



**EDUCATIONAL TECHNOLOGY DIVISION
MINISTRY OF EDUCATION**

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LEAD ICT@SCHOOLS FINAL PROJECT REPORT

| | | | |
|--|---|--------------|--------------------|
| School Name: | Dunman Secondary School | Date: | 22 Aug 2008 |
| Prepared by: | <i>Mr Lee Huan Leng, HOD-Information Technology</i> | | |
| 1. What LEAD ICT projects, programmes were implemented over the 3 years? <i>(Alternatively, you may choose to attach your 3-year workplan with "Review of Progress" section completed. Please indicate, with details, changes made or items not carried out)</i> | | | |
| <p>This project focuses on the use of Tablet PCs and digital inking applications to impact pupils' learning in English, Maths and D&T.</p> <p>By the end of the first year of the project in 2006, the school had procured a total of 55 sets of Tablets in preparation before embarking on the project in Jan 2007. 15 are for teachers participating in this project while the remainder 40 sets are mobile sets for teachers to bring into their classes for pupils' use. Suitable software, namely the "FUN With" series (from Heulab) and Alias Sketchbook were procured to support T&L using the tablets. In addition, a server was also set up to help teachers to manage their virtual classrooms and to provide space for pupils to submit their assignments to the teachers. Training sessions were also organised to equip teachers with the necessary skills to conduct tablet PC based lessons.</p> <p>In 2007, 15 teachers from three department facilitated tablet PC based lessons for all Sec 2 pupils across all streams. In the first semester, 4 weeks each were allocated to each of the subjects, ie. D&T on week 2-5, Maths on week 6-9 of term 1 and English on week 1-4 of term 2. Pupils were exposed to the Tablets for their learning of the various subjects, with 1 2-period lessons per week during the duration. From feedback and to cater to the preference of teachers, Maths and English lessons were held in term 3 with D&T scheduled in term 4.</p> <p>In 2008, the English and Maths departments conducted their lessons in term 1 and term 3, while the D&T department had theirs in term 2 and 4. Based on lessons learnt in 2007, all lessons are carried out in a special room with a Technology Assistant deployed to help get ready the room for lessons and to provide technical assistance. This helped teachers to optimize and have quality curriculum time with the pupils.</p> | | | |
| 2. An evaluation of how well the projects were carried out. <i>(Whether the objectives were met)</i> | | | |
| INTRODUCTION | | | |
| <ul style="list-style-type: none">What were the aims / intended outcomes of the LEAD ICT project? | | | |
| <p>This project aims to take advantage of the maturing Tablet PCs technology as well as the wireless local area network that the school has set up to provide an engaged learning environment with the use of IT in all subject areas. Such an environment would enable pupils to build upon their capacity to learn how to learn, energise them and enable them to collaborate with other learners.</p> | | | |

- What were the opportunities provided for pupils to use ICT for engaged learning?
(please elaborate on the nature of engaged learning)

All Sec 2 pupils use the tablets in the learning of English, Maths and D&T on a 1:2 ratio. With existing resources and with the project cutting across 3 subject areas, about 6 tablet lessons (1 hr per lesson) were carried out per term per subject.

English

Pupils brainstormed in pairs and penned their thoughts in the form of mind-maps using the software. This has provided collaborative opportunities in class. In addition, teachers used the Virtual Classroom (later switched to Heu-Campus), a classroom management software, to regulate lesson flow. They took control of the pupils' Tablets and flashed their work on the projection screen. They provided an opportunity for all pupils in the class to comment on their friends' work. Such activity is not easily carried out in a typical classroom context.

Maths

Pupils first used the Tablets to carry out an Internet Scavenger Hunt relating to statistical information of Singapore. This provided a platform for us to infuse National Education into our subject curriculum. At the same time, it familiarized students with the use of Tablets. Like English lessons, there were collaborative activities among pupils during lessons. As Tablets lessons were designed to be hands-on, it was noted that students were very participative in class.

