Engaging Learners Through The Use of Pocket PC’s

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An overview of the Project
Immanuel Lutheran College was the recipient of an Australian Government Quality Teacher Program grant to assist with the introduction of hand held computer technology into the classroom. The project was a pilot study into the use of pocket personal computer technology by 36 Year 12 students. The aim was to develop and trial the pedagogies, hardware and software necessary to provide students with improved learning outcomes in Physics, Maths C, IPT and Chemistry.

Pocket Technology
The pocket PC is a convergence of laptop, graphing calculator, datalogger and G.P.S. technologies currently used at Immanuel Lutheran College. Pocket PC devices are very portable, with good battery life and open opportunities for data collection, manipulation and transmission through the use of wi-fi 802.11B with immediate access to the College network and the world wide web from any on-campus location. This has enormous application to a wide range of subject areas but, more importantly, offers a new and exciting means of addressing cross-curricular priorities such as literacy, numeracy, information skills, thinking skills, futures perspectives and lifeskills in a relevant and authentic way.

Changes in the Classroom
The use of this technology in the classroom requires a different pedagogy from more traditional approaches. The teacher becomes a manager and communication hub. Students are able to work collaboratively and immediately share information using infrared beaming or bluetooth. This results in engagement and real-life experience. Pocket PCs may ultimately become seamlessly embedded in classroom practice. Enhanced use of e-learning via the College Learning Portal is also being developed.

Personal ownership
One of the major findings of the pilot study was that students and staff must have personal ownership of the pocket PC in order to use it efficiently. It is an excellent organisational and data collection tool but there is some complex thinking and a lot of experience required in order to get the most out of the technology. For this reason Immanuel Lutheran College held a meeting of Year 12 students and their parents to explain the potential of the device and to ask them to purchase an HP iPAQ rx3400 pocket PC. Students could expect around three years effective life from the unit and would probably want to upgrade after that time. Students and staff who use school-owned machines are not motivated to develop their expertise because they are reluctant to alter settings and paths.

Attitudinal Change
At the outset of the project, students were excited about the new technology they were about to experience. They had high expectations that they would become more organised, use the devices for note taking and preparing assignments. As the project proceeded there was a measurable change in their perceptions of the usefulness of the device. Organisation and note taking require perseverance. Handwriting recognition is sometimes frustrating and the keyboard is small and requires concentration. Creating a file structure and locating files is demanding. Wireless transmission and reception can sometimes be unreliable. Web pages are not always tailored to the small screen. Within
a month, students realised that the technology had its limitations and became more realistic in their expectations.

**Significant Differences**
Analysis of student pre and post surveys conducted in the first nine weeks of educational use of the technology showed statistically significant attitude change in the following areas:
- perceptions of being better organised diminished
- they initially saw themselves as a little slower and less productive
- perceptions of usefulness in other subject areas were lower
- students initially felt less in control of their learning
- students came to regard the devices as less useful for note taking
- they recognised their need for assistance in using the pocket PC
- the possibility of doing group work was viewed more positively
- they saw physics as slightly more theoretical and less practical
- they expressed greater difficulty in reading small screens and often changed their views on whether they learned better visually

These changes reflect the fact that students take up the technology with great enthusiasm and become realists fairly quickly.

**Enhanced Learning**
Students in the Physics, Maths, IPT and Chemistry classrooms have been able to visualise abstract concepts by plotting two or three-dimensional graphs and viewing animations. They have at hand in the classroom wireless access to the Internet to gather information at the point of need without the requirement for a computer laboratory. Staff have found a bountiful supply of suitable web pages and software, frequently freeware, to be available. In science laboratories and in the field, flashloggers may be used for on-the-spot data collection and analysis.

**Engagement in learning**
The study so far has shown greater engagement of students, particularly boys with personal ownership of the technology, in science and maths. Females tended to show less confidence in the full use of the technology and this is a matter to be addressed as the implementation continues. The students valued learning from their teachers more as they realised the need for support when working with sophisticated technology on high level tasks. Initially they tended to feel a little less in control of their learning.

**Technological awareness**
Teachers involved with the project became acutely aware of the technological issues surrounding the use of pocket PCs in the classroom. These included networking, remote printing, presentations, blue tooth, infrared and wifi communication. Security of data and the use of pocket technology in different situations such as the exam room were other issues addressed. It became very clear that teachers need contingency plans to cope with unexpected occurrences. Plan A might be individual work with the pocket PCs using wireless networking. Alternative strategies are then required if wifi is not operational or student devices encounter software issues. A teacher cannot be totally reliant on this technology and must enter the classroom prepared for a more conventional lesson. Teachers found also that much of their class time was spent tutoring students in the use of the device or solving software, storage and battery issues for them.
Engaging students in learning
Teachers found that they had to develop new strategies for engagement of students given that there was a diversity of interest and motivation levels in the classroom. Some students had their own machines and were readily immersed in activities, others without machines were observers with infrequent experience of school-owned machines, yet others lacked confidence and had to be encouraged to participate fully.

Motivation
Teachers with a technological bent became very excited by the project. They often trawled the Internet for useful resources adaptable to pocket PC usage. One maths teacher found many different calculators and emulators which made the teaching of complex mathematical topics such as matrices and Fibonacci series much more interesting and intelligible to the students. Teachers without their own personal machine find it difficult to become excited about the technology. It is essential to know the instrument intimately and to be perfectly at ease with its use before a teacher feels confident to use it in a classroom with students.

Collegiality
The staff that participated in the study found that working in a team of committed people was a real highlight of their teaching careers. There is a very positive energy when educators begin to discover new uses for technology in the classroom. Teachers who were peripheral to the study also started to take more interest in the new pedagogy and many wanted to experiment for themselves. The use of the technology by a small core of staff member can, by osmosis, grow into an educational revolution and this is starting to happen in Immanuel classrooms.

The future
Where to from here? Here are some ideas being discussed:
- discovering more applications for pocket PCs
- researching whether Palm devices might be more suitable
- expanding into new subject areas e.g. Geography, LOTE
- bringing staff whose interest is peripheral into the innovation
- deciding when best to introduce the technology when students are responsible yet have time to explore the capabilities
- introducing the technology to a whole year level
acquiring supporting technology such as more access points, data projectors, flash loggers, etc

Identification of the strengths and results of the project:
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Overview of the struggles encountered by teachers and students:

Students had high expectations that they would become more organised, use the devices for note taking and preparing assignments. As the project proceeded there was a measurable change in their perceptions of the usefulness of the device. Within a month, students realised that the technology had its limitations and became more realistic in their expectations.

In fact, analysis of student pre and post surveys conducted in the first nine weeks of educational use of the technology showed statistically significant attitude change in a number of significant areas.