computers". In Singapore, teachers are receiving their training in phases according to the implementation schedule for IT in their schools. The training begins with basic computer literacy courses involving use of basic software packages and open tools like word processing. The actual implementation and integration of software into the curriculum and the pedagogical innovations that should accompany this change unfortunately remains to be worked out at the classroom level. This is perhaps unavoidable given the complexities and the novelty of this educational enterprise.

There has not been many studies on how teachers are reacting to the situation or how they are coping, although support in many forms have been forthcoming from the Ministry as well as at the grassroots level. We also know little about teachers' attitudes towards computer technology, although preliminary studies based on pre-service teachers

suggest that while they are comfortable using the computer for personal purposes, there is some anxiety about using computers for instruction (Cheah & Cheung, 1997). This is a worthwhile issue to consider because ability to use the computer for personal purposes constitutes the main form of training for teachers, but the ability to use the computer and the software effectively in the classroom requires a combination of technical and pedagogical skill. This skill needs to be honed through class experience and not just training.

But regardless of whether teachers review or evaluate software, they need the most basic technical skill to run the software followed by the expertise knowledge about the subject and the medium in which it is presented to do an evaluation, and the pedagogical know-how to use the software effectively. Are teachers equipped to carry out this task?

## PROBLEMS TEACHERS FACE IN SELECTING AND USING SOFTWARE

We carried out a preliminary investigation of some of the problems facing teachers, both pre-service and experienced teachers, on the difficulties they face in selecting software. The sample was 40 experienced teachers and 55 Year 2 pre-service students who are about to graduate from their Diploma in Education programme. We gave them a list of problems to select and Table 1 shows the results of the survey.

**Table 1:** Experienced and pre-service teachers problems in selecting software

|  | In-service | Pre-service |
|---|---|---|
| No time or limited time to do software evaluation | 65% | 46% |
| Lack of software evaluation skills | 35% | 66% |
| Not enough software in my discipline to choose from | 18% | 17% |
| Not comfortable in carrying out software evaluation | 18% | 7% |
| Cannot access available software | 8% | 26% |
| No available computer to carry out software evaluation | 0% | 3% |

The findings suggest that both groups of teachers chose the following two main problems — lack of time and lack of skills. Experienced teachers chose lack of time as their top problem followed by the lack of skills. The lack of skills is understandable since the majority of schools are in Phase 3 of the IT master plan and are still awaiting training. Teachers also claim that there is inadequate software in their respective disciplines to choose from and that they do not feel comfortable doing software evaluation. This feeling of discomfort could arise from their lack of skills but could also be a result of a lack of confidence. Pre-service teachers, on the other hand, were more concerned about their lack of skills, followed by the lack of time. These teachers' lack of skills could be due to a lack of practice in software evaluation since their training at NIE does not provide the kind of intensive practice that they need. Their third concern of lack of access to available software could reflect their own situation as they have no access to the many resources at the Educational Technology Resource Centre (ETRC) like the trained teachers. Their fourth concern is again the lack of software in their specific discipline to match the requirements of the curriculum. Interestingly, the lack of hardware is not a major problem reflecting how well equipped schools are where hardware is concerned.

Given that these are the main problems, how then do teachers go about the business of software purchase? Table 2 shows the findings from our question.

**Table 2:** Experienced and pre-service teachers' approaches to buying software

| Statements | Experienced teachers | Pre-service teachers |
|---|---|---|
| MOE's recommendations | 60% | 57% |
| Software reviews | 40% | 34% |
| Teachers' recommendations | 55% | 54% |
| Description of software from package | 20% | 26% |
| Hands-on experience | 65% | 49% |
| Based on students' feedback and use | 20% | 40% |
| Software catalogue information | 5% | 29% |
| Vendors' recommendations | 10% | 9% |

Once again there are common factors in helping both groups of teachers decide on software purchase. The three top factors for both groups were: MOE's recommendations, teachers' recommendations and hands-on experience. There were slight differences in ranking for both groups as expected. Experienced teachers count hands-on experience as more valuable than MOE's recommendations followed by teachers' recommendations. This finding is unexpected considering that the lack of time to do evaluation is a major problem for teachers. The choice of hands-on experience as the preferred approach to software selection suggests that time is not a factor. On the other hand, the finding could suggest this is the preferred approach which is different from what teachers do in reality.