D&T

In 2007, pupils used the tablets to design and make foam models as part of their coursework. With the tablet PC, the pupils could design, improve, and visualise their products by adding colour and textures. The exercise also helped them to create awareness on the importance of ergonomics in product design. In 2008, with a new D&T syllabus, the pupils use the tablets to sketch their coursework artefact as part of their presentation board to provide a contextual use of the product. During both activities, we observed that pupils are more daring to try to sketch their work since one essential feature of the Alias Sketch Pro software allows them to make changes and enhance their sketches more easily. The Tablets offer lots of functions to create professional presentation boards for their design work. It provided new dimensions for pupils in creating their design and the Tablets have enabled teachers and pupils to engage freely and spontaneously in coming up with their designs.

EVALUATION METHOD

- How did the school measure whether the intended outcomes of the project were achieved? (eg SEM survey results, focus group discussions with teachers and students, comparison of examination results, perception surveys etc)

Two approaches were taken:

- (1) Pre and post project pupils' perception surveys. (See Annex A for overall results)
- (2) Regular feedback from teachers participating in the project to the HOD-IT.

Key findings from the perception surveys are as follows:

- 57% of the pupils agreed that lessons are more interesting and engaging when using Tablet PC. This compares to 43% before the pupils took part in the project.
- Coincidentally, 57% of the pupils also felt that they are more attentive when using tablet PCs compared to a traditional lesson. This result is 10% higher than pre-project.
- 63% of the pupils acknowledged that there are more collaborative activities during Tablet PC based lessons. This is favorably higher than the 40% at pre-project phase.

The above 3 results demonstrate that the project has achieved its intended outcome of creating an engaging and collaborative environment that energises pupils to learn. In addition the surveys also show that 72% of the pupils look forward to continue using tablet PC in their lessons. However, 38% of the pupils feel that they do have ample chances to use the tablet PC during lessons. It means that the current ratio of 1:2 ratio could be improved.

IMPACT ON TEACHING AND LEARNING

- How did the pupils benefit from these learning opportunities?

In English lessons, the Tablet PC has allowed pupils to learn reading, writing and oral communication skills. In addition, with the use of classroom management system, Heu-Campus, pupils are grouped according to their learning styles. Different tasks are created and then given to the relevant groups easily through the transfer file feature.

In Maths lessons, the Tablet PC was used for manual plotting of straight line graphs and quadratic curves, and geometrical construction using Fun with Construction software. Pupils provided feedback that they enjoyed learning how to use the Tablet PC, and think that they are more interested in Maths lessons because now there is greater variety in modes of learning. The use of the tablets in class adds to the novelty and helps to break the monotony of a typical maths lesson.

In D&T lessons, students using the Tablet PC found it easy to produce professional like sketches through its simple and easy to learn commands which they took little time to master. In addition, the students found that their sketches improved after using the Tablet PC as the ICT tools give them new found confidence in their sketches. More importantly, students really enjoyed the Tablet PC lessons as it empowered them to be creative in sketches as they need not worry about making mistakes as they can easily modify their sketches and improve on them.

Besides the benefits mentioned above to provide the pupils to use ICT in their learning, pupils involved in the project become more aware of the emerging technologies available for their learning and it has clearly given them an edge over those who did not have such an opportunity.

- What were new processes/procedures/structures put in place to support teachers' use of ICT?

A teacher (ST/SH level) is appointed from each of the 3 participating departments to co-lead the project with the HOD-IT. These teachers, being more senior and more experienced in subject content, provide mentorship and role model the use of ICT in this project.

Since 2006, the school put in place a one-hour timetabled time to allow teachers from the same department to come together to share and discuss pedagogical approaches. The teachers in the LEAD-ICT project could now tap on this timetable slot to increase sharing and collaboration opportunities among teachers for scaffolding of learning tasks.

- How did the teachers benefit from these processes?

With advancing technology, this project forms a major part of teachers' professional development on the use of IT and to develop them into reflective practitioners as they take on the role of learners as well.

Being new to the Tablet PC technology, the project also provides opportunity to get staff as they work collaboratively in designing lesson tasks, harness their IT potential, to identify and nurture the talented and to provide professional development opportunities for the teachers.

The school strongly promotes a culture of experimentation and this project allows teachers to try new instructional strategies. Through this project, teachers were exposed to new technology at the same time explored new pedagogies approaches to help them in their teaching enabling pupils to learn better.

