Methodist Ladies' College
A School of the Uniting Church

Reflections of a Learning Community

Views on the Introduction of Laptops at MLC

Methodist Ladies' College
A School of the Uniting Church
207 Barkers Road, Kew 3101
Telephone 03 274 6333
Facsimile 03 819 2345

Acknowledgments:

The editors would like to thank all who have contributed to the development of the MLC program: the hardworking innovative staff, the external consultants and especially David Loader who had the dream, and the vision into make it a reality.

We are grateful to the following for permission to produce copyright material: Ashton Scholastic for " A Laptop Revolution" by Pam Dettman from The Entrepreneurial School (ed. Frank Crowther ~ Brian Caldwell); International Society for Technology in Education for "Reconstructing an Australian School" by David Loader from The Computing Teacher; Gary Stager for " Computers for Kids... not Schools" and The Incorporated Association of Registered Teachers of Victoria for" Educational Computing: Resourcing the Future" by David Loader & Liddy Neville, IARTV Occasional Paper no. 22.

Publishing details :

Research and Compilation :-	Irene Grasso and Margaret Fallshaw
Layout and Design :-	Margaret Fallshaw and Irene Grasso
Editors :-	Irene Grasso and Margaret Fallshaw
Wordprocessing :-	Julie Anthony
Desktop Publishing :-	Margaret Fallshaw and Lynnda Heard

Foreword :

Innovation and change have become the accepted culture at MLC making it a stimulating school both for students and for teachers. Change and growth have been accelerated by the introduction of technology.

Learning with and through technology has been a shared experience. As we have dared to be innovative and to take risks, so we have grown and our vision of what is possible has expanded. The now seemingly small and tentative step of introducing personal laptops into some classrooms in 1990 has mushroomed into the development of an entirely different school culture in which technology is not a novelty, but an all-pervasive influence. It has become a medium for constructing one's own learning which is taken for granted in much the same way as pens and paper were previously.

Many of the benefits of the personal computer were just what we had hoped for when we began the program, but the exciting thing was the synergistic effects that were over and above what we had envisaged. Technology proved to be more than a catalyst for change in learning and teaching practices; it also ushered in an entirely new culture in which the school became a community of learners, where co-operative and collaborative learning became the norm.

Visitors to the school, after observing its exciting learning environment, often want to learn more about the thinking that led MLC to initiate this program and about the way the changes were implemented. To meet this need we have put together a collection of papers written by various people who have been associated with MLC and the programs that have been developing here.

MLC is a school that values individual differences, encourages diversity and welcomes criticism and this is reflected in the variety of papers included in the collection. Its staff, as well as its students, take risks and dare to be creative. The papers here, then, do reflect what has and is and will be happening at the school, but do not necessarily represent any "official' view (if such a thing exists).

The publication includes articles which have been written over the period 1990-1993 and so, in the earlier articles, such things as the number of laptops quoted may understate what we actually have now. Even though we have moved on from the situation described in some of the earlier papers, they were included because they marked important stages in our thinking and development and so are significant, not only in an historical sense, but also for an understanding of the process of our development. In some cases these stages may be necessary steps in terms of the implementation of change.

Strong leadership from the principal, David Loader, enabled the vision to become a reality and the fact that he sees himself as a learner, one who continues to forge ahead with new ideas and who invites his staff to adventure with him, means the vision will continue to grow.

Reconstructing an Australian School

David Loader, Principal at MLC

---

1. Preface

It is a rare moment in cultural history when we can self consciously witness a large scale social transformation... (Bell, 1979)

In 1989, parents of grade 4 students at MLC were informed that there was to be a dramatic change in the style of education to be offered to their daughters. As from the beginning of 1990, all grade 5 students would be required to have a personal laptop computer, together with pens, paper and books.

When this policy was announced, a group of Grade 4 parents decided to vigorously oppose this decision. Three parents meetings later, after many hours of one to one conversations between staff and parents, some media coverage and a Parents' Association Meeting where the decision was won by only one vote, the program proceeded.

Thus began a transformation of a school, its culture, curriculum and its teaching learning paradigm.

Historically, the role of technology in education has been peripheral, with new technologies being added to the traditional teacher centred model of instruction. Now here was a transforming technology in the form of computers, making the student centred model more accessible.

Today the transformation continues. Currently there are 1500 laptops in the school with staff and students. This is a computer to student ratio of 3 to 4. It is confidently expected that in 1994 this ratio will be closer to 1:1 with nearly all students Grade 5 and above using a personal laptop computer. Similarly the curriculum continues to be transformed. No longer is the emphasis on 'computerising' the old curriculum. Rather the emphasis is now on 'constructionism' and on developing a new curriculum that is relevant in a culture that is being transformed by technology.

2. The School.

The school is the Methodist Ladies' College (MLC), situated in the city of Melbourne, Australia

It is an independent (private) school established in 1882 by the Methodist Church. Today it has an enrolment of 226O girls from K-12 of whom 110 board on campus. MLC is administered as four relatively autonomous age related sub schools, Junior, Junior Secondary, Middle and Senior Schools. In addition there are another 4000 adults and young people enrolled in an after school (evenings and week ends) program of Community Education.

A unique feature of the school is the homes from which the students come. In these homes, it is the girl who has the computer and it is the brother who has to borrow the computer from his sister.

An unusual feature of MLC is its recognition that schools are not always good places for young people. Consequently there is an openness at MLC to, and an acceptance of, change when it can be shown that to make the change the school will be a more relevant place for young people. Consequently staff who want to work at MLC need to have some sympathy for the Tom Peters statement that people "must learn to love change as much as we have hated change in the past." (Peters,1988. p45)

The MLC philosophy is proactive. It accepts that a future must be chosen and then achieved. The school encourages and supports "bold imaginings" but is also mindful of the market situation that will determine enrolments.

A Pilot Program. Preceding the introduction of laptops by a year was the decision, taken in 1988, to introduce a pilot program, a 'Sunrise Class into' year 7. This class was one of eight at that level; the other seven followed traditional teaching approaches.

This pilot class had access to lots of computers. In such a setting, the computer provided ""the impetus for the new formulation of the classroom and the means by which it may be achieved." (Nevile, 1990. p5) Thus a "technology enabled" classroom was born where in addition to pens there were computers as student tools, where text was supplemented by graphics, music and even robotics as a medium of expression and where students were given more autonomy.

The experiment in 1989 of introducing one Year 7 Sunrise class at MLC was considered so successful that it was followed in 1990 by four Year 7 classes (one of which was a laptop class) and two Year 5 classrooms of laptops. In 1991 there were fifteen laptop classes in Grades 5, 6 and 7.

3. A New Focus.

The old industrial society supported the factory model of education with the focus on 'batchprocessing' of groups of students in classes and the measurement of a teacher's work load by the number of classes taught by that teacher. In the post industrial society of today, it is less acceptable for the curriculum to be transmitted in this way.

Classes and classrooms continue to exist at MLC but their future is not assured There is a search f or a better way of relating the teacher to the student in a setting that is more personal and more flexible.

The goal is that teaching will be subordinated to learning. Thus the educational focus is moving from teachers teaching and teacher styles towards student learning and student learning styles.

The curriculum is opening up with fewer class prescriptions and more opportunity for a student to write a personal curriculum. There is a greater emphasis on co-operative learning with joint projects encouraged. The timetable has been modified to allow for more sustained work that is not interrupted by some arbitrary bell to signify the end of a learning period. The result is that students will often work into their lunch time because their work interests and challenges them.

With so many students working on different tasks in the same room there is a remarkable concentration on task by students. The MLC experience is that personal laptops have decreased a student's dependence on a teacher's subject knowledge, delivery and control. Teachers and students interact more about curriculum and skills and are more joined in the educational task. Because assignments are more open ended, teachers are finding assessment more interesting and are often to be found in the staffroom excited by an original piece of student work. In such a setting, students are more motivated and teachers have fewer control problems.

A significant change observed is the increase in the learning that now occurs from peers. Of the three teaching modes- teacher exposition, self study and peer learning- peer learning implying a new and major role when students have personal laptops. It is noticeable that much of the informal dialogue in the classroom is now work focused compared with before when it had a social orientation. At the commencement of the program, there was some parental fear that students would end up setting in corners focusing on their computers like robots. In fact student interaction has both increased and changed. A group of students working with laptops is both people- focused and highly productive. Another interesting consequence, remarked upon by visitors to the classroom, is the increased articulation of the students. They are used to explaining, asking, commenting. A visitor to a classroom therefore finds student comfort with the questions and surprisingly clear answers. Consider what this is saying about a student's self confidence and feeling of self worth!

Another interesting phenomenon is the new role for students in the home. Students with their laptops are introducing their parents and their older siblings to technology. This has increased the self confidence of students. It has also has also led the school to offer introductory programs for parents. A program at the beginning of this year in LogoWriter had 150 parents arrive with their daughter's computer to have an introductory lesson so that they could "share their daughter's excitement!"

4. Constructionism.

While traditional curriculum dominates at MLC, every attempt is being made to move to a more constructionist approach which is learner centred This approach is based upon Piaget's 'constructivism' where knowledge is "built by the learner, not supplied by the teacher." This idea has been extended by Seymour Papert to 'constructionism' which includes "the further idea that this happens especially felicitously when the learner is engaged in the construction of something external or at least shareable . . . a sand castle, a machine, a computer program, a book." (Polin, l990. p6)

The idea of knowledge being constructed by the student shows appropriate respect for the intellect of the learner and reflects the subjective and evolutionary view taken of knowledge. The student, in such a view, is not a passive recipient of data but a constructionist trying to understand her world, having meaningful experiences, making personally significant connections, developing mental models, collaborating with others in an enriched teacher supported social setting. The student owns the task and sees the computer as an expressive and representative medium, a modifiable tool, a personal assistant. A student working on a traffic management problem using LogoWriter was heard to say in a moment of great excitement, "You beautiful little turtle. My God, I love this turtle."

Examples of constructionist thinking in a laptop environment can be provided in the humanities, maths and science areas. For example, in science a student discussion of the rotation of the Southern Cross (a constellation in the southern hemisphere) led to the challenge to represent this using LogoWriter. The goal was achieved by the Year 7 students and led one science teacher to say: "This is the first time that I have been able to visualise this phenomenon!"

Probably some of the educational outcomes were unplanned by the teachers. For example, the Year 8 French students were issued with a French version of LogoWriter. The teachers thought that these students would benefit from "talking to the laptop" in another language. However the surprise was that the students were "talking to each other in French" in maths and science classes. What is more, the maths and science teachers began trying out their French and now there is talk of a French 'immersion' class for next year!

Of particular interest is the unity of knowledge that emerges with laptops and constructionist emphases. History, Geography, English and Biblical Studies teachers no longer require separate

time for their classes allowing students to work on integrated themes. Year 7 students whose task was to describe the life of Moses, not only did so with prose and poetry, but also considered the geographic setting, noted what else was happening at that time in history, and used graphics, music and puzzles that required the reader's participation to present their knowledge.

Constructionism is a challenging idea and is not necessarily compatible with the Piaget 'stage theories' for cognitive development. Piaget's argument that children can learn things only when they have developed to a certain stage has been translated in schools into a fairly fixed sequenced curriculum. In contrast, constructionist thinking works with a less rigid curriculum, allows more student initiative in the development of the curriculum and gives students more control over their learning.

There is evidence now that a student with a computer in a medium such as LogoWriter has the potential to achieve learning that hitherto was thought impossible. (Dawson, 1991. p23) For example, students in Grade 5 are measuring the value of pi by using LogoWriter to graph circles and measure the radius and circumference. A study of a history topic such as the Olympic Games brought students into early contact with many mathematical concepts such as cartesian coordinate geometry, randomises, sequencing, decimals, percent, functions, visual representation of data, linear measurement and orientation. 3

"Personal Computer" Philosophy. MLC has found it difficult to conceive of tomorrow's classroom without computers. However, these are not school computers but the personal computers of students and staff. Students have the opportunity to use a personal computer for what they see as appropriate to their needs and interests. The student owner is responsible for determining the use of her machine. A personal computer needs to be compared to a student's notebook or to a student's textbook which has underlined sections and comments in the margins. On a personal computer students create their "knowledge space" with their ideas, data and software. It is ownership not just of a machine, but of knowledge and of power. The 'personal computer' policy was born out of educational philosophy, but there were good practical reasons for it too! There is the prohibitive cost for the school to buy computers, special desks and chairs, provide power outlets, et cetera. If the school had bought laptops, there would have been the problem of trying to keep track of them afterwards. A positive outcome of students owning their computer is that they value them more and therefore look after them better.

Neighbouring schools to MLC laughed at the idea of personal computing in a school setting, but they did come in large numbers to visit this "experiment". Three years later neighbouring schools are beginning to venture forth encouraged by the success of the program, its high acceptance in the community and the growing enrolment at MLC.

5. School Computing.

One of the most difficult problems that MLC confronted was the myth that schools should provide everything including computers. The uniqueness of the MLC setting is best described by the 'no' to the idea that the school should provide computers for students and staff to use at school and home. This does not free the school from providing hardware, software and technical support staff. The hardware that the school provides includes the network, battery chargers, ancillary equipment such as overhead pro projection panels and more powerful PCs to undertake special tasks such as administration, desktop publishing and multimedia.

6. Staff Computing.

From the time when computers were introduced at MLC it was clear that a limiting factor would be staff skill and comfort with computers.

What proved to be an even more limiting factor was staff access to computers at home as well as at school. The MLC response to this staff deficit was to offer some incentive to staff to purchase a laptop. In 19924 MLC offered $700 towards the cost of purchasing, maintaining, upgrading a laptop or towards the purchase of new software. There was a time when staff felt that the school should make 'school' laptops available for them to borrow at will. Now staff acknowledge that they need a personal computer too and are pleased to have had financial support to purchase and maintain one. Indeed, could they now do without their laptop?

Some measure of the success of this personal laptop policy is the fact that more than 90% of staff now own and enjoy a laptop.

At no time was there an attempt to design a common training program which would be imposed on all staff. From the beginning, it was assumed that staff had individual needs. Staff would be starting from different points, would learn at different rates and would have different destinations. Similarly it was assumed that staff needed to be in control of their own learning. It was seen as important that teachers came ready to learn, could choose how and when they might learn.

Thus MLC offered free professional training in any computer area, even if the training was not of relevance to the teaching. It was found that this offer of free access made it possible for staff to learn new skills which translated into greater confidence with, and interest in, computers. Financial support was also provided for staff to visit conferences and attend external courses.

The advent of laptops has meant that teachers have to rethink the curriculum. For example what happens to the traditional maths curriculum now that students have access to

spreadsheets, data bases and sophisticated software packages in areas such as statistics? Thus teachers have appreciated the practical support that consultants such as Liddy Nevile, Gary Stager, Paul Goldenberg, Steve Ocko, Brian Harvey and Dave Baker have been able to provide.

The introduction of laptops has meant that staff need to be supported in ways that enable them to cope with their changing professional environment. With the increased use of laptops, staff find many dimensions of their occupational roles changing, including the cultural setting, career opportunities, work standards, required skills, hierarchy and salary to mention a few.

The view is taken by MLC that the school needs to be redesigned to make it into a learning place for teachers as well as students . Time for professional development, for planning and for curriculum development needs to be provided. only then will teachers be able to re-examine their practices and to consider fresh approaches to teaching which will take advantage of the expanding medium in which their students are working.

The above is rather clinical and does not do justice to what is happening. There is lots of excitement, feelings of achievement and professional pride amongst teachers at MLC. In fact, visitors often comment upon what they see as a shared feeling of pride amongst both the staff and students of "this is the only way to go and we are getting there first".

7. What Do The Students Think?

Survey results from 215 Year 7 students in 1991 showed strong personal commitment to their laptop computers and to learning with them.

95% liked using them. "They described learning with these tools as being 'fun' (86%) and 92% denied that working on a computer was boring. Although learning was not seen as easier, they felt that they had attained 'new skills' with the computer (98%) and that laptops had allowed them to do things that could not be done in other ways (88%). 89% were confident that programming had taught them a lot.

Appreciative of its portability (89%), 93% used the computer in their spare time, for recreation purposes. 86% of respondents noted that work was easier to find when they used a computer, and overall 81% felt more organised.

Most students preferred the appearance of work completed on a laptop and 85% preferred using it to paper and pen, although some students stressed that this depended on the task.

85% of students described their learning as more independent, ...82% felt more able to learn at their own pace, ...95% of students noted that teachers trusted them to work alone on projects... 86% of respondents felt that students had helped each other more in class this year...

Student acceptance of this innovation was strongly favourable..."(McDonald, 1992.p6)

8. Additional Costs.

The MLC entry into computers has involved significant additional expenditure both of a capital and recurrent nature.

At the recurrent level, there are the staff salaries, professional development expenses and the cost of the computer subsidy for staff purchases of laptops. MLC started with one technical support person and now there are four, together with a very important secretary/social worker/technical person as the interface between teachers and technical staff. MLC started with and retains one staff adviser. However now when a technology decision is to be made, 25 people expect to be consulted! This is not all bad because with a number of directors of independent computing programs all competing for scarce resources, there is more energy, diversity and personal commitment.

At the capital level, there are substantial costs for networks, for batteries and rechargers, for support equipment such as printers and data shows and software. Last year MLC spent more than S300,000. As well, parents and staff spent a further $500,000 on laptops!

9. Future Curriculum Directions.

At MLC the focus question is: "What kind of learning can take place in a school where students have personal computers?"

Initially the response was to integrate the computer into the existing curriculum. This was effective as judged by the satisfaction, enthusiasm, independence and achievements of the students and the delight of parents about their daughters' progress. (Baker 1989 p6) Now there is a need for new curriculum that acknowledges that some of the present curriculum has been outmoded by the advent of the computer. Philip East goes so far as to suggest that cursive writing "can be assigned the same fate as calligraphy" as it will serve no useful purpose. Similarly he argues that "we no longer have to think of mathematics as a calculation skill" because in the future mathematics will not include paper and pencil calculations. (East, l990.p6)The implications of these observations are yet to be appreciated. For example, in Australia there is a problem looming with existing external exams. Will students be permitted to take their laptops into the exam rooms?

The search has begun for a new curriculum that takes advantage of the existence of a medium that is richer than linear text. For the MLC purposes in Grades 5, 6 and 7, LogoWriter has been found to be excellent, being used in the core subjects of Maths, Science, English, Geography,

History and Biblical Studies. It provides "facilities for the writing of procedures, the manipulation of a micro-world, the production of graphics, animation, music, the provision for word processing and a data base."(Baker, 1989. p4) It requires analysis, logic and perseverance; students constantly hypothesise and test; problem solving and creativity are linked.

For the higher grades, some form of 'hypertext' is needed but is yet to be provided at MLC. At this level students and teachers will want to 'hierarchically organise' and 'cross connect' their text. In this way "overviews can graphically become part of the documents." Then students "can scan at a high level and only zoom into details" when needed. But this hyper text will only be the beginning as moving pictures are added to this text. These pictures will be interactive in that they can be "poked and manipulated." (diSessa, 1989. p3) "The possibility of a computational medium and a new, extended literacy involving it are exciting prospects."(diSessa, 1989. p29) This medium will allow the expansion of knowledge beyond a "narrow stream of text and talk to a rich flood of multimedia knowledge that feeds the senses, stirs the imagination... Learners are not just little linear text computers." (D'Ignazio, l990. p23)

10. Conclusion.

There is a group at the school who call themselves the 'wishing committee'. They talk a lot about possible tomorrows. Heads of sub schools meet together regularly and the agenda always includes the future. The College Council, which governs the College, encourages forward thinking and enjoys participating in this process.

