EVALUATING EDUPAD: 
THE PEDAGOGY OF A PERSONAL ORGANIZER FOR COLLABORATIVE LEARNING

Steven J. Coombs
Nanyang Technological University, Singapore

Abstract: This paper will review the recently proposed educational research project between Singapore’s NIE and the Ministry of Education’s (MOE) Educational Technology Division (ETD). The eduPAD device is a hand-held electronic personal organizer that can store items, such as entire textbooks, on a storage card the size of a postage stamp. In addition, eduPAD allows learners to communicate with each other’s terminal, thus, enhancing new collaborative learning experiences. Clearly, as an IT communications tool, 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 eduPAD in the classroom is the key research question that this project hopes to answer. By carrying out a major study and evaluation of the key identified pedagogic areas underpinning the use of eduPAD in the classroom, we hope to provide valuable feedback to the designers and manufacturers of eduPAD, so they can improve its educational specification. We will also be determining the instructional design criteria underpinning the development of eduPAD’s main courseware application: eduBook. By producing and influencing the quality of eduBook educational support courseware, we envisage a unique set of products and services that could capture a worldwide market, enhancing Singapore’s reputation as a leader of IT educational hardware and courseware.

The eduPAD collaborative research project

EduPAD is a new experimental electronic wireless handheld device that is being developed for use in Singapore’s classrooms. It has built-in IT resources such as eduBooks, which are textbooks stored onto a RAM card that can be used for the enhancement of teaching and learning in schools. The eduPAD development team is an inter-agency collaborative project involving the following Singapore institutions:

- Kent Ridge Digital Labs (KRDL) – educational IT software development
- Dunman Secondary School – involved in trialing the eduPAD system
- National Computer Board (NCB) – who are developing the hardware devices in conjunction with local IT industries.
- Ministry of Education (MOE) Educational Technology Division
- National Institute of Education (NIE)

EduPAD also encourages collaboration among teachers and students through its flexible networking capability and in so doing creates an opportunity for exploring new student-centred learning experiences such as project work.
This imaginative project is investigating the educational uses of eduPAD, through an in situ classroom-based pedagogic evaluation that is being conducted by NIE in partnership with MOE’s Educational Technology Division. NIE recently received an educational research grant (EdRF) from the MOE to conduct a two-year study that will evaluate the pedagogic effectiveness of using eduPAD in the classroom.

How do we assess the pedagogic value of eduPAD?

We wish to evaluate eduPAD in its natural environment, which means conducting classroom-based pedagogic research. This makes the research task more difficult, but offers the potential of learning genuine pedagogic lessons associated with the trialing and implementation of eduPAD into a real life classroom situation.

The main educational research objectives of the project can be summarized as follows:

- To first develop appropriate research instruments for evaluating eduPAD in conjunction with our colleagues from the Ministry of Education (MOE) Educational Technology Division.
- To find out how the use of eduPAD affects the teaching delivery process, i.e. collect video recorded classroom observations of whether didactic teacher-centred or more student-centred approaches are adopted with the use of eduPAD.
- From these video observations, establish the nature of classroom-based social interactions, i.e. teacher-pupil and pupil-pupil etc., and see if eduPAD has made any significant impact upon these.
- To determine the Human-Computer Interface (HCI) interactions with eduPAD. Namely, to find out the quality of interaction among pupils using eduPAD and how this tool might enable individual patterns of self-organised learning tasks to be achieved, and how these are developed within curriculum programmes.
- To find out how eduPAD influences overall classroom time management, i.e. pupils’ time spent on learning tasks and influences of eduPAD upon teacher time issues. These include time differentiation analysis between typical events such as pedagogic discourse versus classroom management.
The key pedagogic research questions and proposed research instruments for evaluating eduPAD in a live classroom setting have been summarized in Table 1.

Table 1: The pedagogic evaluation areas of eduPAD

<table>
<thead>
<tr>
<th>Pedagogic Area</th>
<th>Key Components</th>
<th>Research questions</th>
<th>Research methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching Process.</td>
<td>Teaching style and nature of curriculum, i.e. the pedagogic social context.</td>
<td>To observe whether this is a didactic teacher-centred approach or more student-centred.</td>
<td>Video recorded observations of classroom sessions using EduPad &amp; without EduPad - 2 camera shots.</td>
</tr>
<tr>
<td>Social Interactions.</td>
<td>Teacher-Pupil (assistance) Pupil-Pupil (collaboration) Pupil-Teacher (discussion)</td>
<td>To see if the use of EduPad has affected the nature of social interactions in the classroom.</td>
<td>As above And without EduPad.</td>
</tr>
<tr>
<td>Human-Computer-Interface (HCI) interactions with EduPad.</td>
<td>With individual pupils using EduPad as a learning tool.</td>
<td>To find out the quality of interactability and the developing of individual patterns of self-organized learning tasks.</td>
<td>As above. Besides video recorded, we need to use the tracking system inside EduPad.</td>
</tr>
<tr>
<td>Satisfaction &amp; Motivation.</td>
<td>Teacher feedback. Pupil feedback.</td>
<td>To find out the underlying influence of employing the EduPad technology as a curriculum support tool in terms of perceived satisfaction and motivation of the teacher and pupils.</td>
<td>Teacher on-the-job learning journal as a log of curriculum events, problems encountered etc. Semi-structured recorded interviews as focus group sessions with teachers and pupils. Evaluation forms and questionnaires for teachers and pupils.</td>
</tr>
<tr>
<td>Time Management.</td>
<td>Time-on-task (pupils). Time managing task (teacher). Teacher time – pedagogic discourse vs. classroom management.</td>
<td>To find out how EduPad has influenced the time management tasks of the teacher managing the curriculum and the pupils learning it. How EduPad has influenced the time pupils spend on a task.</td>
<td>Video recorded observations of classroom sessions using EduPad - 2 camera shots. Specific Time-Line observations.</td>
</tr>
</tbody>
</table>