- What were some other outcomes arising from the projects?

Nil

ISSUES AND CHALLENGES

- What were some issues and challenges faced? How did the school try to address these issues and challenges?

Being a technological project, infrastructure, hardware and software readiness is always a main challenge. We spent large amounts of time tackling and addressing problems such as network, software instability as well as to cope with hardware maintenance, on top of classroom management during activity-filled Tablet PC lessons.

Infrastructure

For example, although the school has a campus-wide wireless network, we realised that our enterprise grade Access Points (APs) could not provide adequate support when too many multiple users were accessing them at the same time or when they were transferring big capacity files. We worked closely with the software and wireless network vendor to study the problem and made changes to our APs.

Hardware

As the project is targeted across all Sec 2 classes, we have to derive a mobile system to make sure all classes would have the Tablets during their lessons. A schedule is thus drawn and a 1:2 ratio is deployed since procuring more Tablets would mean a greater monetary investment. In view of the limited amount of Tablets, we also have to ensure timetable is well taken care of, with no more than 2 classes having the same subject lesson at the same time. We also have to make sure the Tablets are ready for the next class, in particular when there is back-to-back Tablet lessons on some days.

Another challenge is that the Tablets, being mobile, would mean that teachers have to draw them out from the Media Resource Centre prior to their lessons. This would mean considerable time is required to get the lessons ready. To reduce set-up time so that teachers could maximise learning during the lesson, we decided to assign a special room for all Tablet lessons in the second semester.

We also realised the material for the stylus pen could be of better quality. We have numerous reports of damaged stylus in the year and we have replaced about 10 pieces since.

Software

One of the reasons we adopted HeuLab's software is its reputation of being a leading developer for Tablet based applications. However, we were disappointed with the performance of the Virtual Classroom. There were technical bugs and to such an extent, HeuLab decided to develop new one (Heu-Campus) and gave the school a free exchange. Even then, there were problems, albeit much lesser.

Many of the teachers are using the Tablets for the first time and during the initial phase, we are encouraging them to explore the features of the Tablet and the software to produce engaging IT based lessons to help pupils in their learning. The school supports their effort to experiment and share their experience. The HOD-IT, as overall in-charge of the project, not only ensures that hardware and software concerns are taken care of but works with the vendors and looks into training/learning opportunities for our teachers.

CONCLUSION & DISCUSSION

- Did the project achieve its intended outcomes?

The outcomes of this project are closely aligned to that of mp2's. Through this project, our pupils are able to use IT effectively for active learning through the various tasks designed by the teachers. From pre and post project survey, we have seen an acquisition of learning and IT skills on the pupils' part. Motivation in learning and attention during lessons is also higher and there is a greater sense of engagement during lessons.

With the Tablet PCs technology, teachers are able to use IT effectively in designing imaginative and stimulating lessons. In addition, this project has helped teachers grow in terms of IT competencies and they are able to use technology to design lessons to support not only teacher-centred lessons but are able to utilise technology for a more learner-centred pedagogy to make learning more engaging.

- Discuss the implications of the project on teaching and learning

While there is a general sense that the project is beneficial, the challenges mentioned earlier in bringing the tablets into a classroom environment and the additional effort to prepare the lab and lessons cannot be ignored. After 2 years of pilot, the school is proposing to refine the project with the following recommendations.

RECOMMENDATIONS

- Should the project be continued / refined / expanded? How?

Given the experience over the last 2 years, the school plans to continue the project with the three subjects. This is largely due to the positive response of the pupils and teachers. We have gradually created awareness and enthusiasm in them, and we hope to sustain this.

As from feedback and perception survey results, tablet lessons is best conducted when each pupil has a tablet each during learning. With a pool of 40 tablets and sometimes with 2 classes going on, it is thus that we refined it to one subject per term (English in term 1, Maths in Term 3 and D&T in Term 2&4 (due to lesser curriculum week). This way, we could arrange for a 1:1 pupil to tablet ratio thus maximizing learning and easing logistical issues. We will try this out in 2009 and make refinements as necessary.

- Should the project be recommended for implementation in other schools? If so, how?