There is also a two year study being undertaken at MLC looking at how the school can be refocussed away from teaching to learning, restructured away from fixed size classes to learning groups of variable sizes, reorganised so that the school day does not have to begin at 8.30 am and finish at 3.30 pm and includes learning that occurs away from the school.

Attempting to create a new future for MLC will involve making mistakes. It is important that any mistakes are not equated with failure, as this would discourage further experimentation. Tom Peters makes the point that there is "an almost irreducible number of failures associated with launching something new. For heaven's sake, hurry up and get them over with!" (Peters, 1988. p260)

MLC seeks to create a safe environment "within which people can struggle with the constant and chaotic world of change." The goal is not only to empower students, but also to allow "educators to emerge from their safe environments and take flight into new worlds. " (Farley, 1992. pl0.) Teachers and students are increasingly being viewed as learners together, in the same place simultaneously. The principal of such a school is not the instructional leader but the "head learner, engaging in the most important enterprise of the schoolhouse - experiencing, displaying, modelling, and celebrating what it is hoped that teachers and pupils will do." (Barth, 1991, p46)

11. Footnotes

---

1. Australian schools are either dependent (fee paying) Schools enrolling about 30% of all students or State Government (Public) Schools enrolling the remaining 70%.

2. Sunrise is the registered name of a 'school of the future project' which is now associated with the Sunrise Laboratory of RMIT (Royal Melbourne Institute of Technology). Sunrise was created by Liddy Nevile.

3. From an observation by Gary Stager while at MLC in an unpublished paper, 1992.

4. This figure varies each year. In 1991, it was $400. The 1993 figure is $500.

12. References

Bell, Daniel, Introduction. Nora S. and Mic A. The Computerisation of Society: A Report to the President of France. Cambridge, Mass. MIT. 1979)

Baker, Ruth. Computers and Independent Learning - A Year 7 Project to Addressed to CEGV Computers in Education. Conference. 1989.

Barth, Roland S. Improving Schools from Within. Jossey-Bass Publishers, San Francisco, 1991.

Burford, Charles. Humour of P Principals and its Impact on Teachers and the School The Journal of Educational Administration Vol 25 No 1 Winter, 1987.

D'Ignazio, Fred. Restructuring Knowledge: opportunities for Classroom Learning in the 1990's. The Computing Teacher August/September, 1990.

diSessa, A. Computational Media as a Foundation for New Learning Cultures. Unpublished Paper. November 1989.

Dawson, A. J....Beyond Piaget Logo learning under a new light. Logo Exchange . Vol 10 No 2. Winter l991. p23.

East, Philip. on the Basics of Education in the 21st Century. The Computing Teacher March 1990.

Farley, Linda Making Sense of Change: Strategies for Educational Technologists. The Computing Teacher April, 1992.

McDonald, Helen. MLC Council Newsletter, Vol 19 No 3. Feb 11, 1992.

Nevile, L. Sunrise. Unpublished Paper. December, l990.

Nevile, L., Loader, D. Educational Computing: Resourcing the Future. IARTV Occasional Paper No.22, September 1991.

Peters, Tom. Thriving on Chaos. Macmillan. London. 1988.

Polin, Linda. What's Hot and What's Not. The Computing Teacher. August/ September, 1990.

The Promises of Educational Computing

Margaret Fallshaw, Computing Consultant, MLC

Windows into the past can enable us to learn from history; windows into the future can allow us to catch a glimpse of what might be and then hold the dream

How we gain an education has changed. The invention of writing enabled communication of ideas between people who were physically distant from each other. The printing press liberated students from the need f or a personal tutor, but historically, education has been a passive experience for most students. Most teaching continues to be offered in classrooms with groups of learners being taught by an individual teacher. This age old practice is probably the single most effective deterrent to improvements in learning.

In 1973 Huberman wrote:: "In many parts of the world classrooms tend to be dull places where students are putting in time without developing an appetite for learning."

Learning and training have been confused in the debates. Most people would see an ability to solve problems as learning, but surely real learning involves reflecting on your own activities and mistakes and modifying your conduct. It is this second loop which distinguishes real education and is the most important part of the learning process.

School systems are encouraged to maintain order and certainty and the countervailing drive to improve and innovate frequently meets opposition.

The free school movement of the 1960's aimed to change the nature of classrooms, but it collapsed partly because it was tied to apolitical movement of the time, and partly because there were some subject matters that nobody knew how to teach in a non coercive way, also because many teachers did not have the skills to maintain a different sort of discipline. Expectations of parents and the society were not met by the movement then. With the computer available to us, we're in a much better position to have a second shot at turning schools into much more interesting and exciting places for the students.

Papert stated 2:"In the real world people always learn by experience."

"The reason why children don't learn math is not because it's hard, but because it's not related to their experience. They can't do anything with it that seems worth doing and so it feels deadly to them"

"Now we have a technology that children can use to make something they're interested in - whether it's pretty shapes with Logo or cars with LEGO. The computer provides children with a way of appropriating mathematical knowledge - and using it in a very personal way."

Papert' s ideas have been around in schools forever 10 years now, yet Logo is far from universally accepted in schools. Part of the answer was pinpointed by Abelson and diSessa3 when they wrote: "Today we are approaching a new technological revolution, one whose impact may be as far reaching as that of the printing press: the emergence of powerful computers that are sufficiently inexpensive to be used by our students for learning, play and exploration. It is our hope that these powerful but simple tools for creating and exploring richly interactive environments will dissolve the barriers to the of knowledge as the printing press dissolved the barriers to its transmission"

Many teachers, watching their students write essays, have noticed that with the computer students will revise and edit in a way they never would when they had to rewrite everything. However few students have had sufficient time to develop the sorts of skills with a computer which would enable them to achieve the success we would like.

Now that more powerful computers are more easily available great changes are possible in our schools.

Change has had its detractors: In the dialogues of Plato, Socrates concurred with the opinion of the god Thamus when told of Theuth's invention of letters, or writing: "O most ingenious Theuth, the parent or inventor of an art is not always the best judge of the utility or inutility of his own inventions . . .This discovery of yours will create forgetfulness in the learners' souls, because they will not use their memories; they will trust to the external written characters and not remember of themselves. "5

Only in fairly recent times have we come to look on change as something positive. In a changing society the capacity to adapt continually to change is itself the desired quality.

There is a greater opportunity for change now than ever before. Educational technology is seen as a desirable methodology for solving educational problems. If used in response to appropriate educational challenges we may well open a window into the twenty-first century. At MLC we want the technology to improve the learning opportunities for our students. Now that each of our students can have her own personal laptop computer, available to her all the time, the power talked of by Abelson and diSessa is at last a reality.

What are the promises of computers in schools?

Technology can been used as a showpiece to impress on parents and community leaders that the school is on the cutting edge of the technological revolution sweeping through other sectors of society. The presence of hardware can convince people inside and outside the schools that modern devices are being used.

The promises of technology however, are to be achieved through hard work rather than hype. Once it was promised that technology could be used as an instructional medium to replace the teacher. Gradually we realised that technology needed to be used as an adjunct to rather than

as an integral part of the teaching/learning process, and people said you would use it more for instruction than for learning and to help the teacher more than the learner. For many years computers seemed to be used for their own sake, tacked on to an existing curriculum. As we become more familiar with what it was possible to achieve with computers many new ways of using them were developed. After "First Fleet" came many other databases, many bundled in excellent curriculum packages. Simulation packages enabled us to venture out archaeological digs, to travel in time and space and chase international criminals. Some teachers sand their classes have become familiar enough with packages such Microsoft Works to develop their own integrated information systems.

We look into the future at pen based systems, data linking, multi media and extremely powerful packages. We know from experience that the power of hardware will increase while the price comes down. But which of the promises of technology for the future do we want to adopt in schools ?Can we think again on the two loops of learning ? 7 The first loop is learning how to do something. In the old days we used to talk about this as instruction and it was this that we did when "training" somebody. Even now many people can see how computers can be used in this area but feel this is as far as technology can go. of course it is the second loop where students come to analyse their own activities and to modify their conduct which is the real challenge of teaching. For us as teachers this is the area where we must ask ourselves "How can technology help us ?"

Computers and wordprocessors, spreadsheets and databases enable the better production of the traditional essay or assignment. Students are able to easily revise and edit their work using these tools. They can return to the piece of work at a later time and revise and improve it. The knowledge can then be communicated in traditional form, but, with the help of a little desktop publishing, much more elegantly.

Computers give access to information, useful information, quickly and easily. By setting appropriate encyclopaedias, reference materials, atlases and world information and press reports (AAP, Reuters, etc), databases can be searched and the needed information printed out or downloaded onto the student's own disk.

Access to remote databases can be achieved using modems for information not available in the school system.

Spreadsheets and calculators allow students and teachers to consider what makes things work because they are freed from laborious numerical calculations. "What if..." situations can be postulated and explored. Discussions to develop concepts which are otherwise very difficult to grasp become possible.

Simulations provide possible ways for students to enter the world they are studying and try out the effects of changes on that world

Students will be able to pursue more independent learning styles, as a result of undergoing more independent learning experiences, made possible by easier access to technology.

None of these are very new educational ideas- what is new is the promise that they are all easily available to any student at any time because the students each have their own, personal computer which is portable. Powerful software, and the ability to use it well, will become more and more important. To run Windows easily more powerful computers are needed than the laptops we have now. When my eldest child was eight I bought anew, computerised, sewing machine. It was simplicity itself to use. I had thought the kids could use the old one but soon realised that these of use of the new technology would allow them to concentrate on sewing rather than on how to work the machine. The same is true with graphical user interfaces.

We have not yet tapped the surface of the possibilities for learning available to us now. At MLC we are attempting to explore what sorts of learning can take place in a school where all the students have their own personal computers.

There is an emphasis on independent learning experiences and on students evaluating and then reconstructing their knowledge. The computer provides the medium where knowledge can be restructured and formalised.

Computers make things happen faster. If you have bad teaching methods computers will just cause your classroom to become a disaster area more quickly. On the other hand, if you are teaching well, and have developed in your own teaching styles the second loop of learning (that is modifying your conduct according to the results) then to have your students able to access the whole body of knowledge on which you have based your life, its values and your professional abilities is a liberating possibility. The computers will not substitute for the teacher, they simply allow students to develop independence more quickly.

Abelson and Sussman5 say: The computer revolution is a revolution in the way we think and in the way we express what we think..."

Literacy and numeracy have long been the goals of education. As we approach the twenty-first century what might we mean by that? Education is not sufficient if it only enables us to repeat the past. To create the future we must find new ways of thinking and learning. At MLC we are on a quest for the right information. Join us in the search for the treasure !

References:

1. Understanding change in education: an introduction A. M. Huberman publ Unesco: IBE 1973 ISBN 92-3-1011 16-2

2. The Promises of Educational Technology by Donald P. Ely and Tjeerd Plomp in Computers in the Human Context edited by Tom Forester, published by. Basil Blackwell 1989. ISBN 0-631-16698-X Pbk)

3. Turtle Geometry by Hal Abelson and Andrea diSessa publ MIT Press, 1986. ISBN 0-262-S1037-5

4. Structure and Interpretation of Computer Programs by Harold Abelson and Gerald Jay Sussman publ MIT Press

5. C.O.M.P.U.T.ER.S in the Language Classroom, Edited by Jonathan Andeson, publ by Australian Reading Association 1985 ISBN 0 9495 12 07 9

6. The Queensland Sunrise Project by Liddy Nevile, November 1990

7. Teaching Smart People How to Learn in Harvard Business Review, May-June 1991.

The Audacity of Sunrise

By David Loader

In April 1988, an invitation was received to view a "School of the Future", the Sunrise School. I was immediately interested and read further. The organisation sponsoring it was reputable - none other than ACER (Australian Council for Educational Research). The accompanying information suggested that "ACER is committed to research into the use of technology within education." Reading further, I discovered that this "School of the Future" was to be located in the Museum of Victoria. There was no particular surprise in this until I discovered the reason this school had to be placed in the Museum. Apparently the sun cannot rise in present schools. "Students and teachers in conventional schools are subject to the culture of their schools and generally this does not support autonomous learning by the students or teaching by the teachers. For this reason, a school was not considered to be a suitable site for this project." (Neville 1988 p.2)

My interest had been aroused. I checked my diary and found I already had appointments. However the "School of the Future" was to have precedence and so appointments were changed.

The audacity of the challenge to schools was not in the rhetoric. We have read books by Ivan Illich and John Holt, who have argued that schools are bad places for young people. In fact the statement of John Holt "almost every child, on the first day he sets foot in a school building is smarter, more curious, less afraid of what he doesn't know, better at finding and figuring things out, more confident, resourceful, persistent, and independent, than he will ever again be in his schooling," (Holt 1971 p.23) has never left me as a specific educational challenge. The audacity of Sunrise comes in that ACER and the Museum of Victoria were not simply talking, but had actually established a significantly different educational setting.

After attending the opening function, listening to the speeches and subsequently meeting and talking with the people involved, it was clear that the challenge to existing schools was not just in the re-establishment of autonomous learning by students but was a challenge to rethink the nature of the curriculum, the relationship between teacher and student and even a new role for parents.

In late 1988 MLC picked up the challenging gauntlet thrown down by Sunrise and entered into an agreement with ACER. MLC was to have a Sunrise class in Year 7 in 1989. The agreement provided for both separateness and togetherness. While we were to evolve together, MLC was to develop its own particular curriculum based on themes from its current Year 7 courses. It was impossible to free the MLC Sunrise class from the existing school curriculum. Yet in a unique sense, the Sunrise class also transformed the other seven Year 7 classes and has subsequently led to substantial re thinking of our Junior Secondary curriculum and teaching methods. As well Sunrise thinking is rising up to Senior School and down into the Junior School.

While other schools are experiencing a top down reorganisation necessitated by the new VCE, the Sunrise class has meant that MLC has a bottom up transformation at the same time. Interestingly, this has not left the Middle School, Years 9 and 10, trapped between these converging forces. Rather, these reformations have encouraged Middle School to step out too, with significant new curriculum initiatives.

The MLC Sunrise class in 1989 could not be classified as an audacious experiment. Nevertheless, it was a significant departure from existing practice. Computers themselves were not new at MLC - there were already nearly two hundred in the school In fact the school has had a long history with this technology. In 1979 programmable calculators were introduced and our first word processor was purchased for our Business School students, not for our academic students. In 198O, MLC recognised the growth in use of computers by the community-and began teaching the social implications of. computers as a core subject in Middle School. At the same time a Year 11 Maths option of Computer Science was introduced and the school administration started to move towards computerisation. To assist with these moves, staff with special skills and training were recruited to help establish computing at MLC. In 1982 the Business School moved quickly to incorporate the new technology in its program and in such areas as Geography, Science, Special Education and Mathematics the focus of computer use changed to computer assisted learning. As this was extended and the value of word processing acknowledged, keyboarding as a compulsory subject for all Year 7 students was introduced in 1986. However, with the coming of 1988 and the Sunrise School, the slow entry curve associated with computers suddenly became a steep entry curve, taking on an exponential rather than a linear shape.

The history of that first year has been recorded already in the Sunrise Journal (Baker, 1990 p.5). Such was the success of this first class, that four new Sunrise classes were established in 1990. our three Grade 5 classes were to have their curriculum modified - all students in these classes were required to have a laptop computer for both school and home use. In the language of physics, a quantum leap had occurred.

Just as the morning sunrise evokes excitement and pleasure for those who rise early enough to see it, the MLC Sunrise School is equally commanding of attention for some. MLC has been inundated with requests from various people - teachers, media, lecturers - to see what is happening. Unlike David Suzuki who, in his new book 'Inventing the Future', dismisses computers as "information processors" (Suzuki, l990 p 198), we see knowledge not so much as being processed but as being constructed in the classroom. John Dewey's observation that the content of a lesson is the less important thing about learning, is relevant in Sunrise. Dewey and Sunrise are both concerned about experiences and attitudes.

In many ways the computer is both the image and the reality of l990. The written word as a fixed artefact, carved into stone not to be changed, is no longer appropriate in a society where knowledge is continually extended and changed, and where we expect from people both interaction and invention. In fact this is portrayed dramatically in the Bible. In the old Testament, we read of Moses descending from Mount Sinai with stone tablets on which the

Ten Commandments had been carved. That was the appropriate way for God to speak to that generation. However, to our generation, God sends a much more interactive and personal communication - He sends His Son whom He describes as the Word of God made flesh. As an alternative to a person, the computer must take second place. However, the computer is better than the linear and fixed structure in our books. on the computer, the text is moveable - it can be replaced, hierarchically organised and cross-connected in any way we choose.

Those of us who have grown up with books may be quick to query whether technology could have such a large impact. It is worth remembering that the book, as we know it today, has only been a significant phenomenon in certain cultures and only during a relatively short span of history. We do not have to go too far back in history to find that our culture was once an oral one. Information was passed from person to person, or from generation to generation, by oral communication.

Then came the alphabet/writing culture. This introduced a new form of conversation between people and between generations. It enabled a rapid acceleration in knowledge - scientists could build on the research of other scientists and people began to specialise in smaller and smaller areas of knowledge. Literature developed and increased. Postman (Methuen 1987p 14)has made the interesting assertion that the written word "is not merely an echo of a speaking voice, it is another kind of voice altogether."

To carry this logic one step further, a technological classroom may represent another transformation in our way of thinking, and certainly a dramatic change in our curriculum.

The idea of a changing curriculum is not new to teachers. The VCE and all the conflicts surrounding it, are a poignant statement of our society's lack of clarity about the content of education. It is simple enough to say we must teach the "basics", but it is difficult to identify what these basics are. Is the word "basic" to be interpreted narrowly as the 3 R's, or as building blocks upon which a person can become personally empowered to cope with a changing and assertive world?

Contrary to the opinion of some (eg Suzuki, 1990 p 195), our Sunrise experience has not been that computing is a solitary activity. While one event does not prove a theory, the following story is indicative of what is happening. on ~ our Grade S students sought assistance from the teacher to achieve something new with her computer. This was at the end of the last lesson for the day. The next day half way through the first lesson, the teacher was aware that all students in the class now had this new skill - that surely is effective communication, student with student.

Another statement by Suzuki also caught my attention. He said, "the challenge is to decide what information is worth anything and how to make use of that information, that is taught best by teachers"(Suzuki, 1990p 196). While I agree that teachers will continue to have a pivotal role in the classroom, interacting with students, I also want students to take more control of

the learning process. Again, our experience at MLC has been that students are curious, determined, energetic, skilful, discriminating learners.

At MLC, teachers in Sunrise view computers in the classroom as allies not enemies. They see themselves being freed to work and interact more individually with students. They are exhilarated by working with motivated students who sometimes do not even realise that the lunch break has come.

It is clear that teachers determine the success or failure of computers in the classroom. This means that teachers need encouragement and opportunity to "re-skill" - to become familiar and confident with this new technology. Teachers have already mastered one technology - that of the written text. Now teachers have to master a new technology, the computer text.

