The Pedagogical Evaluation of the EduPAD Project

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The development and testing of the EduPAD in a trial school was part of the Ministry of Education effort under the IT Master Plan to bring about a paradigm shift in teaching in Singapore schools, that is, to make the learning process in schools more student-centred. The EduPAD development and research was an inter-agency collaborative project involving a number of institutions in Singapore. The Ministry’s industrial partners were mainly responsible for the development of the hardware device and the software applications for the device. The Educational Technology Division of the Ministry of Education was in charge of the training and exploration of the use of the EduPAD system in the trial school. The National Institute of Education was invited to evaluate the pedagogical use of the EduPAD in the classrooms.

The Research Issue/objective
As an IT communication tool, the EduPAD offers tremendous pedagogic potential for learning both in the classroom and at home. The exact nature of what constitutes the best pedagogic practice for optimizing the use of the EduPAD in the classroom was the key research question that this whole project hoped to answer. Teachers can use the EduPAD to create and carry out class activities as well as facilitate the distribution and collection of class exercises electronically. Pupils on the other hand can use the device as a platform for their work, on which they can carry out hands-on and collaborative activities as it allows learners to communicate with each other’s terminal. Pupils can also make use of their EduPAD to explore learning resources on their own. The device was tested in Dunman Secondary School in a number of secondary one classes.

Methodology
Video recordings of lessons taught by the teachers were made prior to the introduction of the EduPAD device and with the use of the device at the initial and final stage. The pre-EduPAD lessons were recorded in January-February 2000. They formed the baseline data for comparison. The EduPAD lessons were recorded in July-October 2000. The videotaped lessons were analysed using an episode-time analysis observation form devised by the researchers. The main episodes recorded related to teacher initiated and student initiated events in the lesson. In this manner a picture of the dynamics of the lessons was captured. After the analysis of the videotaped lessons comparison was made between the baseline pre-EduPAD lesson data with the EduPAD lesson data to determine the shift in the way the teachers conducted the lessons with the use of the EduPAD.

Focus group interviews were carried out with all the ten teachers who were involved in the trial of the EduPAD. Also at the end of trial period we administered a questionnaire to the students and conducted group interviews. A total of 116 pupils responded to the questionnaire. In addition, two focus group discussions were held. Twenty students selected by their respective form teachers joined the discussion sessions, ten students per group.

To date, three conference papers have been generated from the data collected and one article has been submitted for publication in a journal.

Main Findings and Implications
From the review of the nine-videotaped lessons it was observed that the degree of frontal teaching was less in the EduPAD lessons where the teachers tried to incorporate the learning facilities of the EduPAD device. In the lessons reviewed, the EduBOOKs and the Internet link were the features that teachers seemed to favour.

The interviews suggest that both the teachers and the students have a positive view towards the use of electronic communication device to enhance teaching and learning. However, they were apprehensive that the technical problems associated with the use of electronic devices could disrupt the smooth flow of the lesson. Both the teachers and the students have experienced a number of technical problems with the prototype device used in the current experiment.

The teachers were of the view that the TMT (Teacher’s Management Tool) was a useful system for teachers to prepare quizzes and worksheets before the class and CMT.
Nearly 75% of the students expressed a desire to use such a device as a learning enhancement tool.

Over 50% of the students were of the opinion that the classroom lessons were interesting with the use of the eduPAD. In particular they found the access to Internet and the enhancements in the eduBOOK as useful features to help them get a better understanding of the subject content. Negative views expressed towards the use of the eduPAD were mainly related to the technical limitation of the prototype device. Nearly 75% of the students expressed a desire to use such a device as a learning enhancement tool.

On the whole it can be said that the eduPAD device has the general features and potential to engage pupils in independent and collaborative work but has to be made more reliable and interactive if it is to function as a teaching-learning tool in the classroom setting. Also, it has to be kept in mind that bringing a tool like eduPAD into the classroom alone will not result in changes automatically. Teachers need to modify their teaching strategies to accommodate the unique features offered by the new technology and provide learners with opportunities to access knowledge experts as well as their peers.

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This study is supported by the Educational Research Fund (EdRF)

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Headed by Lim Cher Ping, the main objective of the study is to examine and analyze where and how IT is integrated in Singapore schools to develop students’ higher order thinking skills. The specific objectives for the research are:

- To identify, describe and interpret the sociocultural setting elements that promote or inhibit the successful integration of IT in Singapore schools.
- To synthesize and interpret data from the Organisation for Economics Co-operation and Development (OECD) and Second Information Technology in Education Study (SITES) studies to provide a more holistic view of IT integration for pedagogical and policy recommendations.
- To construct models of IT integration for Phase I, II, and III schools based on relationships and patterns identified.
- To engage in an active dialogue of IT integration issues, problems and models with our external collaborators.

Research questions at both micro and macro-levels can then be generated, some of which are:

- What are the pedagogical practices of teachers & students that promote or hinder the integration of IT?
- What are the roles of the human participants, activities and tools in such an environment?
- How does a change in the curriculum promote a culture that aids in the integration of IT?
- How does a change in the mode of assessment affect integration of IT?

Based on the implementation progress, this study is well timed as the integration of IT in Singapore schools has reached a considerable level of maturity and stability for evaluation purposes. By studying and documenting both the “successful” and “unsuccessful” integration of IT in schools with particular learning environments and their broader sociocultural context (education system and society at large), the implications and potential applications are at three levels:

**Constructing IT Integration Models for Singapore Schools**

Singapore will continue to refine and further develop the use of IT in schools. The construction of models for the IT integration for Phase I, II, and III schools based on relationships and patterns identified from the synthesis and interpretation of data will enable effective integration of IT into the Singapore schools.

**Making Policy Recommendations**

Exploring the different levels of the sociocultural-historical context will enable the research team to make policy recommendations on IT integration. This will include areas such as potential changes/reduction in the curriculum; changing the mode of assessment (for example, inter-disciplinary projects); instilling the culture of thinking school, learning nation, school autonomy and the professional development of teachers.

**Establishing Singapore at the forefront of international research on IT integration**

Providing a descriptive and interpretative account of the pedagogical practices of teachers and students, the role that IT plays in these practices, and the contextual factors that support and influence them, the results of the study should be of interest to the international educational community.