The Tablet PC is a useful tool that supports inking technology. Schools interested in introducing it in their environment need to be take into consideration their focussed areas. To help gain teachers' confidence, hardware, software and IT support needs to be carefully planned and put in place so that teachers do not need to worry about these areas and they can focus fully on using the tool in their lessons.

| | | | |
|---|---------------|---|--------------------|
| 3. Total number of teachers involved in the LEAD ICT project | | 18 (See Annex B for list of teachers) | |
| 4. Total number of pupils involved in the LEAD ICT project | | Approx. 720 (About 360 in 2007 and 2008 each) | |
| 5. State the external stakeholders the school collaborated with - e.g. IHLs, industry partners, parents etc. | | | |
| NIL. However, the school worked closely with hardware and software vendors such as HP, AsiaPac Distribution, HeuLab Pte Limited and the Network Hub for support in the respective areas. | | | |
| 6 a. Please tick the appropriate box if any of the following inquiry approaches was used. | | | |
| <input checked="" type="checkbox"/> Action Learning <input type="checkbox"/> Action Research <input type="checkbox"/> Learning Circles <input type="checkbox"/> Others _____ (please fill in the blank) | | | |
| 6 b. Number of teachers involved in the inquiry activities | | | |
| 7. Number of sharing sessions (<i>the sharing platforms, dates of sharing and title of the projects they shared on</i>). Please attach any papers shared. | | | |
| a) MOE Excel Fest – Jul 2007 b) 1 st East Zone Enviro – Life Science symposium – 26 Aug 07 c) EZ ICT COE Opening at Ngee Ann Secondary – 30 Aug 07 d) 2 nd East Zone Enviro – Life Science symposium – 23 Aug 08 | | | |
| 8. Visits focusing on ICT implementation that the school has hosted in 2008. | | | |
| No. | Date of visit | Organisation that the visitors are from | Number of visitors |
| 1 | 23 Aug 08 | Education Officers/parents participating in the 2 nd East Zone Enviro Life Science Symposium | About 400 |
| 2 | | | |
| 3 | | | |
| 9. BY(i)TES | | | |
| Domains | | Score | |
| School ICT Leadership | | 3.00 | |
| Pupil Involvement | | 2.84 | |
| Teacher Use | | 2.86 | |
| Overall BY(i)TES score: | | | |
| 10. Budget | | | |
| Allocated amount in 2008: | | \$7,246.00 | |
| Expenditure in 2008: (<i>please reflect item expenditure</i>) | | \$0 (Note: 3 additional tablets will be procured later in 2008 to supplement existing pool for pupils use. Spare stylus will also be purchased to replace | |

| | | | wear/tear/damaged ones) | | | |
|-----|-------------|-----------|-------------------------|-------------|-----------|---------|
| S/N | Vendor Name | Item Desc | Invoice Date | Invoice No. | Amt Spent | Balance |
| | | | | | | |
| | | | | | | |

Comparisons of pre and post project survey results - All subjects

| S/No | Question | | Pre | | Post | | Pre | | Post | | Pre | | Post | |
|------|---|--|--------------------------|------|-----------------|------|------|-----------------------------------|------|------|--------------|------|------|-----------------------|
| | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| | | | Strongly Disagree | | Disagree | | | Neither Agree Nor Disagree | | | Agree | | | Strongly Agree |
| 1 | EL/Maths/D&T is one of my most interested subjects. | EL/Maths/D&T is still one of my most interested subjects. | 6.4 | 2.8 | 11.8 | 8.1 | 36.6 | 39.6 | 30.2 | 34.0 | 15.0 | 15.4 | | |
| 2 | EL/Maths/D&T lessons in the classroom are interesting and engaging. | EL/Maths/D&T lessons in the classroom are more interesting and engaging with the use of Tablet PCs | 7.0 | 6.7 | 11.8 | 4.9 | 37.4 | 31.6 | 32.9 | 34.4 | 11.0 | 22.5 | | |
| 3 | I am usually attentive during EL/Maths/D&T lessons. | I am more attentive during EL/Maths/D&T lessons when using Tablet PCs | 8.0 | 4.2 | 7.5 | 6.0 | 37.2 | 33.0 | 32.6 | 30.5 | 14.7 | 26.3 | | |
| 4 | I could normally understand my EL/Maths/D&T lessons. | I understand my EL/Maths/D&T lessons when using Tablet PCs | 7.0 | 4.6 | 13.6 | 9.5 | 17.9 | 38.9 | 45.2 | 33.0 | 16.3 | 14.0 | | |
| 5 | There are opportunities for collaborative group work during EL/Maths/D&T lessons. | There are more opportunities for collaborative group work during EL/Maths/D&T Tablet PCs lessons. | 7.8 | 2.8 | 14.4 | 2.8 | 38.8 | 32.3 | 24.9 | 39.6 | 14.2 | 22.5 | | |

