

Teacher Empowerment and Minimalist Design

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1. INTRODUCTION

Although the use of ICT in education has been strongly advocated with a vision of bringing a paradigm shift to education, observational studies and surveys in general indicate that the actual impact of ICT on classroom teaching and learning has been limited. This paper attempts to provide a discussion of the underlying problems, and reports an experience which seems to indicate how the situation may differ if teacher empowerment is taken as a primary concern in the development of ICT in education.

2. TEACHER DISEMPOWERMENT

Classroom observation studies provide clear evidence that putting powerful tools in the hands of students does not necessarily imply their powerful usage, and the teacher has a crucial mediating role to play. (Somekh & Davis, 1997; Wegerif & Schrimshaw, 1997). Unfortunately, teacher empowerment studies in general observe that technologizing has brought to most teachers a feeling of deskilling and disempowerment, rather than empowerment. Cuban (2001a, 2001b) points out that underlying most national ICT initiatives is the authorities' agenda to impose educational reforms on teachers, with little consideration of the reasons behind existing practice or innovations in classrooms, and little power is given to the 'frontier soldiers' to decide whether and how things should be done. Alienation and resentment develop, and Cuban contends that if this fundamental issue is not addressed, the whole initiative is going to be self-defeating.

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3. CRITICAL AWARENESS OF THE NATURE OF THE TECHNOLOGY

Technologies are generally non-neutral. They are created to satisfy our needs, but they also exert an effect on us. Don (1993) points out that it is almost like a law that when one's power gets amplified in a certain dimension, there will inevitably be a reduction in another dimension, both due to the same nature of that technology. Just because a magnifying glass magnifies something, it pushes other things out of your view. From this perspective, Bowers (1988) draws educators' attention to a new way of examining the use of ICT in education.

Fundamental to the nature of computers is that they process representations. Obviously representations can help people's thinking, provided that they can relate these representations (text, diagrams, images) to what are represented. But then the other side of the coin is, how about those who don't see these representations as representations? On almost this same point, Brown and Duguid (2000) remind people of the importance of tacit/implicit knowledge, and warn about 'tunnel visions' in technology developments that focus narrowly on 'information' as if it is an object on its own, leaving out of focus the 'social peripherals', including existing intermediary relationships, and implicit communal knowledge that are essential for the generation and 'reading' of the information.

The notion of ubiquitous usage of computers in classrooms is hence questioned. The computer software at its very best only provides an additional experience. The students and teachers have to make sense of this experience together, and in relation to many other human interactions and physical experiences. And there are also many other valuable and enjoyable activities in the real classroom that don't seem to be replaceable by the technology. The ICT representations can only become rich in meanings as they go along with other concrete contextualized experience.

Immediately pertinent then are the questions: How often do educational software developers take non-ubiquitous and hybrid usage as their objective? And secondly, how much flexibility has been given to teachers in orchestrating the whole range of activities?

Programmability is also fundamental to the nature of ICT. Capitalizing on that, you can prepare rich presentation slides before you teach, but at the same time, it reduces your flexibility in responding spontaneously to feedback from the class. More importantly, the two stages of work can now be undertaken by different people. On the positive side, you have more parties contributing. Yet it is a separation. Is it uncommon to see that the more a developer thinks about and implements his/her desirable flow of a

lesson into the software, the less usable the software becomes to the teacher? The separation also implies an issue of power.

4. A CONTRASTING EXPERIENCE

In 1998 our research team was sponsored by the Language Fund of Hong Kong to develop a series of computer software packages, called the Dragonwise Series, to enhance children's structural understanding of Chinese characters (Lam, Ki, Law, Chung, Ko, Ho, & Pun, 2001). Based on the theoretical framework of the team, the software was created. After its completion, the software was introduced to over 1,000 local primary language teachers through various teacher workshops. As indicated by surveys done in workshops, the majority of the teachers liked the pedagogic principle and considered the software "very helpful" and "helpful" to their teaching. However, follow up surveys revealed that only limited actual usage of the software can be found.

In view of this, the team decided in 2001, when it received a second phase funding from the Quality Education Fund of Hong Kong, to make a drastic change in its model of development. The resulting classroom impact was dramatic.

5. MINIMALIST DESIGN: A NEW STYLE OF SOFTWARE

The idea is borrowed from the theory of Minimalism (Carroll, 1990, pp. 7–10). Simply put, it means to minimise the obtrusiveness of the software to instruction. Our original programs are broken down into a wide range of tiny *learning objects*, each allowing the user to play with a specific concept in a focused context. These learning objects make no assumptions about whether the user is a teacher or student, or whether it is used for presentation, exploration or consolidation. It is just like a piece of rock in a geography lesson, which carries its own properties, but no assumption about how, when, and by whom it is to be used. In this way the software gives maximum flexibility to the teachers in designing their lessons. The learning objects are self-contained and downloadable. They can be run online and offline, or embedded into teacher-produced multimedia materials. Each learning object is simple to use. They are also small; the activity normally takes only a few minutes to finish. If teachers like, they can put several of them together to form a longer activity.

6. NEW DEVELOPMENT MODEL: WITH TEACHER EMPOWERMENT

School teachers were given a highly prominent role right from the very beginning of the design of the software. Before any substantial development was done, the team visited 15 schools to introduce prototypes of the learning objects in which are embedded the pedagogic ideas about structural understanding of Chinese characters. Teachers in the schools could choose those types of interactions they liked most, and suggest modifications. After these preliminary exchanges, the team and the schoolteachers went into a partnership for the new software development. Teachers were asked to study their students' work to see if the kinds of errors predicted by the theory did occur, and then to suggest the content of the learning objects they thought most relevant to their students, as well as compatible with the already existing curriculum plans of the school. The research team held discussions with the teachers and produced the agreed learning objects.

With this change of model, the actual classroom impact was dramatic. Within about seven months, a large volume of new software was developed (a total of 1,441 learning objects), and the school teachers were very eager to put them immediately to use in their classrooms (many of them were originally very apprehensive about using technology in classrooms). Some teachers even integrated the learning objects into their school based literacy teaching program, and seven of the 15 schools offered to share their experiences and classroom videos in front of hundreds of other primary school teachers. The materials produced were then put on the web for everybody to share. Within four months, there were over 15,000 hits to the web site (<http://www.dragonwise.hku.hk>).

7. CONCLUSION

It can be seen that, with the principles of teacher empowerment and minimalist design, the teachers not only felt confident and comfortable in using the software, but also they were empowered to synthesize and invent novel and creative ways of teaching their lessons together with the many other traditional means. Teachers' participation in the development process allows praxes of using the software to grow out of the actual needs of the teachers. And ultimately it is the people and the praxes that inject more people into the game.

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