Sunrise at MLC is not an achievement but a process. It has more than lived up to the audacity of its challenge.

References:

BAKER, Ruth "Computers and Independent Learning - a Year 7 Project" Sunrise Notes, A.C.E.R R., March 1990, Number 1.

HOLT, John "The Underachieving School' Penguin Books, Australia 1971

NEVILE, Liddy "The Sunrise School - a School of the Future Project". A paper presented to the Australian Computer Society, 19 May 1988.

POSTMAN, Neil "Amusing ourselves to Death" Methuen,London 1987.

SUZUKI, David "Inventing the Future" Allen & Unwin, Sydney l990.

A Laptop Revolution

An interview with Pam Dettman, Head of Junior School

According to Pam Dettman, head of the Junior School, Methodist Ladies' College in Melbourne very exciting school with the self-knowledge necessary to face the future with confidence. The school's strength derives from its l O8-year history and its 2000 students. Add a principal with vision and a dynamic staff, and challenges confronting the school seem quite manageable.

Even under these conditions, however, a great deal of creative thinking, raw energy and risk taking is required when particularly challenging task presents itself- such as equipping al eighty two Year 5 students with a laptop computer in 1990.

Pam Dettman describes how the school faced that challenge and in the process revolutionised the school's approach to using computers.

At the beginning of 1989, the Junior School, as with the secondary sections of MLC, had been exhorted by the principal to develop an outstanding computer studies program, one that would help to equip our students technological independence in their current learning environment and, later, in the world beyond school.

The Junior School computers at the time were in a rather sorry state. The small BBC network that served half a class at a time was old and constantly breaking down, while the few Apples scattered around the classrooms-and shared between 26O students allowed only limited access. Ideally, a computer should be available at the time and place it is needed. So, it was clear that drastic action was required to give students something closer to the desired amount and type of computer exposure, in line with the principal's request.

Then there was the question of space. Even if we had many more computers, where would we put them? Some extensions to the building were about to begin, but why should we loosen art room or reduce the size of the library fora computer room, when computers were probably more useful in classrooms anyway? Furthermore, classes would have to be timetabled to use a computer room, thus negating the idea of using computers at the point of need

A core of skilled staff.

The one area in which we were well set up was that of staffing. The newly-appointed deputy head of the Junior School had high-level computer skills and two other members of staff possessed above-average computing skills. From the beginning of the year, not knowing what form the computer program would eventually take, these staff members became the computer team, with the deputy head as the leader.

Later, they in serviced other staff members at staff meetings and on staff development days .At the end of the year, four teachers enrolled an external Graduate Diploma in Education

(Computers in Education) course. by arrangement with the tertiary institution concerned, they were allowed to act as a study group under the guidance of the deputy head

Meanwhile, during the first half of 1989, we were continuing to clarify our own desires and expectations. our aims were to:. provide the students with much greater access to computers, so that they could develop high-level technical skills

- enable students to use computers whenever they felt the need
- put computers where they belong, in the normal classroom, where the students would possibly feel more secure in their learning, and where the integration of the computer with other subject area would almost certainly be enhanced.

The final obstacle: cost.

After several months of investigating the latest hardware and software, we decided that these purposes could best be served if each student had her own laptop. We decided we would start with the then highest Junior School grade level, the Year 5 ' s, who in 1 990 would number 82. The only obstacle, of course, was cost.

The capital outlay for 82 laptop computers, at an approximate cost of $1500 each, was not within the capacity of MLC The only option was to approach the parents, explain what we thought was the desirable course of action, and hope that they would support us by finding ways of providing their daughters with the laptop that we had selected, the Toshiba T1000SE.

Parents had the choice of purchasing a machine through the school at a reduced price, or of renting one of the machines bought by the school. A great deal of negotiation took place between the school and suppliers of the Toshiba laptop before agreement was reached on price and maintenance arrangements. Issues such as damage and loss insurance and tax liabilities required thorough research before arrangements could be finalised. A major effort was made to find ways of providing staff with the opportunity to purchase a laptop.

Next came a series of parent-teacher meetings which dealt with a range of parental concerns such as finance, transport of the laptops between home and school, the possible effects on spelling and on handwriting, the risk of RSI, the effects on families of children having superior computer skills to their parents and many others.

We had thought through all of these issues and offered what we considered to be reassuring responses, but we knew it was impossible to guarantee outcomes. The project was a carefully calculated rise We were venturing into the unknown and we had no guidelines to follow.

Finance was not as easy for parents as some might imagine. Given the MLC policy of making fee levels accessible to as wide arrange of the community as possible, we had many parents for whom the additional cost of the computer was a major burden. It is also true, however, at many of these parents chose MLC for their daughter because they perceived this school to be

modern and adventurous. The laptop proposal fitted this expectation, so parents were prepared to make every effort to cope with the cost of the machines.

By the end of 1989, all parents had declared their intention to either rent or purchase a Toshiba laptop. The split between the two options was approximately fifty-fifty.

At the beginning of 1990, the program began what might be called a blaze of glory. Reporters from the print and electronic media visited in large numbers, wanting to talk to the principal, teachers and the Year S girls about this new development in education. As the year wore on, increasing interest in the program was shown by other schools, particularly independent secondary schools and some independent primary schools. Our deputy head and other computer staff gave a great deal of their time during the year, explaining the program and the expected outcomes to groups of visitors. Similarly, the deputy head and I have given papers at conferences, addressed groups of student teachers, and generally spread the message that the use of laptops is a viable means of providing a grounding in technology.

Just another learning tool.

Well, how do we use the laptops?

First and foremost, our main aims to provide a learning environment in which students use the computer as a tool. The emphasis is not on 'computer lessons' as such. While we aim for the development of basic technical skills and confidence in using the computer, the printer, the disk drive and certain software packages, nevertheless our main aims relate to the teaching of the normal primary curriculum, so that the computer becomes just another means of achieving this, like a notebook or a calculator.

We have purchased site licences for a variety of software, which allows us to cover large parts of our curriculum. With software such as Logowriter, Forte, Australian databases, Where in the World is Carmen San Diego?, Crossword maker, The Children's Writing and Publishing Centre, Gap maker, Gap taker several others, we are well-placed to allow the girls to use the computers in many subject areas.

This is not to say that the computers are useful day and every day. Indeed, they are probably only used for a maximum of two hours on most days. What it does mean, however, is that the girls are developing arrange of computing skills which can serve various needs as they arise. one girl might wish to produce a ten-sided polygon during maths; another might wish to change the front of her latest poem in order to present it beautifully; another might wish to use her word processor because it reduces some of the labour involved in handwriting; another might wish to use a database for a social studies assignment.

Using and operating a computer in this intensive fashion imposes many responsibilities on students. They must keep their laptops in a safe place, keep their batteries charged and store and care for disks. So far no damage has occurred to any of the girls' machines. one teacher

managed to drop her laptop while carrying too much at once, but to her relief the machine still worked perfectly. No machine has been lost or stolen, but a few disks have been misplaced We have structured our computer homework around long-term assignments, so that students can choose to take their computers home and make transport arrangements accordingly. The laptops must be at school every day. The majority of students take their machines home two of three nights a week and at weekends. We have heard of one girl taking her computer to the soccer, while another took hers to the beach, and we have seen photos of girls working or playing on their computers at a slumber party!!

A few girls benefit perhaps more than the others from being able to take their machines home. These are our hearing-impaired girls. MLC has a program for the hearing-impaired, but it is only now, through the use of computers and modems, that we have been able to help these girls to communicate with others outside the school's sign-language environment

Major gains for students.

Results to date indicate that the laptop computer program has meant major gains for the Year 5 students taking part. These benefits could have been obtained through any computer use, but they have been greatly enhanced by the exposure made possible by the laptops.

The first major change has been that the emphasis in performance has moved away from the right-wrong mode of thinking, to a 'what works or doesn't work' approach. This is attributable partly to the fact that any errors can be immediately erased and therefore dismissed from the student's environment, leaving neither a reminder of error or a mass of corrections. In addition, the computer reacts in a totally objective, non-emotional manner, thus leaving the student to pass judgment on her own progress.

We have come to understand that students do not mind their so-called failures; rather, they object to the fact that other people usually determine their level of success or failure and how, and to whom, that information will be released. Furthermore, the frequency of feedback afforded by the computer allows students to be more relaxed than in a situation where a teacher can only get around to each student on a restricted basis, which puts many students under pressure to get something right quickly.

A second profound change has occurred in the students' interaction within the classroom. This is interesting, because one of the major concerns of parents was that their children would end up sitting in corners, focusing on their machines like robots.

In fact, classroom interaction has both increased and changed its character. It has become a great deal more work-based. Whereas before we would see two students sitting beside each other doing their own work and talking about social matters, now we see them truly engaged with each other in the thinking-talking process, talking about their task and possible solutions. Teachers report that this appears to have carried over into activities in which the computers are not used.

We have also noticed that the students' risk-taking behaviour has been enhanced, partly because the emphasis on being ''right' immediately has decreased, partly because no idea is too far-fetched for the computer to deal with, and partly because the immediacy of feedback encourages further investigation.

The students really can proceed at their own pace. Those who find solutions quickly can get on with something else, while the slower students can finish an activity, unlike the situation with 'normal' computers which may only be used now and again. There is a sense of fun and excitement because the immediate feedback maintains the purposefulness of an activity, and also because much mundane repetitive work can be eliminated.

We are beginning to understand just how much students' minds are held back by the rate at which their hands can work - for example, when they have to manually construct the internal angles of a polygon. They are more strongly motivated when, having learnt to construct the figures with a protractor, they can press a repeat key on the computer and eliminate some of the tedium in the remainder of the task.

We have also noticed that students' problem-solving abilities have improved, because they are generally more prepared to persist with problems on the computer in order to find a solution. Again, we basically attribute this to the immediate and non judgmental feedback, combined with students' non-stop access to the computer.

Creativity is another area that has developed. At first, many parents and some staff were concerned that students' creativity might be adversely affected by computer use, but now we feel that the opposite is the case, partly because of the increase in risk taking, partly because simulations allow students to vicariously experience many things that they could not otherwise experience, and partly because the ready use of graphics aids the imagination.

Laptop advantages.

There are certain advantages which are unique to laptops, as opposed to other computers, provided that students have one each:

- learning is generally enhanced, because the computer is available at the exact time and place of need.
- portability allows not only greater exposure, but different types of environmental influence, eg writing essays by the fountain, recording geographical data in the field, showing big brother a maths puzzle at home.
- The laptops are so unobtrusive that they do not dictate how students must sit in class or what space should be allowed between them (when entering the laptop classroom, many visitors comment that the computers are scarcely noticeable): in short, they do not take over the classroom; the human element remains foremost.

- having a laptop enables each student to identify its powers as their own, and the processes of learning become their own - they feel they are in control of their own learning situation.

Earlier in the year, when we first began to notice that the Year 5's seemed to be growing up rather quickly, we seriously wondered if we were pushing them too rapidly. We watched closely and began to realise that instead of putting them under pressure, we had done the reverse. We had taken the lid off the pressure-cooker, so to speak, and what was coming through was a sort of natural motivation which perhaps the system up until now had repressed.

We are now beginning to develop real insights into the extent to which students want to manage their own learning, and how capable they are of doing so.

Conclusion.

In summary, the laptop computer program has created something of a revolution in our Year 5 classrooms. The students now have real power over their own learning. The teachers are happier and more relaxed, because they feel that individual needs are better provided for, and parents are very positive about the program. In 1991 we will have ninety Year 5 students and ninety Year 6 students, each with her own laptop.

The revolution continues.

This article is reprinted with permission of Ashton Scholastic from The Entreprenaurial School (ed. Frank Crowther & Brian Caldwell)

Educational Computing: Resourcing the Future

By David Loader, Principal, MLC & Liddy Nevile, Senior Lecturer RMIT.

Introduction.

The aim of this paper is to broaden the discussion of computers in education to include 'the future'.

In developing educational computing, it is important not to be constrained by the past. We believe many of these constraints are based on inadequate models of computers and of education. The models that we have in our minds lead us to define computer use in particular ways: imagining computers as teachers or knowledge transmission devices is an example of this. While computers can at times deliver instruction and information, to see them as only in these roles is to limit unnecessarily their potential for the 'construction of knowledge'.

Tomorrow's classroom, as envisioned by us today, is characterised by the transparency of the computers within it. In the near future these devices will be ubiquitous but not dominating the classroom ambience. They will be found among the students' books, papers and pens. Furthermore, we anticipate that some of the traditional forms of knowledge representation--what we are familiar with now--will be found inadequate for many of our purposes. Thus we expect that the forms and content of knowledge considered relevant and appropriate to students in compulsory education will change.

We also anticipate an extension of the range of cognitive styles being supported within education. We are assuming that 'technology' will be curriculum as well as being integrated into the curriculum in much the same way as English expression is today.

In particular, this paper is based on a constructivist theory of knowledge. As such, it emphasises the subjective and evolutionary nature of knowledge: what is 'knowledge' for one person may not be for another.

In this teaching framework, students are encouraged to broaden their knowledge beyond what they know. They are encouraged to find out ' ways of knowing'. Students need to develop an awareness of ' what they know' and 'how they know' it and then negotiate this with their peers and the wider community. For this reason, we advocate 'constructionist' as a pedagogy: the teacher has a special role in this context.

We are trying to develop an 'enterprising' approach to schooling which includes the provision of resources by schools. This assumes it is the responsibility of teachers and schools to generate energy for learning and then to support that learning in ways which recognise the differing needs, interests, abilities and cognitive style of the students.

In this 'future', teaching will be greatly enhanced by the provision of appropriate media The traditional forms and ways of knowing can then be extended to take advantage of the development of computational media.

To achieve this requires a proactive stance towards such things as imperative forms of knowledge (including programming) and extended forms of representational media (including animation and hypertext, for instance).

In our model, computing (a process not an object) extends the range of media within which teaching and learning can take place. We see the computer (an object) as a convivial tool with which humans (our students) can develop their personal knowledge.

We think of the computer as a new sort of pencil and paper'. We even go so far as to be interested in whether the computer is an intelligent tool with which we can for meaningful relationships.

In her seminal work, Turkle (The Second Self, p. 13) warns us that: "the computer affects the way that we think, especially the way we think about ourselves ...The question is not what will the computer be like in the future, but instead, what will we be like, what kind of people are we becoming."

The Role of Personal Computers

In our vision of the future, the computer as a personal tool becomes a vital element. A personal computer is not just a computer which has only one owner. It is personal in that it allows its user to create a personal knowledge space' with idiosyncratic ideas, data and software of personal value. The ownership involved is not just of a machine, but of knowledge and power.

Personal computers are like diaries. They have our information--often private the programs that we need, our particular sets of tasks; and all are arranged in a way which is convenient us. We use personal computers for private purposes such as writing essays, solving a mathematical problem and so on. We are responsible to ourselves for our use of our computers. We consider this view of computers stands in sharp contrast to what we call school computers.

School computers are for school purposes. In arriving at this stance, we have had to work through our ideas of the purposes of school computing. Many purposes to which priority was given in the past have been rejected and some new ones adopted.

For example, we do not believe that schools should feel obliged to give all students a number of hours of exposure to computers. What is the value of experiencing episodes of school computing, such as 45 minutes of word processing per week, when writing with a word processor is not part of the school curriculum?

Using the computer in this limited way does not necessarily merit priority over the many other life skills which our students need help to develop.

There is little evidence to support the notion that small doses of school computing enhance the lives of our students. There are many professionally- expert teachers who are yet to be convinced they should give up classtime for such activities.

On the other hand, once students have personal computers, there is a substantial role for school computing. That role is the process of making personal computers suitable for educational purposes. In our case we have decided this means school provision of networking facilities, for example. This allows students and teachers both on and off campus to have access via their computers at any time to school resources such as electronic encyclopaedia, international electronic data bases, bulletin boards and mail, and most importantly to each other.

This model of the computer allows for it to be used for interaction with, and communication of, ideas. In this way it supports constructionism in the classroom. School computing, as we define it, does not stop at hardware provision. School computing is in attitude to computer use, a culture which supports computer use, and it must extend into the general curriculum

Many elements of the established syllabus are no longer relevant in a community where computing is promoted (we adopt a proactive approach to computer use). In addition, schools are forced to make decisions about how students should work and this in turn question show their efforts should be evaluate (In our case we have chosen to promote collaboration..)

At this point it is useful to re-consider some models of school computing from the past. No longer will schools need laboratories of computers and computer teachers struggling to give all students equal doses of 'computing exposure'. Instead, schools are burdened with an increasing need for all teachers to be prepared to re-examine their practices and to consider fresh approaches to teaching white wall take advantage of the expanding medium which their students are working.

'Professional development' is not about training teachers to use computers in specific ways so they can train their students to do likewise. It is helping teachers to stand back from their practices and see which elements are still their exclusive responsibility and which roles the students can assume. This is being 'enterprising'. 'Enterprising' (in the educational context) was coined by the authors of an OECD report some years ago (Ball,1989). It is a way of thinking which helps bring into focus the real purposes of teaching and aims to increase the energy and resources available for these purposes.

For example, an 'enterprising' teacher would not consider herself the only teacher in a classroom: while there may well be only one school-employed adult in this role, there are usually many others available who can play that teaching role. Participants are teachers at times, in one of three ways: as school teacher, as peer teacher as inner teacher.

An enterprising teacher does not carry the responsibility for creating all the learning experiences: learners assume responsibility for many of the aspects of the learning/teaching process and they, not the teacher, generate many of the problems on which they work. This might mean that learners are engaged in investigative work which raises unexpected new aspects of a topic with which they are concerned. Equally it might mean a problem such as how to model a particular idea or how to save data on a computer.)

The OECD model of enterprise depends on giving students real responsibilities which is not sanitised to eliminate risk. The three R's (reality, risk and responsibility) are used to generate energy for learning and there are many examples of cases in which they do just this.

In our case, the increased need for skill development among both teachers and students is being responded to in remarkable ways and we believe that the combination of the three R's is working.

Some may think that we are taking unnecessary risks by casting aside familiar practises. While the school gives help in material and technical ways, it is left to the teachers and students to decide how to use their computers and when they need them. of course personal ownership of the computers magnifies all three R's.

The MLC approach.

The current- MLC educational computing program is designed around a personal computer. We have chosen a portable computer because this allows for different types of environmental influences.

At Mallacoota, our residential site, students can take laptops into the rainforest to write their essays, poems, or to write to their parents. At both Mallacoota and Kew, students are freed from desk-driven social placement and are found choosing to sit close to a friend, alone, at a desk or on the floor.

In order to achieve anything like a meaningful experience of personal computing, we have had to find ways of placing personal computers the hands of all our students. We have chosen to invite our parents to support us in our endeavours. We are pleased to report that the overwhelming majority of our parents have chosen to accept this invitation.

This support has made it possible for MLC to negotiate reasonable prices and financial programs for the purchasing of the computers and to develop an insurance policy for their protection.

MLC provides students with technical support in excess of that which would normally be available to families who, in isolation from others, acquire computers. MLC has also taken responsibility for evaluating available and future hardware and advising parents in their choice of computers.

MLC commenced this program acutely aware of the limited computing expertise within the school community. Rather than try to solve this problem in advance, MLC made it part of the process and have been most gratified to find that teachers and students, once they become the proud owners of laptop computers, will acquire uncommonly high levels of expertise from manuals (the inner teacher again), peers and formal instruction.