Pre-service teachers' choices reflect their relative inexperience and lack of professional confidence when they opted to go with MOE's and then teachers' recommendations, followed by hands-on experience. Other significant factors for both groups are student feedback and use and software reviews; the former received a higher ranking from pre-service teachers.

## INTEGRATING IT INTO THE CURRICULUM

Software selection is but a preliminary step in the process of introducing IT into the schools. What is more urgent is the issue of integrating the technology into the curriculum, which in most cases is fairly structured. Careful integration requires attention to pedagogical and content issues. We ask teachers about their biggest problems in integrating computer technology into classroom activities. Their responses, both pre-service and experienced teachers are shown in Table 3.

As in the case of software selection, the lack of time appears to be the main problem for teachers in both categories, that is, the lack of time to develop instructional activities for the software. The lack of time appears again as the fourth major problem, and that is the lack of time for choosing software. This points to a realization on the part of teachers that the software cannot be used as is, and that careful planning is needed. This is perhaps augmented by the realization that the many software packages available do not match the existing curriculum, the problem that is ranked second by both groups of teachers. This need not be a major problem if teachers accept that there can be no perfect match between software and the curriculum. If teachers have time and

**Table 3:** Problems experienced and pre-service teachers face in integrating computer technology into the curriculum

| Statements | Experienced teachers | Pre-service teachers |
|---|---|---|
| Difficult to book computer lab | 7.5% | 8% |
| Don't know how to use software in a meaningful way | 28% | 26 % |
| Not too many software packages to choose from | 15% | 9% |
| No time to choose software | 20% | 17% |
| Takes too much time to develop instructional activities for software | 50% | 43% |
| Poor quality of software | 3% | 11% |
| Software packages do not match curriculum | 40% | 37% |

the skill to think of innovative ways to use the software, they can still use the software productively. On the other hand, the lack of time could also be related to a structured curriculum that teachers feel compel to complete. Indeed, one teacher told us while completing the questionnaire that it would be great if the Ministry could develop a software that closely matches the curriculum topics. In other words, a software package that can replace the textbook and presumably be used in place of the textbook in class.

The third problem both groups chose is a more serious one, that of not knowing how to use the software package in a meaningful way. This is because the problem reflects teachers' lack of knowledge about the nature of teaching and learning via this new medium as well as the lack of a set of clearly defined guidelines for using software. The latter is unavoidable because this manner of teaching and learning in a formal way is still new, and attempts at integrating technology into the curriculum are still at the experimental level. This is perhaps the most urgent of the three problems, and training should concentrate on helping teachers develop the skills to develop meaningful activities from the software.

## CONCLUSION

Our preliminary findings on the problems teachers face in selecting, evaluating and integrating software suggest that the overwhelming problem is time and a lack of skills. The issue of a lack of time is a real one, but there are ways around this. One way is through the provision of technical skills and support. This means that instead of struggling with running the software, teachers can concentrate on the educational merits of the software. Another way is to provide for more sharing of teachers' resources and expertise on the web or in support groups. The start of an IT Special Interest Group (SIG) by the Division of English Language and Applied Linguistics (ELAL) recently has resulted in useful sessions where more experienced teachers from Phase 1 and Phase 2 schools shared their skills and knowledge. Sharing of resources on the web is yet another way of providing support to teachers. In addition, this will also help nurture a community of professionals in this area.

The issue of more skills is more urgent considering the fact that the top three problems in integrating software are directly linked to the pedagogical skills of teachers. Teachers cannot expect a perfect match between software and the curriculum, and this is not a desirable trend in software development because it will result in less than inventive materials and can lead to a lock-step approach to teaching that is so prevalent with textbooks. The skills needed to develop instructional activities are not new skills *per se*. Many of the guidelines for preparing meaningful language tasks for children are applicable to tasks based on software packages with some attention and modification to the specific nature of the medium. In-service training should focus on these aspects instead of just looking at technical skills.

In many instances, we find that teachers are generally paralysed by their fear of the unknown, which in this case is IT. It is always useful to remember that the technology is but a tool for us to use, and that while successful teaching can be affected by the use of the tool, the most fundamental principle remains that of "curriculum first, technology second". An adherence to this principle will ensure that in our zeal to catch up with technology, we are not sacrificing effective instruction with superfluous technical wizardry. In the same way, teachers' evaluation of software will be always be guided by sound pedagogic considerations.

*Cheah Yin Mee is a consultant in language education.*

*Cheung Wing Sum is Assistant Professor in the Division of Instructional Science, National Institute of Education.*

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