Our main idea is to make authentic classroom observations through the use of video-recording methods. Observing and understanding curriculum practice through the use of video has been
Successfully experimented with by Stigler (1997) who maintains that: “videotape instruction of classroom instruction allows us to refocus on teaching processes, with the aim of improving student’s learning” (p. 1). Clearly, video qualitative evidences provide a primary data source from which to understand and analyze the pedagogic processes involved with the integration of eduPAD into the everyday secondary school curriculum. We also intend to obtain qualitative feedback from both the teachers and students using the focus group method (Gibbs, 1997), which we also intend to record as videodata evidences for conversational analysis and qualitative triangulation (Coombs, 1995). Gibb’s (1997) summarizes five core issues associated with adopting the focus group research methodology:

- Focus group research involves organised discussion with a selected group of individuals to gain information about their views and experiences of a topic.
- Focus group interviewing is particularly suited for obtaining several perspectives about the same topic.
- The benefits of focus group research include gaining insights into people’s shared understandings of everyday life and the ways in which individuals are influenced by others in a group situation.
- Problems arise when attempting to identify the individual view from the group view, as well as in the practical arrangements for conducting focus groups.
- The role of the moderator is very significant. Good levels of group leadership and interpersonal skill are required to moderate a group successfully.

Clearly, focus groups offer a number of distinct advantages over other forms of group-based evaluative feedback. Gibbs distinguishes the main difference and cites that normal group interviewing puts the emphasis on only eliciting “questions and responses between the researcher and participants”. While focus groups offer the key discourse advantage of group-based interaction relative to the focus questions set by the researcher: “the key characteristic which distinguishes focus groups is the insight and data produced by the interaction between participants”. Thus, focus groups provide a critical thinking learning environment for the participants and represent a value-add to the quality of resultant qualitative data produced from the session. Our project will clearly gain advantage from adopting the focus group method as the sessions will provide a forum in which the various eduPAD classroom teachers can share and exchange their experiences relative to the pedagogic evaluation focus issues. No other form of evaluative survey could either inspire or elicit the hidden experiences of the teachers that lie outside the narrow confines of a standard interview queation but might be elicited during group-based interaction and debate of the focus issue at hand. This additional learning experience from focus group social interaction represents a “laddering up” (Hinkle, 1965) process of the group’s individual qualitative meanings and provides a collective group judgement that informs our pedagogic findings. Gibbs (1997) also supports this notion that focus groups provide a useful forum from which to elicit new meaning and understanding of the issue at hand as well as empower the research project by being made to feel a valued part of the social process:

“Another benefit is that focus groups elicit information in a way which allows researchers to find out why an issue is salient … If multiple understandings and meanings are revealed by participants, multiple explanations of their behaviour and attitudes will be more readily articulated... The benefits to participants of focus group research should not be underestimated. The opportunity to be involved in decision making processes to be valued as experts, and to be given the chance to work collaboratively with researchers can be empowering for many participants”.

In summary, the five pedagogic areas that we will be concentrating our study upon are:
• Teaching processes: teacher versus student-centred approaches adopted.
• Social interactions: teacher-student, student-student, and student-teacher.
• Human Computer Interface issues, e.g. interactability of the resources used.
• Satisfaction and motivation issues associated with the use of eduPAD.
• Time management issues, e.g. on-task versus classroom management.

Conclusion

In conclusion, the pedagogic evaluation of eduPAD represents a ‘ground breaking’ project. Not just because the technology in the classroom is leading-edge state-of-the-art equipment, but because the qualitative educational research methods to be adopted represent a novel solution. The evidences gleaned from video recorded focus group discussions and classroom usage of eduPAD will be analysed and fed back to the software and hardware development agencies of KRDL and other IT industries in Singapore. Pedagogic issues and lessons learnt about the curriculum integration of the eduPAD tool will also be shared with our partners from the MOE Educational Technology Division. There is no doubt that this type of valuable feedback exercise will impact upon the future design of classroom-based instructional resources that can benefit from the use of eduPAD as both a student-centred and group-based collaborative tool. While the eduPAD project has only just got underway in the schools, it is our intention to report future findings through both the Educational Research Association in Singapore and any other international forums that would benefit from learning about this project.

References


The NIE research team and principal collaborators

The NIE team is drawn from the Division of Instructional Science:
• Assoc. Prof. Philip Wong: Principal Investigator
• Asst. Prof. Steven Coombs
• Asst. Prof. Hu Chun
• Asst. Prof. Jackie Hsu
• Dr A. Lourdusamy