In a recent survey it was established that many teachers have extended their repertoire of computer use far beyond the requirements for their particular teaching role. Similarly, students adopt naturally the same approach to learning to use their computers as they do to using the family VCR; formal classes in abstract computing skills are not required very often.

In the classes which have fully adopted our new computing policy, the model of computer as medium is taken seriously. This has at times produced some surprising results which have had to be considered with care. A good example is provided by the students in Year 7 whose work in Biblical Studies resulted in a set of animated stories about Moses.

Seen in isolation, it might seem strange to find a Biblical Studies class writing computer programs to make cartoons of Moses running up and down a hill. Given the broader scenario, the fact that these students could use the Cartesian plane so easily would delight any mathematics teacher.

Shifting the focus of consideration of this example back to the teacher, we find that the task of assessing the work is less burdensome than it might be: the promotion of particular models of computing provides the teacher with guidance which helps her make decisions with respect to the students' work. We have used this technique deliberately.

Depending upon the non-school teachers in the classrooms has also been rewarding. our experience is that there is a great deal more student co-operation in the personal computer classrooms and student social interaction seems to be more often work-oriented than in other classrooms .

The MLC experience. The MLC experience is based upon more than twelve years of involvement with computers at MLC, two and half years with the Sunrise school and one and a half years with the laptop program

The staff are now reporting a number of positive outcomes. A culture is developing in which risk-taking is enhanced with the immediacy of feedback encouraging further investigation. For the computer, no idea is too wild or too far-fetched. As a result, imagination and creativity are liberated in new and exciting ways.

MLC parents and teachers report that students are generally more prepared to persist with problems in order to find a solution now that they have a computer. A consensus seems to be that students are becoming more effective and more independent as learners.

The future. The future is not far away! Today's Grade 3 students will be graduating from school in the year 2000. What will their world be like? We are living in a society with an increasing rate of change in complexity and technology.

In these times we educators must be bold, so that the future to be achieved is our chosen future. In order to do this, education should-play a proactive role now. With this in mind, MLC is planning for nearly 1,000 laptops by 1992 and 2,000 by 1994. This means that by 1994 all MLC students above Grade 3 will be using personal computers.

Written text, of which this paper is an example, is a technology that dominates our present culture and provides us with intellectual capabilities that we could not have without this technology. Is it too bold to assume that with this new computational medium people will be able to unlock skills and intelligence as yet unknown?

Bibliography

TURKLE, Sherry, Second Self: Computers and the Human Spirit. Granada London, 1984

BALL, Colin, Towards an 'Enterprising' Culture - A Challenge for Education and Training. Education Monograph No 4, OECD, Paris, June 1989.

A Practitioner's Viewpoint

By Maggie James, JSS History Co-ordinator

Recently I was struck by the growing demands that are being made on classroom teachers to cope with the increasing complexities of technology.

Such things as: using two different types of laptops, with a few isolated cases of other types being thrown in just to keep us on our toes; computers that have technical faults, or computer lockers that have technical faults; girls who don't have their computers available (for whatever reason, usually genuine); the incredible scope of ability when it comes to using Logowriter at the start of Year 7; the expectations that are constantly there in the background from parents, students and the administration; are part of the daily classroom experience of the Year 7 Humanities teacher.

Add to this the constant interruptions to the program that occur due to keyboarding lessons, athletics sports practices, choir practices, etc. I 'm not saying that these are bad, but they also add to the stress of teaching in such an environment. (Also include trying to teach Logowriter in both English and French!) Two things really strike me:

1. How do we make the learning experiences in the classroom valuable for all the girls, especially in relation to the use of their laptops/LogoWriter/word processing?
2. How do we make the learning environment less stressful for those who are teaching in this situation, especially for those teachers who are new to the school, or to the Year 7 Humanities/Mathematics programs?

This piece was written in preparation for a collaborative workshop held at MLC on 19.3.1993.

Computers for Kids ... Not Schools

By Gary Stager, Educational Consultant, USA.

A funny thing happened recently when I carried my Macintosh LC computer with four megabytes of RAM, forty megabyte hard drive, floppy superdrive, colour monitor, CD-ROM drive, extended keyboard, and mouse into the kindergarten class at Methodist Ladies' College. I held up the mouse and asked the class of twenty-five girls if they knew whether object was. only two gids actually knew what the device was called, but every girl used the mouse expertly when it was their turn to navigate the interactive story.

I only mentioned the technical specifications of the machine because that is often the practice in articles regarding computers in education. The spotlight is too often placed on the computer, rather than on education. Alan Kay, the man credited with the idea for mice and windows, has defined technology as" anything that wasn't there when you were born." Your television might seem mysterious to you if you were born before the 1950's, but it is not mysterious to children. The microcomputer is not technology to a school-aged child either.

The incident in the kindergarten class exposes the absurd way in which computers are viewed by educational policy makers. Schools sought to make computers, which are transparent in the world and the life of the child, and make them into a discipline - hard and worthy of study. Terms such as computer literacy, computer lab, computer coordinator, and courses in for nation technology have become commonplace in elementary and secondary schools. These ideas, at best, are rooted in the educational bureaucracy's deeply-held paranoia about only teaching what is testable and at worst is designed to create an artificial range of good computer users and bad computer users - kids who will earn an "A"" in "computing" and others who will earn an "F" in "computing." Neither case respects what students already know. It seems ridiculous to think that an eleventh grade student in an information technology class needs to be taught what a mouse is.

Since 1990, I have been fortunate enough to be associated with a school, Methodist Ladies' College (MLC), deeply committed to making the potential of computers personal and transparent throughout the learning environment for both teachers and learners. By January 1993, over 1,50O students and teachers at MLC will own their own notebook computers. l This fact not only challenges the status quo of computers in schools, but creates new and profound opportunities for the teaching staff at MLC. Schools often take computers so seriously (ie...hiring special computer teachers, scheduling times at which students may use a computer) that they trivialise their potential as personal objects to think with. Computers are ubiquitous and personal throughout society, just not schools.

The laptop initiative inspired by Liddy Nevile and the MLC Principal, David Loader, was never viewed as traditional educational research where neither success or failure mattered much. Rather, personal computing was part of the school's commitment to creating a nurturing

Learning culture. Steps were taken to ensure that teachers were supported in their own learning by catering to a wide range of learning styles, experiences and interests.

Although educational change is considered to occur at a geologically slow pace, the MLC community (parents, teachers, students, administrators) has immersed itself in some areas of profound growth in just a few short years. The introduction of large numbers of personal computers has served as one catalyst for this "intellectual growth spurt." ...children and teachers

Teachers in many schools rightfully view the computer with suspicion as just one mandated fad or as a threat to their professionalism as large Orwellian teaching systems are unloaded on to the market place. The national average of students to computers in the United States is nineteen to one. The state of Florida recently announced that it will spend $17 million (US) this year rewire schools in order to make way for computers.2 $17 million could buy at least 20,000 students their own notebook computer. Schools routinely spend a fortune building fortresses, called computer labs, complete with special furniture.3

The personal computing experience at MLC has been different. Given the changes that have accompanied classroom computer use, this initiative would have been cheap at twice the price.

The act of asking every parent to purchase a notebook computer for their child4 was not nearly as courageous or challenging as the way in which MLC has chosen to use computers. The quaint idea of drilling discrete facts into kids' heads with computer-assisted instruction was dismissed and so was the metaphor of the "computer as tool." The popular tool metaphor is based on the business paradigm of increasing productivity and efficiency. I would argue that there is seldom an occasion in school when the goal needs to be increasing a student's efficiency or productivity.

MLC has chosen to guide its thinking about personal computing by the ideas of "constructionism" and by viewing the computer as "material." Constructionism is the idea of Jean Piaget and extended by Seymour Papert to mean that learning is active and occurs when an individual finds herself in a meaningful context for making connections between fragments of knowledge, the present situation, and past experiences. The person constructs her own knowledge by assembling personally significant mental models. Therefore you learn in a vibrant social context in which individuals have the opportunity to share ideas, collaborate, make things, and have meaningful experiences. After the first year of using laptops, the seventh and eighth grade humanities teachers asked f or history, English, geography, and religious education to be taught in an interdisciplinary three-period block This scheduling modification allowed students to engage in substantive projects.

The computer as material metaphor is based on the belief that children and teachers are naturally talented at making things. The computer should be seen as an intellectual laboratory and vehicle for self-expression - an integral part of the learning process. In this context a gifted computer-using teacher is not one who can recite a reference manual, but one who can heat-

up a body of content when it comes in contact with the interests and experiences of the child. This teacher recognises when it might be appropriate to involve the computer in the learning process and allows the student to mould this personal computer space into a personal expression of the subject matter.

Teachers at MLC were introduced to computers by being challenged to reflect on their own learning while solving problems of personal significance in the software environment, LogoWriter - the software the students would be using. I would argue that educational progress comes when a teacher is able to see how the particular innovation benefits a group of learners. These teachers come to respect the learning processes of their students by experiencing the same sort of challenges and joy. The teacher and learner in such a culture are often one-and-the-same.

LogoWriter is a popular software package that combines the power of the Logo programming language with word processing, graphics, animation, and music in one user-friendly environment. Five year olds and university professors experience the same playful enthusiasm towards problem solving and learning when working with LogoWriter. The learner is free to express himself in unlimited ways - not bound by the limits of the curriculum or artificial (school) boundaries between subject areas.

Students at MLC have used LogoWriter across the curriculum in numerous and varied ways. A student designing a hieroglyphic wordprocessor, a longitudinal rain data graph, Olympic games simulation must come in contact with many mathematical concepts including randomisers, decimals, percent, sequencing, cartesian coordinate geometry unctions, visual representations of data, linear measurement, and orientation, while focusing on a history topic. A sixth grade girl was free to explore the concept of orbiting planets by designing a visual race between the planets on the screen. Fantastic examples of student work abound.

Two particular projects by MLC students warrant attention because of the ways in which they challenge us to rethink the organisation of schools. Seventh grade students were assigned the task of designing a LogoWriter program to solve a linear equation, such as $3x + 4 = 16$. While such a task is typically too advanced for twelve year old students, the girls at MLC have gained much mathematical experience through their computer use and are therefore capable of solving such problems. One girl went well beyond the assignment of solving the equation by not only writing a computer program to solve similar equations- she created an elaborate cartoon of a girl walking into her bedroom, complaining to her mother about her difficult math homework, and then a magical computer appeared and showed the user how to use the equation solving program. The student extended the typical dry algebra assignment with great joy by demonstrating her creative art and communications abilities. Another student's linear equation solving program included the playing of a complete Mozart sonata. Every note of the sonata had to be programmed in away the computer understands. The mathematical experiences of both students were greatly enhanced because their computing environment allowed them to express their mathematical knowledge in their own voice. There is great hope

for schools when a student ' s interests and experiences are encouraged to converge with the teacher's curriculum.

The last example I wish to share illuminates how teachers have been forced to reflect on their role in the learning process and take action based on observations of students learning in the computer-rich environment. The French teacher at MLC was provided with a French language version of LogoWriter. It was originally thought that their students might find it interesting to "speak" to the computer in another language. one French teacher was intrigued by the idea, but did not know anything about LogoWriter. She felt comfortable asking a math teacher for help -This type of professional collaboration is now commonplace at MLC. The math department some eighth grade girls the opportunity to do their math assignments, not only on the computer, but in French. Students in several classes were intrigued by the challenge. A math teacher asked his colleague how to say a few phrases in French so that he could leave comments in French on his students' projects. This teacher's demonstrable respect for his student's work and colleague' s subject area is exceptional by contemporary standards.

A few weeks passed before the French teacher visited the math class. The teacher was notably pleased to observe the students learning mathematics, computer programming, and French, but was ecstatic to find that the girls spontaneously speaking French. This veteran teacher later reported that she had never witnessed students of this age actually speaking French outside of a French class lesson. In the LogoWriter environment language is active - the computer does something if you combine words in the right or wrong way and you receive immediate feedback.

This experience has caused a small group of teachers from a variety of disciplines to propose that the school allow them to create a French immersion class in the junior secondary school. Teachers who have not used much French since university are so excited by the learning of their students that they are willing to practice the language along-side the students they are teaching. This sort of professional risk-taking is more common in constructionist environments than in traditional school settings. Risk-taking is an essential element of self-esteem and a critical characteristic of great teachers.

Policy makers must choose between two visions of educational computing. Each of the following proposals convey profoundly different philosophies of education.

Vision One

> In every teacher' s life there 's something that's transformed them professionally, says third grade teacher Myrene Cox. "For me, it's been the Mac." Such remarkable stories among teachers with Macintosh personal computers are becoming more and more common, for two reasons: First, the Macintosh streamlines many of the instructional-management tasks teachers have to do. With innovative software applications like The Print Shop and Classmaster, creating things like lesson plans, seating charts, and instructional materials becomes significantly easier...5 ...Together they drafted a

> proposal entitled, "Teachers Can't Wait" and set up a pilot program in four classrooms - including Myrene's. With a goal of putting a Macintosh on every teacher's desk within five years, the program is already extremely successful. . .Apple Computer Print Ad (Fall 1992)

Vision Two

> "...only inertia and prejudice, not economics or lack of good educational ideas stand in the way of providing every child in the world with the kinds of experience of which we have tried to give you some glimpses. If every child were to be given access to a computer, computers would be cheap enough for every child to be given access to a computer." Seymour Papert and Cynthia Solomon (1971)

Responsible schools should challenge the status quo and computer literacy dogma by de-emphasising computers and reasserting that the learner be central in the learning process. Used appropriately, computer technology can assist adults in making schools more vibrant, relevant, and humane while students embark on the joyous path of lifetime learning.

Footnotes:

1. By 1994, all students in grades 4- 12 will have a notebook computer making the ratio>l computer/student

2. Electronic Learning Magazine, September 1992

3. Corporations, such as Apple Computer, must realise that it is possible to do good and to do well simultaneously. It makes a lot more sense to sell 1,000 notebook computers to a school than to sell 10 for a computer lab. During the summer of 1992 Powerbook 100 notebook computers were being liquidated by Apple for less than S800 each Perhaps hardware manufacturers will wise-up some day and market such low-cost powerful machines to K-12 schools.

4. Each MLC teacher interested in owning a personal notebook computer received a substantial subsidy from the school in order to purchase a computer. The school decided against fully funding the computer for two reasons:

(i) The teacher had flexibility to purchase the computer that met his/ specific needs and

(ii) Teachers were being asked to make a personal commitment to personal computing. Each year a $400- $700 stipend has been available to teachers interested in upgrading their hardware or purchasing peripherals.

5. When did The Print Shop become innovative software? Is this the best educational use of computers and case study that Apple Computer could find?

Bibliography

Franz, S. & S. Papert (1988), "Computer as Material: Messing About with Time," Columbia Teachers College Record.

Loader, D. (1993), "Restructuring an Australian School, "The Computing Teacher. March, 1993.

Loader, D. & L. Nevile (1991), "Educational Computing: Resourcing the Future,' LARTV occasional Paper, Jolimont, Australia: September, 1991.

Solomon, C. & S. Papert (1972) "Twenty Things to Do With a Computer," Educational Technology.

MLC Initial Research Report

By Helen Mc Donald

At the end of last year, 215 Year 7 students completed a questionnaire which sought to to obtain their views and opinions with regard to laptop computers. The following findings reflect student responses to 4S statements which were based on a pilot study. Percentages are included to indicate strength of responses.

Ninety-five percent of Year 7 students in 1991 "liked using their laptops". They described learning with these tools as being "fun" (86%) and ninety-two percent denied that working on a computer was boring. Although learning was not seen as "easier", they felt that they had attained "new skills" with the computer (98%) and that the laptops had allowed them to "do things that couldn't be done in other ways" (88%). Eighty-nine percent were confident that "programming had taught them a lot."

Appreciative of its portability (89%), ninety-three percent used the computer in their spare time, for recreational purposes. Eighty-six percent of respondents noted that work was easier to find when they used a computer, and overall eighty-one percent felt "more organised."

Most students (90%) preferred the appearance of work completed on a laptop and eighty-five percent preferred using it to pen and paper -although some students stressed that this depended on the task at hand.

Negative comments were that it was too heavy to carry home (60%), with travel on public transport being a problem due to fear of screen breakage. Eighty-three percent become annoyed when the battery alarm goes off, thus interrupting their work.

The second Section of the questionnaire focussed more strongly on teachers and teaching style.

Eighty-five percent of students described their learning in 1991 as "more independent", with ninety-three percent distinguishing clearly between the teaching styles of primary and secondary school teachers Eighty-two percent felt more able to learn at their own pace, with ninety-three percent claiming that they have been given greater responsibility this year. Ninety-five percent noted that their teachers "trusted" them to work alone on projects.

Students (87%) accepted that their teachers were learning about Logowriter with them and did not expect teachers to have total mastery of the program - although eighty-nine percent insisted that teachers should know enough to appreciate what they (the students)had done.

Eighty-six percent of respondents felt that students had helped each other more in class this year, as compared to previous years in their experience.

Student acceptance of this innovation is strongly favourable with many positive benefits being endorsed. Negative responses were relatively isolated and tended to concentrate on a single bad experience such as a broken screen or losing an assignment. Some students included a written comment on their questionnaire paper. Although I cannot claim that their views are representative -they make interesting reading. A selection is printed below:-

- "I wrote an adventure game for my Logowriter project. I enjoyed making something that looked professional. It was good that I could work out ways of making the computer do what I wanted."
- "I have done most of my projects on computer and I find computers make work look neater and it is easier to correct when it is on computer. You can also write more on computer before you become tired "
- 'It is fun when we get to work on our own projects and then we show them to friends and they think they are really good. I would like to try out some different programs to see what else you could do on the laptop."
- "Mum is always saying "Be careful with it....make sure you don't lose it!" It's tiring - parents get on your nerves."
- 'I live in Templestowe so my computer hurts my back even in a backpack when I take it home."
- "I my laptop."
- "I like my laptop computer because it helps me keep up with everything."
- "I find that even though I work much faster on a laptop, I am much more creative on paper in the way of stories."
- "Using laptops is great but when you start to write you feel really lazy."
- "I don't think we use the laptops enough because when the teachers need to do something fast they make us use pen and paper."
- "I feel absolutely terrified when something goes wrong with my computer."
- "Laptops arc fun and make work quick and neat and interesting - especially if you use graphics."
- "Laptops are great fun, for I can do my working the living room while watching T.V."

A Technology School for the Future: A Proposal

By Ruth Baker, Jeff Burn and Di Fleming

"...the know-how and creative process that may utilise tools, resources and systems to solve problems, to enhance control over the natural and human-made environment in an endeavour to improve the human condition." (UNESCO 1985)

Recommendations:

1.1 That a 'Technology School for the Future' be developed by Methodist Ladies' College to extend the opportunities for MLC students and the wider community.