| S/No | Question | | Strongly Disagree | | Disagree | | Neither Agree Nor Disagree | | Agree | | Strongly Agree | |
|------|---|--|-------------------|------|----------|------|----------------------------|------|-------|------|----------------|------|
| | | | | | | | | | | | | |
| 6 | There are thinking skills activities during EL/Maths/D&T lessons. | The use of Tablet PCs increase thinking skills activities during EL/Maths/D&T lessons. | 9.4 | 4.2 | 17.4 | 13.3 | 21.7 | 40.7 | 27.8 | 24.9 | 23.8 | 16.8 |
| 7 | There is a good mixed of lessons (chalk-and-talk and use of ICT) in EL/Maths/D&T lessons. | The use of Tablet PCs helps to improve the mixed of lessons (chalk-and-talk and use of ICT) in EL/Maths/D&T lessons. | 21.1 | 0.4 | 3.7 | 7.4 | 18.7 | 26.7 | 25.1 | 32.6 | 31.3 | 33.0 |
| 8 | I learn well with the current teaching approach by my teachers. | I learn better with my teacher uses ICT in EL/Matshs/D&T lessons | 2.4 | 2.8 | 7.0 | 4.2 | 25.7 | 37.2 | 34.5 | 34.4 | 30.5 | 21.4 |
| 9 | I look forward to new method of learning using the Tablet PC during EL/Maths/D&T lessons. | I would like to continue using Tablet PCs in my learning of EL/Maths/D&T | 1.3 | 3.2 | 0.8 | 3.5 | 7.5 | 21.4 | 25.9 | 32.6 | 64.4 | 39.3 |
| 10 | I have handled and use a tablet PC before. | I have ample chances to use the Tablet PC during EL/Maths/D&T lessons | 47.1 | 10.9 | 14.4 | 15.4 | 1.9 | 36.5 | 32.6 | 21.4 | 4.0 | 15.8 |

* All figures presented are in percentages

Annex B**List of Teachers participated in the project**

| S/No | Name | Department | 2007 | 2008 |
|-------------|---|-------------------|-------------|-------------|
| 1 | Mr Lee Huan Leng (Dept Champion and overall project leader) | IT/D&T | ✓ | ✓ |
| 2 | Mr Tan Chung Sin | D&T | ✓ | |
| 3 | Mr Lee Wei Leong | D&T | ✓ | |
| 4 | Ms Grace Kwek | D&T | ✓ | ✓ |
| 5 | Mr Julian Lew | D&T | | ✓ |
| 6 | Ms Angela Tay | D&T | | ✓ |
| 7 | Ms Gan Pei Xian | D&T | | ✓ |
| 8 | Mrs Wee-Quek Jee Eng (Dept champion) | Maths | ✓ | ✓ |
| 9 | Mr Gan Yew Seng | Maths | ✓ | |
| 10 | Mr Danny Wong | Maths | ✓ | |
| 11 | Mr Vincent Lew | Maths | ✓ | ✓ |
| 12 | Mr Gabriel Sim | Maths | ✓ | |
| 13 | Mr Ivan Sim | Maths | ✓ | |
| 14 | Mdm Faridah (Dept champion) | English | ✓ | ✓ |
| 15 | Ms Jeanette | English | ✓ | |
| 16 | Mdm Rosilawati | English | ✓ | |
| 17 | Mdm Siti Fatimah | English | ✓ | ✓ |
| 18 | Mr Walter Wu | English | | ✓ |