1.2 That the Technology School consist of:

- areas which would provide technological support across the curriculum. Assistance from private sponsors in the development and maintenance of specific areas would be sought.
- a multi media area where students and staff could produce materials f or film, television, video, computer or print presentations.
- a robotics and electronics area where students could combine construction and computer programming.
- a CAD/CAM area where students could explore design concepts and the use of a variety of materials, for example: plastics, resins, glass, composites, metals, fibres, cardboard, ceramics, laminates, wood, paper or fibres.
- a music area with simulators and computers which allow students to explore programming and creating electronic music.
- an information centre which gives students access to equipment such as CD.ROM, Video Disks and scanners.
- a communications area with modems, ISDN links, etc., providing access to Marshmead, other schools, bulletin boards and international contacts. (MLC is already developing such activities and these would still be needed in their current diverse locations.)

1.3 That the Technology School be open: 8.00 am - 10.30 pm for use by MLC, students from other schools, TAFE and community group and individuals. Access to be negotiated.

1.4 That the Technology School be a joint project with:. Victorian Education Foundation (VEF) State Training Board of Victoria. Private Sponsors might include: BTR Nylex; AEG Telefunken; Kodak; Apple Macintosh and Toshiba. Campaign for Excellence for Girls (MLC)

2.1 That MLC develops programs appropriate each school (Core and/or Elective) to enable girls to engage in learning experiences which will increase their technological capability. This could include Technological Studies as a specific subject. Traditionally girls have had fewer opportunities to engage in construction activities and in working with a variety of materials.

Such programs should include the following:. consideration of the role of technology in society including social, political, economic and moral aspects.. experience in processes leading to new products including creating, designing, planning, ranking, evaluating and testing.

2.2 That the Technology School provides specific programs for articulation between MLC and a range of tertiary institutions e.g. Swinburne, RMlT, Philip, Institute, David Syme Business School and all Victorian Universities.

Proposal Aims

- To enable students and teachers to participate in learning experiences designed to develop technological capability.
- To foster innovative, enterprise and invention skills in individual students.
- To enable teachers and students access to specialist computer software and hardware in interactive environments.
- To provide training and develop activities new areas of technology.
- To have access to and assistance from trained professionals through industry links

Proposal objectives.

To provide a basic course of "tools for tomorrow" so that all users are aware of the technology and how to make it work. To encourage independent learning and recognition of gifted and talented students in this area by allowing them to generate their own projects, programmes and inventions. To centralise the specialist technological resources and support staff so that the school community knows what and who is available, thus ensuring optimum use of expensive and often quickly obsolete equipment. The Community Education Centre could take a vital role in the development and management of the programme

Proposal Outcomes

- Students will be literate in the area of technology with:
- a knowledge base and a repertoire of skills especially in the non-traditional areas for girls and young women; personal enrichment, satisfaction and developing self esteem; an enhanced ability to be productive in society;
- an understanding of the future and the opportunity to be a productive part of it.. Many students will have studied Technology as an elective subject and some would take VCE Technology Studies Units 1,2,3 & 4.
- Teachers will be trained at the school level.
- The Community Education provision will increase substantially.
- Vocational aspirations for girls will change significantly to involve many of our students in Post Secondary training and careers which break into areas which have traditionally been for "men only." (Non traditional areas for women are decreasing.)
- The already established articulation process will be further developed.

- The partnership between private enterprise, tertiary institutions and schools will be further forged in a public and dynamic way.
- Co-operation across all school systems will be encouraged.
- To be part of the developing association of Technology Schools of the Future.
- To facilitate curriculum development and research in Technology Education.

"In an age when technology pervades our lifestyle it is crucial that students learn not only about technology but also with and through it.""

Although a Technology School has not been established, many of these proposals are being implemented as integral parts of the regular school curriculum.. (Ed.)

Design and Technology: The next Challenge?

By Ruth Baker, Head of Junior Secondary School, 20.9.1992

Designing a "wolf-proof" house may be the task for Grade one students fresh from listening again to "Little Red Riding Hood" and "The Three Little Pigs. " In Grade 4 it maybe to evaluate pop-up books or design a wildlife garden for the school grounds: in Grade S to make signs to ensure visitors to the school are made to feel welcome and don't get lost.

In Grade 6 a theme such as "Feed the World" can lead to an investigation of the problem of raising water for irrigation using wind power and the designing and making of models of possible structures.

In Year 7 a Science class could be concerned with finding solutions to the problem: "to control disease-carrying flies in the home without producing harmful side effects on humans, wild animals and pets."

Investigating food with particular emphasis one of the four elements of earth, air, fire and water may be the design task for Year 8 Home Economics students. From their activities will come fresh approaches to food and its preparation and presentation.

Other tasks at a secondary level can be: providing inexpensive seating, work surfaces and play equipment for pre-school children; designing a safety barrier behind which certain science demonstrations can occur, producing a display and storage area for masks which would encourage students to use them when operating dust-producing machines in workrooms; designing, making, packaging, advertising and marketing a product for use in the garden.

All these activities are now linked in English schools through the Technology component of the National Curriculum. From 1990 to 1995 this is being implemented in all government schools. The subjects of Craft, Design and Technology and Information

Technology are part of this compulsory experience. The National Curriculum document on Technology describes this as an "activity concerned with developing students' capability, initiative and discernment bringing about change in real circumstances." (Design and Technology -Taking a Broad View, D. Buchan)

The essential processes in Design and Technology are identifying the problem and the formation of the design brief; investigation of the problem, including analysis and research; the generation of realistic ideas to satisfy the design brief; evaluation of ideas and identification of a proposed solution; modelling, developing and refining the proposed solution; planning and organising this, including draft drawings; realisation of the solution in the form of a model, prototype, artefact or system; testing the solution to see if and how well it works; evaluation to determine if the solution meets the design brief, possible improvements and a consideration of how well the process worked.

All of this of course sounds familiar if you have read the Victorian Technology Studies Framework P-10. What is interesting and helpful about the English model is that it identifies ten levels of attainment targets to be achieved between the ages of 5 to 16 years and provides examples for appropriate tasks. It offers a more detailed blue print than Frameworks document.

At this stage of its implementation, the program allows schools considerable flexibility. Some schools opt for specific subjects of Craft, Design and Technology and Information Technology. other schools have linked existing subjects in Art, Craft, Graphic Communications and Home Economics to provide the essential problem solving and design experiences. Staffing is drawn from various backgrounds. In one school I visited in England, the director of the Technology program was formerly a Science teacher, in another an Art teacher, in another an Industrial Designer and another a Woodwork/Metalwork teacher.

Is there a challenge here for us at MLC? Already within our curriculum, design and technology tasks exist - as is evident in a Year 7 Woodwork class or a lego-logo group activity or a Graphics Communications task or in the Science Talent search efforts. What is lacking official recognition of the place of such problem-solving, design and production of activities. We lack a curriculum framework which provides a consistent description of theories, an identification of tasks and skills appropriate to age groups and a plan for providing these experiences.

Once such a task had been completed we would have a better understanding of the type of facilities needed to deliver the program. While use can be made of facilities nearby such as Swinburne, a more efficient approach is to develop facilities in existing departments(such as Art or Science) where sole parts of the program may be provided. In addition there is a need for a multi-purpose workshop students may work with a range of materials and produce their models and artefacts. Such a centre would include technology in various forms and CAD/CAM facilities.

Just as we are successfully incorporating the use of computers across subjects, so we can approach the task of integrating more specific and technology opportunities across the curriculum. It is, I believe, an immediate challenge as we work to provide the richest possible educational experience for girls.

Using Laptops in Schools: the Administrative Implications

Margaret Fallshaw, Computing Consultant, MLC

(Presented as a paper at the Windows into Education Conference at MLC in July 1991.)

Schools exist to educate. Teachers in schools, or blackboards in schools, or computers in schools exist to help educational activities.

Our society asks much of its schools - both to maintain order and certainty and to improve and innovate. Innovation suggests improvement and progress, yet it can displace attention from the learning involved on to a concern with the technology. It is important that the program is set up to enable teachers and students to focus on the educational activities and not become caught up with too many unnecessary concerns with making the technology work.

(It is useful to distinguish here between learning to use the computer for its educational purpose and being caught up in what might be called wirehead activities. The analogy with driving a car is a good one - you don't have to be motor mechanic, but it helps if you recognise odd noises !)

At MLC we are working towards a vision, a vision where every student will be comfortable with the technology and able to make good use of it. We believe that only when every student has her own computer will the promise offered by the new technology be able to be realised. This goal drove the decision to use laptops. A major goal is to achieve a curriculum which encourages our students to be more independent learners. We focus on the individual learner. We want our students to move easily from school to a workplace in the twenty first century. That involves considerable effort to make sure that our students will be comfortable with change and new technology and also that they have all possible advantages of any better learning available to them because the technology is available.

My task as Computing Consultant at MLC is to make technology serve educational needs. That involves assisting in curriculum choices and then with professional development in arranging ways for teachers to learn to use the technology efficiently.

It is also to advise on the support necessary to assist the educational programs. Without support, the instructional delivery will not work at an optimum level.

Here I will explore some of the administrative implications of using laptops in schools in three parts: Software: the content and range of the curriculum, the methods of delivery, the changes to content and process, professional development and training.

Interpersonal relations: whenever an important innovation, technological or social, is proposed teachers and administrators are asked to interact differently with each other and with the students.

Hardware: the computers and the infrastructure to store them, charge their batteries, fix them and keep them going.

Software

The success rate of computers in commerce and industry has been mixed. In some companies they are only used for wordprocessing, yet in others they support every activity. Why? It is truly said that computers make things happen more quickly. If the company is in a muddle then the introduction of computers will simply magnify the muddle, but if the systems are right then the use of computers will make the company even more competitive.

The experience in schools is similar. If the school knows what it is doing in educational terms then computers can be a great benefit. If, on the other hand, computers are introduced as a response to "use technology" then they will only add to the stress levels of the school.

Real improvement of education cannot be achieved by focussing on independent parts of the system. Curricular materials, teaching strategies and teaching philosophy are so interrelated and interconnected that one cannot be changed without considering changes in the others. A holistic approach is necessary. Computers will only improve education if the teacher is properly committed, prepared and supported. Teachers cannot be replaced by machines, and machines will only improve the educational experiences of the students if they are well used by the teacher as an integral part of the program.

To achieve success in a new program a school ought to consider the following:

- Begin with a problem to be solved, not with a medium to be used.
- Analyse the context in which teaching and learning takes place.
- Ensure agreement on, and ownership of, the goals of the program.
- Design materials and implementation strategies which will reflect the philosophy of the program
- Select simple, available media
- Determine the role of the teacher
- Determine the professional development needs of the teachers
- Set up support systems to assist the teachers and students.

To achieve our curriculum goals we needed to have the tools of Logowriter, wordprocessing, spreadsheet and database available to all students in their classrooms. This meant we needed to undertake an extensive program with laptop computers. With the software decision made, then its impact on the community became the next issue to consider.

Interpersonal relations

It is more than twenty years since computers first appeared in schools. For the last ten years in particular they have been widely available. During that same time they have become widely used in commerce and industry, but in many schools they remain little used. Why is this?

Teachers care about what they teach. They take seriously society's demand that they maintain order and certainty. Teachers want to know that an innovation constitutes an improvement in teaching - yet in the early days computers were often viewed as solutions looking for a problem instead of the other way round. The mystique which surrounds new technology caused enthusiasts to try to apply them in almost any setting without regard to their appropriateness. Teachers were being asked to interact differently with each other and with the students. It often appeared that the students knew more about the computers than their teachers did. Hence many teachers were not convinced and resisted the changes.

The goals of the organisation need to be clarified There must be clear and known processes for general discussion of the need for change and of the expected effects on the people involved. Teachers and parents must be convinced that the software is right.

At MLC the vision started by David Loader is able to be realised because of the massive support of the school community. This was achieved during many meetings with staff and parents. The vision became shared . But more than that, as well as talking to people about the vision, those people were listened to. Their doubts were addressed and their suggestions were considered.

A realistic implementation program was started. In 1989 the Sunrise program had begun with one Year 7 class, using desktop computers. This had helped us to realise the advantages of students having their own computers. In 1990 we introduced laptops into all Grade 5 classes and into one Year 7 class. By 1991 all Grade 5 and 6 students had their own laptop. The computers were compulsory in Year 7, but 225 of the 300 Year 7 students entered the laptop program.

To achieve change the organisational climate must reward the innovators. Rewards for innovating include:. Recognition of particular teachers by publishing achievements in their classroom or creating opportunities in staff meetings to tell others, often just a note saying "thanks" or "well done". Pay increases or help in other ways. Staff are assisted with the purchase price of their own laptops, technical support is available. . Time release is available through the academic fund for people to develop materials or programs and the setting up of support systems.

Entrepreneurial models do not exactly abound in most schools, but rewards do help develop ethos, even when they are actually little more than the time taken to say 'thank you".

Teachers as a group have felt accountable to parents for maintaining a stable and secure system. There are inevitably stresses and strains involved in introducing Laptop computers into

a school in significant numbers. When things go wrong it is easy to look for the nearest, newest thing and blame it. The responses of the leadership group determine the climate. Panic is clearly not on, neither is apparent lack of concern! For example, when the network crashes just before a class when you planned on using it, colleagues who offer constructive suggestions for alternative activities will leave you feeling much more positive.

Leadership and sponsorship are critical. Clear analysis of where the difficulties are occurring and their causes, with an ability to act promptly before the whole climate sours is important. We have recently strongly encouraged all staff members to use the computers to their reports. Because there were several difficulties people tended to blame the computers. A process should be set up to identify the bugs in the report writing system. Training people to use procedures such as regular saving of their work, checking for clear space on their disc before starting potentially large documents and to know the limitations of the program they are using will help avoid problems. Good leaders will assist in identifying the real problem at its source and work to relieve the cause.

Rewards must always be offered to those who try, as well as to those who succeed. There will be failures, but these must be seen as learning experiences. A mechanism for review and recovery from failure is as important as a mechanism for rewarding the obvious successes.

Funds need to be allocated for investment in Research and Development. Investment in Professional Development will need to be considerable. MLC spends way above the 1.5%. of payroll required by the Training Levy legislation. For a manufacturing plant to maintain an innovative edge the investment in research and development and professional development combined can be over 15% of turnover. What is an appropriate figure for schools?

Hardware

In choosing what to buy one strives for acceptable and attainable solutions, not necessarily always the best one. A school which decides on appropriate software to use in a well thought out curriculum will then buy hardware which will run the software and serve the curriculum needs of the school. Choosing the hardware first usually leads to the "what can we do on the computers?" approach which simply magnifies the directionless nature of an already stressed curriculum.

If goals are confused greater importance is attached to the medium than the design of the program and the accompanying materials. There is nothing more sterile than the old argument about IBM vs. Macintoshs vs BBC vs any other machine. The 'new' argument of laptops vs. desktop machines is from the same stable. The plain fact is that most companies and most schools have a variety of computers.

At MLC most of our administration needs are met on a PICK system but we also use Macintoshes and DOS machines in various offices. our laptops are DOS but Macintoshes, Ataris and some old Apple //es are found appropriate for some other curriculum areas. It is

increasingly easy to transfer data as the platforms move closer together so the particular platform becomes even less important.

There is more future in talking manufacturers into providing easier interfacing than there is in training ourselves into conforming to the particular oddities of a particular computer make. Appropriate educational technology ought to be used in response to particular problems. My major determination is that whatever we use supports the curriculum need and is made as simple as possible for teachers and students to use.

Our hardware decision was we wanted every student to have her own computer. Then we looked at the laptops available and compared their specifications. Weight, price, memory, disc size were critical deciders. The costs were not prohibitive for most families as we are a lower fee school. Costed over four to six years, most of our families consider the computer a worthwhile expense. For those who chose, it was possible to rent their computer from the school.

There are many physical facts of life when you have 600 laptops around:.

- The batteries run out of charge We have built power supply units into storage lockers in some classrooms and have developed 'pop-up toaster' battery charging units to function with a battery bank in others.
- You can't carry a laptop round all the time. We had to build lockers for each classroom for safes storing during the day and overnight. These needed the power supplies connected.
- The batteries wear out after a year or so. The school bookroom now carries stocks
- Students need their own copies of the computer programs we use all the time (Logowriter, and Forte or MSWorks) The bookroom carries stocks, and this makes protecting software copyrights much easier. (Where necessary, to cope with different machine formats, etc., technicians make copies of discs.) This also frees teaching staff from a lot of time consuming effort on trivial tasks.
- There are often computers breaking down. We employ technicians who are able to small problems. We have a regular courier service with our distributor and a fast turnaround time for repairs. The technicians are also responsible for computer maintenance of the network and of the desktop machines around the school. We have just appointed a person who will be available at all times during the school day. She will provide help with software problems, extra support to the classroom teacher and a service point for repairs, batteries, etc. Xircom plugs are provided in classrooms and will be available in the library also for access to the network. These provide a link to the work prepared by teachers with the authoring program, and also to encyclopaedia, PC Globe and other reference software. There is still a need for other hardware to supplement the laptop program. This is catered for in computer laboratories and with stand alone machine as appropriate. There is a continuing need for update and training courses for teachers. We are able to fill this need for professional development through our Community Education Department. Short courses in various aspects of computing

and other subjects are offered to the public on a regular basis and MLC staff do not have to pay for any computing course.

Using computers magnifies the effects of what we do. If we have clear goals, and appropriate systems in place then using computers appropriately will magnify the efficiency with which our organisation works. If, on the other hand, our goals are unclear, the systems are not in place, and there is insufficient support for the innovators, then the administrative headaches will be many.

Laptops are a wonderful tool to enable students and teachers to make use of new technology to have their own personal notebook computer. The implications for the administrator are clear though... if your act is in order you'll enjoy the challenge; if not you'll spend a lot of money and undergo huge frustrations.

References:

1. The Promises of Educational Technology by Donald P. Ely and Tjeerd Plomp inComputers in the Human Context edited byTom Forester, published by. Basil Blackwell 1989. ISBN 0-631-16698-X Pbk
2. Understanding change in education: an introduction A. ~ Huberman publ Unesco: IBE 1973 ISBN 92-3-l011 16-2

Learning with Laptops: Who Pays

By Roger Dedman, Director of Finance, MLC

In 1989 Methodist Ladies' College embarked on a bold experiment which was to alter the direction and emphasis of education throughout the school.

The aim of the Principal, Mr David Loader, was that each girl above Grade 4 would be using a personal laptop computer by the middle 1990's, and that the computer would become as familiar to her as the pens and notebooks it would partly replace.

The experiment has been an undoubted success. MLC is recognised - throughout Australia and beyond - as a leader in the use of computer technology in the classroom. Students are quite used to visitors, many from overseas, invading their classes to see the laptop program in action. But the question most often asked of me, quite understandably, is: how is it paid for?

With more than 2000 girls in Grade 5 and above, the cost to the College of providing even the most basic laptop from capital funds would have been prohibitive. It was agreed that parents should pay for the computer, either by purchasing it outright or by hinge it from the school.

For the l990 school year it was decided to make the laptop compulsory at Grade 5 and optional at Year 7. The recommended model was the Toshiba Tl000SE, although the cheaper and less powerful Tl000 was also acceptable. Toshiba discontinued the T1000 at the end of l990, but the Tl000SE continued to be manufactured and remained MLC's recommended model for 1991 and 1992.

The College negotiated a special sales tax-exempt price for computers to be hired by parents from the school. It was further arranged that parents could purchase a computer outright for the negotiated price plus 20 % sales tax. This compared very favourably with prices available from retail outlets. One of the conditions of this arrangement was that Toshiba could use the College's name in promotional material; the publicity generated was probably as beneficial to MLC as to Toshiba.

Parents nominated whether they wished to purchase or hire, but all computers were ordered by the College, and parents collected them from the school on a specified day. When an official of the Australian Taxation office made a surprise visit early in l990, I was pleased that we had carefully maintained quite separately the orders and invoices for the hire laptops and for those being purchased by parents.

At the beginning of l990, approximately half of the 300 Year 7 students opted to purchase or hire a laptop. With the 90 Grade 5 girls, this meant that more than 240 laptops entered the school, in addition to a substantial number purchased by or for staff members. About three-quarters of the parents opted for outright purchase, and one quarter hired from the College. As the sales tax-exempt price of the Tl000SE (by far the more popular model) was $1315, this

meant a capital outlay of approximately $80,000 on the part of MLC. About $30,000 of this was recouped in that year in the form of hiring charges.

The hiring charge was set at $525 a year, charged in three equal parts with the term accounts. The intention was to set a hiring charge high enough to encourage parents to purchase (at $1578), but low enough to offer a genuine alternative for parents unable to afford the full purchase price.

The same alternatives were offered in 1991, when the vast majority of Year 7 girls - in addition to all Year 5 and 6 students - acquired a laptop. In nearly all cases this was the T1000SE; the Tl000 was no longer available, but a few parents preferred a more powerful Toshiba with a hard disk.

In 1992 a laptop computer was made compulsory at Year 7 as well as at Grades 5 and 6. The price of the Tl000SE had now dropped below $1000 (tax exempt), but the hiring charge was reduced only marginally to $510. By this time the total income from hiring charges during the year very nearly covered the capital outlay on computers to be hired.

At the beginning of 1993, some girls had been hiring a computer for three years, and had paid a total of $156O in hiring charges. They were asked for a final payment of $100, and ownership of the computer passed to them.

Insurance

Potential loss or damage had always been a concern, both to the school and to parents. Initially we had been unable to find an insurance company prepared to cover the laptops for an acceptable premium, so we offered an internally administered insurance policy at a premium of $50 per year. This covered loss or damage at school, and while travelling between school and home, on the assumption that parents' household policies would cover the computer at home. Parents were to pay the first $250 of any claim.

In the first year of operation, the College made a profit on its insurance policies, but in the second year suffered a larger loss. Parents' main concerns - that the computer would be left on the train or dropped - were largely unfounded. Not one claim was made for a lost or stolen computer (a condition of the policy was that the laptop must be carried in the student's school bag). The major causes of claims were broken screens (often the result of closing the computer with a disk resting on to keyboard!) and damaged disk drives (usually as a result of forcing damaged disks into the floppy disk drive).

In the third year of the laptop program, an outside insurer offered a policy covering the computer for three years. This was arranged through the supplier, and experience suggests that it would still be difficult to arrange independent cover at an acceptable price.

During 1992, Toshiba discontinued the T1000SE, and moved out of the market at the lower end of the price range. By this time it was felt that any computer chosen should have at least a 386 processor and a hard disk. The difficulty came in finding such a computer room a recognised manufacturer at a price below $2000 - the upper limit we thought parents could be asked to pay.

We were now in a position to offer to take 400 units. All new Year 5 and Year 7 girls need a computer, and many girls in higher year levels had expressed an interest in one to help in the submission of VCE (Year 11 and 12) work. In addition, staff are encouraged and assisted to purchase or lease a laptop.

With this purchasing muscle we were able to negotiate a tax-inclusive price just under $2000 for the Compaq Contura 3/20, with a 386SL microprocessor, a 40MB hard disk and 2MB of RAM. But a better alternative was now suggested. Through a finance company we were able to arrange to lease the computers, and we could then lease them to parents on similar terms. As the computers remain the property of MLC during the term of the lease, the lease payments can be calculated on a tax-exempt price. This results in total payments over three years, including a final residual payment, of $2000.

The lease repayments are timed to coincide with due dates for term fees. The College pays a deposit of $325 on delivery in January, followed by nine payments of $175 in each of February, May and August for three years. On payment of $100 residual charge, the computer becomes the property of the College.

Parents lease the computers from the College on the basis of the same deposit and annual lease payments. The vital differences are that no fixed term for the lease is stipulated, and parents are not told that they can buy the computers at the end of three years. If we were to tell parents they could eventually buy the computers we would be contravening the requirements for maintaining our sales tax-exempt status.

Circumstances may allow us to sell the computers to parents at some future time - if, for instance, that model is superseded- but we can't guarantee it. Parents have the choice of leasing the computer on these terms or buying it outright for $1995. This purchase price does not include insurance, which is available separately (and which we insist is taken out); the lease agreement does include insurance.

One of the unexpected advantages of the lease agreement was that, having negotiated a price for the computer with the manufacturer, the College could then call for tenders from more than one finance company for the most favourable leasing arrangements. It was as a result of these subsequent negotiations that the insurance premium could be built into the all-inclusive lease payments.

Despite the relative attractions of the lease (we have given parents full details of our lease agreement and they could reasonably hope to be able to assume ownership after a similar period) about 25% of parents have opted to purchase the computer outright.

To pretend that the introduction of laptops at MLC has been all smooth sailing would be misleading. To the more obvious problems of negotiating with manufacturers, suppliers, insurance companies and finance companies, arranging the delivery of machines to students, and convincing the first batch of parents that the additional $1500 expenditure was justifiable, could be added a myriad administrative, practical and educational considerations. One of the most difficult problems was the design and installation of special lockers in which each girl's computer could be not only securely stored, but also are charged overnight. No doubt the most time-consuming and demanding were the selection of suitable software, the radical revision of the curriculum to ensure that the computers became an integral part of classroom activities, and the intensive and continuing training of teachers to make full use of the laptop's capabilities.

But whatever the difficulties and frustrations, we have no doubt that the decision to move to laptops was the right one. An increasing number of schools will follow MLC's example. I hope that the lessons we have learned will be of some assistance in smoothing the transition for a number of those schools.

Junior School Computing Curriculum

By Steve Costa, Deputy Head, MLC Junior School

The Junior School curriculum blends the "normal" expected primary curriculum with a number of computer related activities. We are very aware that the future educational needs of our students require more than the basic reading, writing, spelling and mathematical skills. We have endeavoured to blend and enhance each subject area with a number of appropriate computer skills and activities.

The Junior school teachers accepted the responsibilities of helping the girls to develop the appropriate computer skills needed to extend and reinforce their learning along with developing meaningful, purposeful units of work. Teachers in Years 5 and 6 work closely to develop new themes and units of work. The team approach has helped us to support one another. The problem of one teacher can be shared, or the experience and insight of another can be used to help solve a present problem or one that has appeared on the horizon.

We believe our curriculum is strengthened through the use of computers. We have seen how the power of the computer combined with the appropriate (open-ended) software can increase the understanding of the topics or concepts being presented. We have also become aware of the advantages of being computer literate. Word processing, keyboarding, programming and being able to search database packages, or to create database with the materials gathered, are but a few of the skills that can be used across a number of subjects and activities.

We use a thematic approach and the integration of the computer across our curriculum has enhanced this. Each chosen topic has been looked at closely to see where links can be made between subjects. The Social Studies theme is generally used as the focal point integrating our studies and activities. Our Mathematic topics, Language work, Science lessons and computer tasks are often blended together. A Social Studies lesson that is centred around Endangered Species, may have a number of activities that will need data gathering and database work, writing up of research using a word-processor and the presentation of graphs, pictures and diagrams using Logowriter. By using this approach our timetable has become more flexible. The overall task has become the important goal, not the exact order of how it is to be done.

We have seen how the students have become more interested in their work and in the work of their peers. A collaborative atmosphere has been encouraged along with a personal desire to do one' s best. As the number of tasks become more intertwined the students have to organise their tasks and the amount of time allocated to certain aspects of their work. They have to become more responsible for their efforts. The sense of ownership has also been strengthened as the girls are given more freedom to develop their "projects" as they see fit. This is not to say that we leave the girls to their own devices. on the contrary, a good unit of work depends on a carefully structured outline provided by their teachers. Clear guide-lines are essential. Whole class lessons are also planned with the aim of instructing, and imparting knowledge, concepts

and skills that can be used in a number of ways and in more that one subject area. Thus a maths lesson focusing on circumference can be useful when creating pie-graphs for a Social Studies project. The skills learned in a Language lesson using a word-processor can be helpful when preparing a report on a Science experiment. Making Logowriter "setpos" pictures to help illustrate an Endangered Animal helps to reinforce the positive and negative number work or a co-ordinate pairs activity covered in previous maths lessons.

Software used

We have chosen the basic tool software to help support our curriculum.. A word processing, database and spreadsheet package (FORTE)

- Logowriter
- A keyboarding package and
- Selected adventure /simulation packages that support one of the given topics.

As software can be very expensive, we have spent a great deal of time in selecting that can be purchased through site-licence agreements.

What the students have achieved:

- They are more computer literate
- They have gained a number of computer related skills i.e. word processing, key boarding, database skills, logowriter programming, spreadsheet skills, and general computer competence
- They are more prepared to take risks
- They are more task oriented (ownership of each assignment has increased)
- They are more willing to help one another, they take time to "see" and appreciate each other's efforts.
- They have more pride in their work
- Self-image has improved as they "see" that they are gaining "adult valued skills" in using a computer.

Teachers as well as students have accepted the need to take risks. Our expectations of the quality of work our students' can produce have been raised. We are able to give practical lessons that suit all spectrums of abilities. The "open-endedness" approach helps to extend those who need to "fly" as well as allowing those who may not always excel academically to produce work of which they can be proud . Each child has been able to learn many new concepts and skills at their own level of understanding.

Computing and the New Teacher

By Alison Brown, Teacher, MLC Junior School

Beginning Teaching at MLC

Completing my teacher training at the end of 1991, I was one, amongst many, looking at a very gloomy future for teachers. To be appointed at MLC in l992 was an exciting and challenging opportunity.

The first year in a classroom is a very demanding and anxious time for any teacher. Much to my relief, the year unfolded with relative ease. This was largely as consequence of the way in which MLC operates, and the considerable support offered to all teachers, not only new members of staff.

Support provided for all staff members greatly affects the way in which we work. To know that the school is encouraging staff development in terms of courses, inservices etc., is great incentive to actually take part in extra training. The support available to teachers in terms of maintenance assistance, technical assistance, availability of resources and consideration of particular needs in terms of time or assistance encourages a very positive and enthusiastic approach towards our own responsibilities. My needs have always been met, often in excess, with enthusiasm and encouragement from colleagues. Something that struck me immediately, when I began at MLC, was the dedication and professionalism amongst the staff. It is a continual pleasure and honour to be working with and amongst such a group of people.

Walking into a 'laptop' classroom was a very exciting prospect for me. Having always enjoyed working with computers, I was extremely anxious to explore ways in which they could be incorporated into the curriculum. This, however, was not something we were taught at college, and I suffered many days of despair at the beginning of the year, until I learnt to adjust my classroom vocabulary. Why did it take me a week to learn to close each lesson with the instructions . . . "Save what you have done, and put your computers away"'? Never have I regretted the short life of a battery more than when fifteen machines began 'beeping' in the middle of a vital maths class. I never dreamed that my homework sheet would read:

1. Learn spelling
2. Maths sheet
3. Charge battery.

Many classroom procedures differ here from other schools. I still double check the padlock each night before leaving the room, carefully locking away computers to the value of almost $50,000.

Curriculum

Teaching at a Junior School level allows great flexibility in terms of integrating various curriculum areas. Not only are there fewer constraints in terms of timetabling etc., but many subject areas can be incorporated into a single task. Various topics lend themselves to a particular computer application, and other topics can be effectively reinforced through the development of a computer program using newly learnt concepts or skills.

It is a continual challenge to incorporate the use of laptops across the curriculum in a meaningful, purposeful, genuine and interesting manner. Some of the areas in which technology has added a new dimension to learning are as follows:

Language - Story Writing

To extend the girls' writing style beyond fiction and narrative alone, the idea of writing and illustrating a children's picture storybook was introduced. In this way, the girls learnt to adapt their style of writing, their use of language/vocabulary and the final presentation of their work. The focus, from the very start, was on producing a picture-story book to share with the Year 2 class on a cross-age tutoring basis. As an added dimension, the stories were to be written and illustrated on computers, using Logowriter for both text and graphics and incorporating the functions of clearing screens, storing and retrieving information, moving from one page to another, user interaction, sound and animation.

Using 'setpos', the girls were able to produce very detailed, large and attractive illustrations. Using four turtle shapes, they were able to incorporate the movement of up to four characters on the screen at a time. Music and colour added interest to the story, and text was stored and displayed with appropriate pictures .To enable the Year 2 students to direct their own reading, and to move through the story at their own pace. The stories were programmed to respond to the press of key before moving on to a new page.

As a learning exercise for the Year 6 girls, this task highlighted the need to adapt one ' s writing style for a particular audience. Using computers as a means of storage and presentation also allowed for the reinforcement of many new programming skills as well as ensuring a well presented and interesting story. For the Year 2 class, the time of sharing stories allowed for entertaining practice in reading skills. Not only did the Year 2 class enjoy a new and interesting way of reading picture-story books, but they became particularly inquisitive about and impressed by the way in which the stories were produced and the 'magic' of the computers.

Maths - Money / Spreadsheets etc...

As an extension of a maths topic on money, the girls spent a term working on creating and continually updating a spreadsheet. At the beginning of the term, each girl was issued with a 'cheque book' of home made cheques created on a computer graphics program. The classroom took on a new focus for the term, with girls being paid $20 per day for attending school, yet at the same time, renting their desks for $40 per week. All marks/results such as spelling tests,

assignments and maths results were credited to each girl's account so that a girl scoring 18/20 for a spelling test and 84% for a maths test would be credited with $102 for the week.

While there were many things for which the girls received payment, they also incurred a number of costs during each week. As well as renting their desks, they were also required to pay for assignment sheets and hand-outs, and 'buy' any extra stationery requirements such as paper and pens. Many girls also incurred 'fines' for littering, wearing incorrect uniform etc. In the same way, bonuses were often offered as an added incentive, so that one or two girls were been credited with an extra $50 or $100 bonus at the end of the week.

Once the girls became familiar with the process of debiting and crediting their spreadsheets and calculating weekly expenditure and total balance, they were offered interest at varying rates each week. One column of the spreadsheet was set up at the end of each week to calculate interest on the final balance figure .This interest figure (usually 7 - 12% of the balance) was then added as an extra credit, before calculating the final balance.

As the girls all possessed their own chequebooks, with varying balances, the spreadsheets became a very personal and important thing. Girls anxiously waited to hear the interest rate each week and looked for every opportunity to earn an extra dollar. While they were certainly learning the skills of setting up and operating a spreadsheet, the exercise had far more meaning for them, as the items were real and personal, and the need to be detailed and accurate was of paramount importance.

Holiday program

By Alison Brown, Teacher, MLC Junior School

MLC has been running computer camps over the holidays for a number of years. These were first introduced on the initiative of Gary Stager, a computer consultant from the USA.

Computer camps cater for students from l0 -14 years old. Many students from state schools, who are enrolled to enter MLC in year seven, take this opportunity to become familiar with computers and the software packages which they will be using the following year. Other students who have a particular interest in computers also enrol, as well as many who have had no previous experience.

Some programs are open to both girls and boys, and others to girls only. The programs run for four days, with computer classes in the morning and afternoon, and a variety of other activities midday, such as swimming, tennis, art, drama etc.

The main emphasis of the program is to allow children to be exposed to the program "Logowriter", giving them opportunities toe experiment, create, become immersed in the program, and develop competence and confidence in computer usage.

Initially, Gary Stager ran the program and was assisted by members of the MLC Junior School staff. Since then, demand for the computer camps has increased, and the program runs every holiday period. A Christmas program is proposed, and as Gary will not be here, it is envisaged that the staff members from previous camps will work together, running the program in a similar way.

Although the focus of the camp is not a "teaching" one, as such, there is still a need to provide the children with a certain amount of information about the logowriter program -various commands and primitives. With these tools, then, they are able to experiment and create individual assignments and programs.

A booklet with such information was compiled and distributed to each child. From this, they worked very much on their own, with each child designing his or her own project, on which they worked for a number of days. For this reason, the teachers working with the classes were constantly in demand, as children were challenged by a wide variety of problems or questions, which really needed to be answered or dealt with on an individual level. At times, the whole group stopped and worked through a particular procedure together, but generally, the teachers assisted the children as they needed help. It was interesting to see children helping one another, sharing ideas and creating programs - moving back and forth from one machine to another.

As the focus of the week was to create a project which the children had designed themselves, they took great pride in their work and had a strong determination to complete the task. It was

interesting to note, as the week went on, that the children were arriving earlier and earlier each day - rushing into the room and continuing with the projects, often half an hour before the sessions were due to start.

The week finished with the children completing their projects and storing all of these, together, under one directory. A datashow was then set up and parents were invited in to view the work of the children - firstly through the data show presentation and then on an individual basis, working with their child on the actual computers in the lab. The courses run so far have all been very enjoyable and beneficial. There is quite a buzz" amongst the children - they learn a great deal in a very short time and "have fun" in the process.

Professional Development Requirements for Teachers

By David Loader, Principal, MLC

(A Paper for the Ministerial Teacher Education Reference Group's Seminar, 28.8.92.)

"A school is an institution of consequence."

This paper asserts that in the important matter of the professional development of teachers, the school to which the teachers belong needs to be an integral and significant part of the process and not simply the recipient of the trained and retrained.

This paper will consider how schools can be improved from within by providing significant opportunities for teachers to improve their professional expertise. It will identify some of the ways that a school might tap into the energy, inventiveness and idealism of teachers and students for the benefit of all.

Teachers and students are viewed as learners together, in the same place simultaneously. The school is a community of learners, the principal of that school is not the instructional leader but the "head learner, engaging in the most important enterprise of the schoolhouse-experiencing, displaying, modelling, and celebrating what it is hoped that teachers and pupils will do." (Barth, 1991, p46) Similarly the community of teachers is really a community of learners, process operators and not product generators.

For such process reasons, no attempt is made to "list" the characteristics of an effective teacher nor of an effective school. Such lists do not recognise the individuality of the schools nor the professionalism of teachers. Indeed this paper begins with the statement that concludes Professor Goodlad's book, A place Called School: "... education is as yet something more envisioned than practised."(Goodlad, 1984. p361.)

Assumptions: In order to understand the reasons MLC preceded with its professional development of staff in the way it did, it is necessary to make explicit at the beginning of this address some of the underlying assumptions and beliefs.

Schools need to be improved.

Research has shown that schools are not always good places for young people. School practices need to change. Consequently staff who want to work in schools need to have some sympathy for the Tom Peters statement that people "must learn to love change as much as we have hated change in the past." (Peters T.1988. p45) From an institutional point of view, there is an acceptance that no school has a guaranteed future. "Education is a permanent human activity, but individual educational institutions may come and go." (Kotler, Fox. 1985. p.117)

Schools have both the capacity and the will to improve themselves.

School improvement is not about the importing of improvement from outside but about the building of a learning community within the school.

The student focus needs to be on individuals and away from groups. The industrial society supported the factory model of education with the focus on 'batch processing' of groups of students in classes. This persists today in the way that students are grouped and in the way that a teacher's load is described as the number of classes that are taught by that teacher. A new student focus for a post industrial age is necessary.

Teaching needs to be subordinated to learning.

The educational focus is moving from teachers teaching and teacher styles towards student learning and student learning styles. The goal is to move from instruction by teachers to construction by learners. The idea of knowledge being constructed by the student shows appropriate respect for the intellect of the learner and reflects the subjective and evolutionary view taken of knowledge. The student, in such a view, is not a passive recipient of data but a constructionist trying to make sense of the world.

Today's classroom includes technology. In an educational setting, the student and teacher can see the computer as a personal assistant. Technological devices offer students and teachers the potential to explore new ways of learning, to develop skills and understandings that will empower them in their everyday lives in an increasingly technological world. In such a setting, text is supplemented by graphics, music and even robotics.

Technology will have some of age when it is as invisible and as necessary as the pencil. "Tomorrow's classroom ... is characterised by the transparency of the computers within it. In the near future these devices will ubiquitous but not dominating the classroom ambience." (Nevile, Loader, 1991 p1)

Historically, the role of technology in education has been peripheral, with new technologies being added to the traditional teacher centred model of instruction. Now there is a transforming technology in the form of computers, making the student centred model more accessible.

Peer "teaching" is becoming more significant the three teaching modes, teacher exposition, self study and peer learning, peer learning plays a major role in computer classrooms. It is noticeable that much of the informal dialogue in the class room is now work focused compared with before when it had a social orientation. Previously there had been two types of people with different roles-that of student and that of teacher. Now these two people have remarkably similar roles.

Schools have the burden of the past in the form of an old curriculum. In Victoria we still have externally set exams and consequently an externally set curriculum for the last two years of

schooling. This limits ones freedom. Thus it has been necessary to stay with curriculum that surely soon must be discarded!

Strategic thinking is important. Unlike many institutions, schools have their primary impact in the distant future. Consequently they must operate from a long-range perspective. Strategic thinking in schools will therefore envisage a planning horizon of decades rather than days. Education properly conceived is proactive. Today is a time for educational leaders to "shape, accept, or even reject the alternative futures that are available" to them. (Bell, Daniel 1979)

A Case Study Approach

Consistent with the assumption that schools are places of significance, for the purposes of this address, a school case study will be undertaken. The school that is known best to the author is obviously MLC and so it will used. The most dramatic change that is occurring at MLC is with technology. How teachers have coped with this change allows a discussion about "the professional development of teachers".

As the case study unfolds, I would be pleased if you would understand that " ... our regrets are equally divided between the mistakes we made and the mistakes that we didn't make."

The MLC Setting.

The staff and students of MLC find it difficult to conceive of tomorrow's classroom without computers. However, these are not school computers but the personal computers of students and staff.

The words, "personal computer", are not meant to convey the idea of a computer with only one owner. It is not the computer that is being discussed. It is the use to which the computer is to be put. Students have the opportunity to use a personal computer for what they see as appropriate to their needs and interests. The owners of these machines are responsible to themselves for its use. A personal computer needs to be compared to the student's notebook or to the student's textbook which has underlined sections and comments in the margins. on a personal computer students create their "knowledge space" with their ideas, data, and software . It is ownership not just of a machine, but of knowledge and of power.

The situation at MLC is that from the beginning of 1990, all Grade 5 students have been required to have a personal laptop computer together with pens, paper and books.

Currently at MLC there are 1000 laptops in the school, owned by staff and students. It is confidently expected that in 1994 this number will be doubled with all students Grade S and above having a personal laptop computer.

The MLC experience is that computers have significantly changed the role of teachers. There is a decrease in the student' s dependence a teacher's subject knowledge, delivery and control

Teachers and students interact more about curriculum and skills, and are more collaborative in the educational task. There is a greater emphasis on co-operative learning with joint projects encouraged. An even more significant change is the increase the learning that now occurs from peers.

As a result of the introduction of the computer, the curriculum is being transformed with the consequence that teachers have to play a larger role in curriculum development. Initially the old curriculum was retained and the computer was used to teach it. Now, with the emphasis upon constructionism' and upon developing a curriculum that irrelevant in a culture that is being transformed by technology, a new curriculum is needed.

Clearly what is happening at MLC is the transformation of a school: its culture, curriculum and its teaching learning paradigm. is for this reason that MLC offers an interesting and relevant "case study" for the examination of the professional staff.

The Professional Development of Staff.

From the information provided in this case study, it is clear that MLC needed a staff with new skills. How was this achieved?

At no time was there an attempt to design a common training program which would be imposed on all staff. This is an important point! From the beginning, it was assumed that:

- staff had individual needs. Staff would be starting from different points, would learnt different rates and would have different destinations. No attempt was made to define the qualities of the good teacher.
- staff needed to be in control of their own learning. It was seen as important that teachers came ready to learn and could choose how as well as when they might learn. This does not mean that the school took a laissez-faire approach to professional development. To the contrary, the school played a very active role. MLC took the view that the school needed to be redesigned to make it into a learning place for teachers as well as students.

The school:

- presented a strong vision of the changing future in terms of the impact of technology on teaching and learning. No teacher could be in doubt about the direction that the school was taking.. encouraged personal growth in an attempt was made to create atmosphere in the school where mistakes were not equated with failure.
- encouraged personal growth in teachers. Plane travellers know the statement "For those of you travelling with small children, in the event of an oxygen failure, first place the oxygen mask over your face and then, and only then, place the mask on your child's face." The fact of the matter is "that the adult must be alive to help the child." (Barth. 1991. p42.)

- provided opportunities, at the school's expense, for professional training. MLC mounted, through the Community Education unit at the school, an impressive array of courses, but also funded courses that were undertaken outside MLC.
- provided time for professional development and collaborative learning. This was time for skill development and for planning with other staff. It was time for teachers to be able to re-examine their practices and to consider fresh approaches to teaching which would take advantage of the expanding medium in which their students were working. As staff shared their new found computer skills, they were inadvertently modelling learning in the classrooms to their students.
- provided consultants to work with staff within the school. These consultants, inmost cases, saw themselves as learners and consequently worked alongside staff, modelling the learning what the school was espousing.
- provided incentives. In the case of staff wishing to be regarded as an Advanced Skills Teacher, the applicant was asked for evidence of new skills acquired, initiatives taken and new curriculum developed.(Loader, 1990.). responded to teacher initiatives. This served two important purposes. Firstly it recognised the professional competence of the teacher. Secondly it provided different programs which encouraged reflection on the relative merits of the alternative programs.
- accepted that mistakes would be made. An attempt was made to create an atmosphere in the school where mistakes were not equated with failure, as this would discourage experimentation. Tom Peters makes the point that there are "...an almost irreducible number of failures associated with launching something new. For heavens sake, hurry up and get them over with!" (Peters, 1988. p260)
- established a safe environment "within which people can struggle with the constant and chaotic world of change." The goal is also to allow "educators to emerge from their safe environments and take flight into new worlds." (Farley, 1992. p10.)
- undertook research. At MLC there is currently a major study being undertaken into the school day, school structures and teaching/learning. It is expected that the research will substantiate the assertion, "I have found more success in promoting the growth of teachers by rearranging the conditions and structures under which teachers work." (Barth. 1991. p59.)
- encouraged open ended questions such as, "What kind of learning can take place in a school where students have personal computers?"
- consulted staff. Now when a decision is to be made, 2S people expect to be consulted! This is not all bad because with a number of teachers who have each developed independent computing programs and who are now competing for scarce resources, there is more energy, diversity and personal commitment creating a stimulating environment.

In fairness, not all staff celebrated the advent of computers at MLC. The less enthusiastic staff might well describe the coming of computer as " . . . an illness, not like an ordinary certainty, not like anything obvious. It installed itself cunningly, little by little. . ." (Jean-Paul Sartre3)

The above is rather clinical and as such does not do justice to what is happening. There is lots of excitement and feelings of achievement and professional pride amongst teachers at MLC. In fact, visitors often comment upon what they see - a shared feeling of pride amongst both the staff and students of "this is the only way to go and we are getting there first".

Changes in the Role of Teachers.

There is growing acceptance that the teacher's role is changing. There is less group instruction and a greater focus on the individual student. The use of technology to facilitate more individual learning frees teachers to assume more a "facilitator-consultant- tutor role. Although some formal group teaching will survive ... greater emphasis will be placed on diagnostic, evaluative and counselling functions" of teaching so that all students can have a curriculum designed to meet their individual needs. (Dimmock 1991. p4) This focus on the individual and away from the group was what teachers and administrators aspired to in the 1960's. Then it could not be attained. Today it is achievable with the advent of computers.

Teachers as initiators into education is an important role. In education, as in initiation, "experienced people turn the eye of others outward to what is essentially independent of persons." Initiation is an avenue of access to a body of belief, "perhaps to mysteries that are not revealed to the young." It conveys the suggestion of "being placed on the inside of a form of thought or awareness..."It is "initiation activities or modes of thought and conclude that are worthwhile ..."(Peters RS. 1966. p54,5)

Another area of change for teachers is with themselves. They become a supportive group of learners, a community of teacher collaborators. A climate needs to be established that will encourage such collaboration. The change to personal computing, constructionism and new curriculum cannot be achieved by teachers working in isolation from their peers.

New Graduates from Melbourne's Universities

In preparation for this address, the four new graduate teachers at MLC were interviewed about their preservice training. The results did not depict the Universities as forward thinking institutions dragging the schools into the 1990 ' s, at least with respect to technology. In fact the opposite was the case!

M . . ., with the B .A. from Melbourne (Dip. Ed Rusden) had not used a computer at all as part of her studies.

L... with a 4 year B.Ed. from Melbourne commented that "in the course work they (computers) were seen to be subsidiary to, and a rather 'gimmicky' approach to, the real work, whereas at MLC they are an integral part of the curriculum."

A. . . with a B.A. from Victoria University and a Dip. Ed. from Melbourne found that "in English Method there was no attempt to introduce computers, let alone any strategies for effectively using them in the classroom.'

A . . . was the only person to have been prepared adequately for her teaching through a Primary course at Toorak.

As well prepared as these new teachers were for "teaching", they were not prepared for MLC. If they had gone to another school, would they have been prepared for it? Can a teacher be prepared in isolation from the school in which they are to work?

School Structural Changes

With the advent of technology and the possibility of distance learning, will schools continue to be the learning place for young people?

The answer can only be a tentative yes, and only then if schools change! In the school of the future there will need to be a greater emphasis on the social setting. That is the one quality that cannot be transmitted effectively by technology. Hence MLC has invested in a remote camp to which all Year 9 students go for eight weeks. In such a setting the focus can be upon community. The environment is not four sterile walls. The school day is not 8.30 am to 3.30 pm, but early morning to late at night for seven days a week.

The school of the future is an interesting topic but only relevant to this paper in that it highlights the need to reconceptualise the role of the teacher and the ongoing role for a teacher's professional development.

In conclusion

I finish with two quotes: the first as food for thought and the second as a personal disclaimer!

In evolving from its present state to some distant, desired goal, an institution must progress in quantum steps via stable intermediate structures. Each stage of evolution requires a critical mass of resources, creates a new organisation more rewarding to its stakeholders than the previous stage and shifts the institutional infrastructure closer to the ultimate objective.(Restructuring for Learning with Technology)

. . .the Budda's "golden words" may get in the way of ultimate perception; hence the Zen expression "Kill the Budda!". The Universe itself is the Scripture of Zen, for which religion is no more and no less than the appreciation of infinite in every moment.(Matthiessin, The Snow Leopard, p42)

Footnotes:

1. A statement attributed to Paul Valery.
2. MLC is an independent (private) college established in 1882 by the Methodist Church. It has an enrolment of 2240 girls from K- 12 in the day school, 110 boarders and another 4000 adults and young people in an after school (evenings and weekends) program that we call Community Education. The day school is structured into four relatively autonomous age related sub schools.
3. Reported in Louisa, a book by Brian Matthews.

References:

- Bell, Daniel. Introduction. Nora S. and Mic A. The Computerisation of Society: A Report to the President of France. Cambridge, Mass. MlT. 1979)
- Barth, Roland S. Improving Schools from Within. Jossey-Bass Publishers, San Francisco, 1991.
- Dimmock, Clive. Schools for Quality Learning. In Hot Topics, Australian Council for Educational Administration. No. 5,1991.
- Farley, Linda Making Sense of Change: Strategies for Educational Technologists. The Computing Teacher April, 1992.
- Goodlad, John I. A Place Called School. McGraw Hill. New York. 1984.
- Loader, David. Teacher Evaluation, A Future oriented Intervention. IARTV occasional Paper No.18. November 1990.
- Matthews, Brian. Louisa. Penguin Books. 1988. p23.
- Matthiessin, Peter. The Snow Leopard. p42
- Nevile, L., Loader, D. Educational Computing: Resourcing the Future. IARTV occasional Paper No. 22, September 1991.
- Peters, R.S. Ethics in Education. George Allen and Unwin, London. 1966.
- Peters, Tom. Thriving on Chaos. Macmillan. London. 1988.
- Restructuring for Learning with Technology: A statement from the Centre for Technology in Education, Bank Street College of Education and National Centre on Education and the Economy.
- School-Centred Education, Building a More Responsive State School System. Report of the Management Review: NSW Educational Portfolio. 1990.
- Turkle, Sherry. Second Self: Computers and the Human Spirit Granada, London. 1984.

Computer Pathways: A model for change

By Di Fleming, Head of Middle School

The London Underground: a Mental Map

In 1976, when I was in London for the first tune, I relied on the map of the London Underground. The map was colour coded with a key to symbols, express routes, routes which stopped at all stations and circular routes which always returned to Victoria Station. Fifteen years later, the mental picture of this map provided the concept for the Computer Pathways Model, a model for the management of change.

[Sadly, the graphic that belongs here appears lost to history]

The Nature of the Change

As Head of School I had the task of leading and managing the innovation. The innovation was to prepare the staff, over eighteen months, for the front line movement of girls with laptop computers through the school. Methodist Ladies' College is the only schooling the world which has made a commitment to technology where every girl from the age often owns and uses a personal computer as a tool for learning across the curriculum. By the time the girls reached the Middle School, a school of 600 girls, many of them were most adept in word processing, Logo Writer and in using an integrated package such as Microsoft Works.

For the staff, it was a different story. Many staff were not computer literate and yet in eighteen months time they would be expected to work with the students in a learning environment where personal computers were a major learning tool.

The Implementation Process.

The first task was to identify the essential computer skills in all the major subject areas in Years 9 and 10 which were common. Identification of software specific to subjects was to come later. Staff representatives from all subject areas, who brought with them diverse computer experience, helped to develop a list of essential skills which was to become the focus of the Professional Development Programme

Essential Skills

1. Word processing, menu reading, text entry, editing, layout, formatting, pagination, printing, using the spell check, thesaurus, clipboard, cutting, copying, pasting.
2. reporting, wordprocessing, layout, data base and merging.
3. Information Retrieval: reading instructions, menu selection, bibliography and printing.
4. Visual Display: headings, font, size, pattern, style, computer aided drawing, merging and matching.

5. Graphs, Charts and Diagrams: column, pie chart, frequency, tables, charts and maps.
6. Maps: geographers, historians and mathematicians.
7. Why is it so? What is on the inside of the computer?
8. File Management
9. Data Bank: Phone books, using and making, Hypercard.
10. Facts and Figures: spread sheets, Hypercard, or Halo.
11. Programming: Logo Writer, Hypercard, Toolbook and Pascal.
12. Presentation: Powerpoint, Hypercard, Slide shows and Data Show.

Computer Pathways: The Professional Development Model

For many staff the list was daunting; however, by superimposing the list of essential skills onto the Computer Pathway, and establishing one skill for each station the task began to look achievable. Note that Station one, Victoria Station in the real world, was devoted to wordprocessing, the common denominator to all computer based work for the students and staff.

Another characteristic of the model was the choice to express through skill stations or to change skill platforms at an appropriate time for the learner. The third characteristic of the model was that it could be broken down in to easily manageable parts. Each member of staff was requested to select up to three programs based on the Essential Skills. Each program was designed for beginners or advanced learners and they were timetabled according to the availability of the staff: this included mornings, afternoons, weekends and student free days. Some programs were developed as weekend residentials.

The philosophy and consequences of the change

What has happened as a consequence of the decision for all girls at Methodist Ladies' College Laptop Computers as a learning tool and the preparation of the staff to teach in such a different teaching/learning environment?

There has been a major shift in the teaching/learning process. The implementation of laptops has facilitated the change from a teacher centred classroom to a learner centred environment. The traditional focus on instruction has shifted to construction, where the learners are able to focus on building their knowledge and constructing their world. The personal computer has:. aided in the development of independent learners; become a tool for information retrieval;. underpinned the building of data bases t~ test a series of hypotheses;. developed powerful presentation skills which improve student understanding of areas of work and interdisciplinary links; through presentation, helped to build knowledge for the identified audiences;

- increased the flexibility of the learningenvironment;
- changed the nature of the learning environment to include places which are fundamental to the adolescent and their youth culture;
- encouraged student self management;

- been a means of freeing the student from instruction and a one way track for learning;
- become a multi media research tool.

Laptop computers with their associated flexibility and mobility are shaping the learning environments and the places of learning. The Computer Pathways Model is preparing teachers for this in a computer rich culture. The electronic classrooms of tomorrow will change the roles of teachers and the nature of learning. This is already happening in some schools. It is happening at Methodist Ladies College, Melbourne, Australia, today.

MLC Community Education and Technological Developments

By Joan Taylor, Head of Community Education MLC

In 1988, MLC established a Community Education division within the College. MLC Community Education provides programs for the general community - mainly for adults, but also for primary and secondary students. The programs are conducted in the late afternoons, evenings, at weekends and during school holidays. They include some that are designed to provide specific employment skills and others that are recreational in nature. The programs for adults are largely Short Courses in the following areas - computers, fitness, languages, art, craft and music.

What contribution has Community Education made to the technological developments at MLC over the past three years?

In answering that question I'd like to identify three groups within the College:

- families associated with MLC
- students of the College
- staff of the College.

Many families of the College are highly literate in computer terms. But many are not, and some of these have participated in computer courses scheduled by Community Education. Significant numbers of parents have taken courses, ranging from ones that were basic and introductory through to the more advanced. Many have taken these courses for employment-related reasons. Many because they wanted to understand better what their daughters were experiencing.

Of particular relevance to parents has been a series of courses we have conducted on laptops: Getting started with your laptop, Microsoft Works on a laptop, File Management on a Laptop and Logowriter. These courses were supplementary to activities for parents offered by the day school staff in relation to laptops. The Community Education courses were designed for parents who wanted more intensive exposure to these areas than was otherwise available to them.

Generally speaking, the development of student computer skills and understanding is the role of the day school staff. However, Community Education has contributed, in specific ways, to the computer skills of some students within the College. our focus has been on those students who have entered the College at, say, Years 7, 9 and 11 and whose computer skills were limited. In addition, during term time, but after regular school hours, we offer specific courses when requested by teachers or students, as needs arise.

But the most significant role which Community Education has played in relation to the technological developments at MLC over the past three years has been in relation to the staff of the College - the administrative staff, the teaching staff and the ancillary staff.

Any computer course conducted by MLC Community Education is available free to any member of MLC staff. Staff are permitted, in fact encouraged, to take computer courses offered by Community Education.

Generally this means that staff enrol for scheduled courses - in the evening, weekends, during school holidays. For example, the College changed the wordprocessing program used within the administration and all staff were able to participate in a range of scheduled courses on the new software. Another example: for many purposes, Microsoft Works is used by staff and students of the College. Frequent scheduled courses are provided on this program at a range of levels.

In addition to the scheduled courses, special customised courses are frequently developed to meet particular needs. Most recently, we have offered a special series of courses on computer reporting for academic staff. Early last term, we offered a special course on desktop publishing using PageMaker for staff working on school publications.

These provisions have meant that the training has been easily accessible to staff. We can ensure that it is efficiently tailored to the needs of participants. our assessment would be that more than half of the staff of theCollege are effective and regular computer users.

In specific terms, in 1991, 75 members of staff undertook approximately 1,000 hours of computer training through Community Education. Costing this training at the conservative rate of $1O per hour, its value is $10, 000 - and all at no cost to the College.

The upgrading of computer skills within the College - of families, of students and particularly of staff, has been facilitated by the operation of the Community Education division - and we believe it has been a very cost-effective way to achieve this outcome.

An Elaborate Pyjama Party

By Alison Brown, Teacher, MLC Junior School

MLC is committed to staff development and training, particularly in the area of computers. A computer seminar was held earlier this year- a residential conference over three days. Members of staff who felt a need to become more familiar with laptops and the programs we used, would have an opportunity to work closely with Gary Stager, a computer consultant from America, employed by MLC. The feedback and results were very positive.

Towards the end of third term, a second residential conference was proposed. This conference, however, had a slightly different focus. Although it was still planned to cater for beginners, in assisting them to become more competent, it was also hoped that the conference would serve to provide an opportunity for computer users across the college to work together, sharing ideas, assisting one another with problems and collaborating on the application and use of computers across the curriculum.

Participants for this conference were suggested by the Heads of Schools, and the names sent to Gary. Those of us, therefore, who shortly after received an invitation to a "Pyjama Party", were slightly wary and surprised. This, however, was all part of Gary's zany sense of humour and, in fact, proved to be one of the lighter and more entertaining elements of the conference. Whilst still not totally convinced, we read on, only to find the proposed venue -"The Hilton". There were very few doubts from this point on.

Quite a variety of staff attended the conference, representing a wide range of abilities in terms of computer use. Some people had been to previous conferences run by Gary. others had never used a laptop before. The major focus of the conference was to highlight the various areas of need and interest. After this was done, people broke up into small working groups to look at particular areas or problems together.

Many of the non-users stuck together at first and worked on some basic commands and procedures. Some of the more advanced users helped one another with particular problems - sometimes sharing an idea one had already discovered, or at other times, sitting down together, trying to find a solution to a specific need or situation which had occurred or had come to mind. Many people worked on list processing, some groups worked on plotting reflections from concave and convex lenses, others worked on creating a diagram of a circuit board, a few worked together to create a program that would receive and store data under a variety of "hidden" pages, for the collection of survey results and two worked together to keep a running, cumulative total of a bank balance. These are some of the ideas which were explored, reflecting the various needs and ideas of participants.

A major issue arising from the conference was the vast range of abilities and knowledge represented in the group. In many ways, this was beneficial, as the more advanced users could assist (and also inspire) the beginners.

Overall, the conference was very interesting, very valuable and very tiring. The accommodation was brilliant. Working until 10.00 pm was certainly well compensated by the beautiful surroundings and the luxurious" conference" conditions. Never have I had the opportunity to take a spa between sessions at any other conference, or to finish a long day with a swim in the rain, followed by the "in-house" movie, lying in bed. This was an excellent conference. Probably the major benefit for me was actually meeting and working with other staff members across the school - sharing ideas, discussing curriculum applications and establishing links.

Teacher Change: Philosophy & Technology

By Helen McDonald, secondary English teacher & PhD. student from Monash University

Abstract Computers and their related technology maybe relatively new to the educational scene, but the process of change is not. Persuading people to change is rarely an easy task. Change can seem threatening, it can bring insecurity, anxiety and a great deal of hard work . The process of change is personal and time-consuming, requiring commitment and support. Therefore to embark on what may be a difficult process (and perhaps a stimulating and exciting one) requires a conviction that the journey will be worth it - a belief that the outcomes are worth achieving.

This paper looks at the relevance of a firm philosophical foundation as a basis for technological change. It also notes the importance of action-research in re-assessing the purposes, beliefs and practices for teachers. Much of the research referred to relates to a case study of Methodist Ladies' College, Melbourne, where a program based on independent learning and utilising laptop computers has been operating since 1990.

Change can be achieved on many levels, from a superficial adoption of a few visible facets, to a complete as simulation of the change which challenges and alters old structures and existing beliefs. Real change must go below the surface, beneath the adoption of hardware and software, beyond the acquisition of new skills. For teachers it means looking at learning and re-examining its processes.

I need three more days in the cycle to be able to get through all of this! I feel lie I can never do anything properly: I'm just skimming over the surface. I haven't got time to read what I need to read and I haven't got time to digest it. Look at this pile of work I have to get through!

Please - no more change! We haven't got through the last one yet. I need to have time to think about what I am doing instead of changing it every five minutes! (MLC teacher Feb. '93)To many teachers, frequent change is not an attractive proposition. It is too demanding, too exhausting and often doesn't seem worth the effort. Change takes time and it often requires the relinquishing of control. No wonder that some teachers prefer to "cultivate their gardens", changing things they can control- small pieces of the syllabus; additions to a program - safe innovations that are manageable. (Huberman (1992) p.5). By so doing they avoid the roller-coaster ride of major change which may exhilarate one minute, and plunge innovators to the depths of despair the next.

At Methodist Ladies' College in Melbourne, the roller coaster ride is mandatory for all staff. The climate at this school is demanding but it also encourages risk-taking, supports innovators, invites experimentation, copes with mistakes/problems and celebrates achievement. Envisioned as "a learning place for teachers as well as students" (Loader, 1993, p.6), MLC seems

to have developed an institutional capacity to innovate. As coping with change appears to improve with practice, many of the existing staff are well-versed in the process. The administration both supports and encourages (or some may say pressures)active participation in innovative programs and has established formal networks to facilitate change. That is not to say that all change at MLC is successful, nor does it come without the associated "pain and disorder" which are "healthy signs" of school improvement. (Huberman, 1992, p.6)

The particular change upon which this paper focuses is one of many occurring at MLC and should be seen in that context. The innovation centres upon constructionist thinking and the encouraging of effective independent learning at Junior Secondary level (Years 7 and 8),although both concepts are not exclusive to this section of the school. Linked significantly to this philosophical base is the integration of laptop computers and the use of Logowriter.

The Principal, David Loader, speaks enthusiastically of MLC's move towards amore constructionist approach, which centres upon the individual student's learning:

This approach is based upon Piaget's "constructivism" where knowledge is "built by the learner, not supplied by the teacher." Seymour Papert extended the idea to "constructionism" which includes "the further idea that this happens especially felicitously when the learner is engaged in the construction of something external or at least shareable. . .a sandcastle, a machine, a computer program, a book." (Polin, 1990. p.6)

The idea of knowledge being constructed by the student shows appropriate respect for the intellect of the learner and reflects the subjective and evolutionary view taken of knowledge. The student, in such a view, is not a passive recipient of data but a constructionist trying to understand her world, having meaningful experiences, making personally significant connections, developing mental models, collaborating with others in an enriched teacher supported social setting.(Loader, D. 1993, p.4)

In MLC' s Junior Secondary School, this view became woven into the philosophy of independent learning. The aim was to create a learning environment which highlighted individual differences rather than suppressed them. Students were encouraged to work effectively without constant direct instruction.

They could set their own working pace, have some flexibility in areas of study, and pursue options which motivated them - all within a framework provided by the teacher. "Learning experiences" were emphasised rather than "teaching programs" as students were encouraged to take responsibility for their own learning. Their role became more active: observing, participating, working together, constructing and reflecting. In fact, "independent" learning is perhaps a misnomer as the relationship with teacher and peers is more "inter-dependent" and co-operative.

Computers and other forms of technology, were seen as having strong potential for assisting the implementation of these beliefs and so were introduced concurrently. In 1989a pilot class

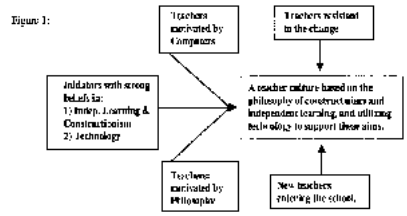
was taught by a team of three, following the ethos of independent learning. Four computers were located in the classroom as a resource and the program Logowriter, was used.

In 1990, four Year 7 classes took the innovation on board, with one class using laptop computers. School policy requested that each student in this class own their own laptop computer at an initial cost of approximately $1,500. The success of the project and subsequent parent demand saw nine out of ten classes made up of students with laptops. In 1993, all Year 7 students use their own laptop computer. Logowriter has been integrated into English and the Humanities (History, Biblical Studies and Geography),Mathematics, Science and some LOTE. In teacher terms, the team of three expanded each year, attracting like-minded staff until the change became policy.

Many people both within and outside the MLC community tended to view the highly visible laptops as "the change." Some labelled it as a "gimmick" or and "enrolment booster"- part of a technological bandwagon that would provide a clear advantage to those who were a part of it. However, those who initiated the program would argue that the laptops were introduced only to facilitate and enhance the possibilities created by independent learning. In many ways, laptops were not the change: the change was in thinking, in learning and in teaching The technology supported the change as a rich resource. As one MLC teacher stated:

You can't put a kid in a classroom with a laptop and Logowriter and expect miracles to happen. The computer itself doesn't do a thing for you. It needs someone to make it happen, someone to give you ideas. It needs a philosophy of how and why we are doing it - it needs an aim. It needs people who know how to go about achieving it. (Interview: 4. '92)

And so the teachers who worked in the Junior Secondary School had to assimilate the views of constructionism and independent learning with their own personal educational outlook. For a few - particularly the initiators who were involved in the pilot program - the philosophy, the technology and their own educational outlooks were compatible from the outset. For others, the task was not so easy.



Some accepted the philosophy, but shied away from the laptops and the technology entailed. Others embraced the computers, seeing the technology in terms of professional development and as a means of enhancing their teaching. A third group wished only to continue "cultivating their gardens", and tended to accept the trappings of the change without significantly altering practice.

However, there does seem to be a point where these paths can merge. (See Figure 1)

Once teachers have come to grips with the more operational aspects of the change(whether it be computers or independent learning), they begin to build the mental models necessary to provide inroads into the other aspect of the change. The teacher who embraces computers, for example, soon comes to realise that students can and do work more independently with the laptop. The flexibility provided in recording, generating and presenting information allows students more scope. The medium also seems to encourage more frequent interaction among peers - such as group problem solving. Whether intentionally or not, the teacher's role in the classroom changes. No longa the expert, the teacher must learn to facilitate. No longer the instructor, the teacher guides. The philosophy of independent learning becomes relevant and the reality of the classroom make the connection between beliefs and practice.

Alternatively, for those who believed in the philosophy, the value of laptops and Logowriter quickly becomes apparent. As students use it in most subjects, they begin to utilise its functions across subject boundaries. Teachers do not need a great deal of technical expertise to allow the laptop to be used as a tool in their classes. They do not need to be a master programmer to mark a piece of work on disk. As they see the technology assisting students with organisation, drafting and problem solving, it quickly becomes apparent that its link with independent learning is a valid one.

The third group, teachers who are resistant to the change, can be quite successful in limiting changes to practice but only for a short time. As students become skilled with the technology, they begin to use it in all subjects. A teacher who does not encourage computer-use soon becomes visible and has to deal with a situation where students expect consistency of approach both in classroom operation and learning style. Students do not react well to a student-centred approach in five classes and the traditional teacher-centred approach in one.

This reticent teacher group, although not experiencing the changes first hand, can not fail to observe the educational outcomes as they become apparent. Subject meetings soon include frequent demonstrations of successful programs generated by colleagues; the staffroom conversations introduce the jargon associated with both constructionism and computers and the administration begins to insist that all reports are generated using a computer. As the culture of the school alters, those who avoided the change feel increasingly "left behind".

To meet the needs of all teachers, a support system must continue to provide opportunities for staff to tap into a learning network which allows participants to obtain new knowledge and skills as the need arises. Gary Stager(Interview: 1991) described it as "casting small nets" - to encourage teachers, at the point where they feel ready, to "have a go and to be part of the emerging culture. New staff entering the school must also be catered for, as they bring with them knowledge and skills which may further build the culture, but they may also need support to acquire the skills necessary to teach in the established program.

Although the school succeeded in providing a solid and appropriate philosophical foundation for the introduction of technology it was often the case that teachers had to work with laptops and within the new structures in order to forge their own links and meanings. As Fullan (1992: p.25) states "It seems that most people do not discover new understandings until they have delved into something. In many cases, changes in behaviour proceed rather than follow changes in beliefs." Some teachers also need to see outcomes emerging before committing themselves personally.

The importance of "beliefs" and "understandings" is central to the success of change process. As Michael Fullan states: "All substantial innovations have underlying beliefs, rationales or philosophies...(.Those involved will) have to come to understand and believe the new assumptions and ideas that underline that reform." Fullan, M.G 1991, p.2 However, the point in the change process where that meaning is obtained is not set or fixed. If a school's philosophy is based on constructivism, then teachers too must be encouraged to build their own mental models and develop their own meanings and beliefs. This includes the active provision of experiences which confront theory and allow for the evaluation and re-evaluation of aims and purposes. As teachers conduct and share their own action-research, meanings can be exchanged and a culture extended which includes and accepts the experiences and beliefs of all participants.

In such a learning environment one needs to see learning philosophy as fluid and as changing. Just as teachers are influenced by the provision of a set of beliefs and concepts, proposed as a foundation for teaching and learning, so does their experience influenced and alter the educational philosophy. Ideas may be extended, emphases changed some concepts maybe rejected and others integrated. And so the cycle of theory and practice continues, constantly evolving. (Figure 2)

Fullan and Miles (1991) describe "change" as "a process of coming to grips with new personal meaning... a learning process." It requires the participants to alter their purposes, develop commitment to new ways and to "unlearn old beliefs and behaviours" (Fullan and Miles, 1991.pp 10-12) As such it requires great effort from individuals who must cope with anxiety, difficulties and uncertainty as they seek, not only to introduce change and innovation but to change the culture of their schools.

To embark on major change - to take on board new ideas and skills, is demanding. Change takes effort and a great deal of commitment. Anxiety, uncertainty, frustration, overload, lack of skill, complexities, incompatibility: all were experienced in the MLC study. The process of change is not easy as the comments below indicate: "It was the most frustrating thing I've ever been through."

"There was a lot of expectation placed on teachers..the approach was made compulsory, but where do you find the time to build new skills? It was assumed we would do it, assumed that you would understand and be able to cope - but some people did not understand and some didn't cope and some didn't really try." (Interview 6/12/91)"It's exciting, but you wonder how long people can maintain this enthusiasm and commitment...you wonder how long teachers can keep up the pace and the pressure. The environment for the kids is fantastic - they have exciting experiences, computer experiences and all that. But the teacher workload is very, very high." (Interview 3.'92)

If the process of change is to be experienced as accomplishment rather than frustration, a strong sense of purpose needs to be accompanied by many practical considerations.

As Linda Darling-Hammond writes:...the process of change is slow and difficult. It requires perseverance, and it requires investments in those things that allow teachers, as change-agents, to grapple with the transformations of ideas and behaviour: time for learning about, looking at, discussing, struggling with, trying out, constructing, and reconstructing new ways of thinking and teaching. L. Darling-Hammond p.240

In practical terms MLC did much to support staff with workshops, rebates for computer purchase, educational courses, classroom support, access to information and a network of people who could provide assistance.

Most activities were voluntary and repeated, allowing staff to join in when the experience would be most meaningful and/or convenient. One of the most worthwhile professional development options was the running of residential workshops, which took staff away from their usual commitments and provided the time "to play" with Logowriter and discuss philosophies of learning in a supportive environment. As well as formal structures, personal networks emerged, through which teachers could obtain information without feeling anxious or incompetent.

Support must be planned for, but it must also be flexible enough to serve a variety of needs at the same time. As needs change and new demands are made, so support structures must adapt, for it is only after attempts are made to implement change, that we come to understand more clearly what we need to know.

Teachers, like all learners, should be given the opportunity to make sense of change. Whether it is a philosophy of learning and teaching, ora technology-based innovation, staff must be allowed to experiment, to make mistakes, to explore and to discover. Structures need to be developed which allow for the free exchange of ideas and experiences in a supportive environment.

The initial motivation to participate in change may come from many directions, but a climate should exist where participants can feel that their involvement in the change has purpose and will provide benefits. To ensure relevance and a valid framework for change, the existence of a

clear philosophy needs to be shared with those involved. Nor should the change or the philosophy be viewed as a static package which is to be "learned" or implemented. Meanings and beliefs need to emerge through experience and practice: they need to be shared and they need to be challenged.

Encouragement can take many forms but, as in a financial transaction, people need to be able to see a definite return for time and effort invested. Learning outcomes need to be monitored and recorded, changes in relationships and roles need to be discussed and adaptation must occur as needs dictate. In this regard, the role of action-research is critical to ensure that theory and classroom reality support each other.

References.

- Darling-Hammond, L. (1990) Instructional Policy Into Practice: The power of the bottom over the top, Educational Evaluation and Policy Analysis: vol. 12 no 3 Fall 1990 A.E.R.A. pp. 233-252.
- Fullan, M. (1991) overcoming Barriers to Educational Change. University of Toronto: Paper commissioned by the office of the Under Secretary of the US Dept. of Education.
- Fluon, M. (1992) Successful School Improvement. open University Press, Philadelphia
- Fullan, M.G. and Miles, M.B. (August 1991) Getting Educational Reform Right: What works and what doesn't. Submitted to Phi Delta Kappan.
- Huberman, M. (1992) Critical introduction to Fullan, M. (1992) Successful School Improvement open University Press, Philadelphia pp. 1-20.
- Loader, D. (1993) Reconstructing an Australian School. Submitted to The Computing Teacher.
- Polin, Linda. (1990) What's hot and what's not. The Computing Teacher. August/ September.

Staff Development

By Pam Dettman, Head of Junior School, MLC

Rationale

Following an examination of the literature in relation to placing professional development within the context of whole-school change, some research has been undertaken to assess the validity of some of these principles for effective practice. The research has been based within the context of specific whole-school change within a given school.

The school used in this research is Methodist Ladies' College, Kew, a school of 2250 girls from Year K -12. Three years ago, MLC made a highly significant decision to dramatically increase the amount of exposure to technology available to its students. The implication of this move was that a large number of teachers were suddenly required to improve their computer expertise within a short time. Particularly affected were a number of teachers within the year levels S, 6,7 and 8, whose students were soon to acquire a laptop computer each, which they would use every day as a normal educational tool. Such a dramatic increase in the amount of computing hardware and software within the school necessitated an unprecedented staff development program. Since that time, different kinds of professional development have taken place, with little follow up evaluation undertaken.

It is the intention in this paper to examine the factors that staff consider important to the success of the various professional development activities undertaken at Methodist Ladies College since 1989, in order to determine the extent to which they match aspects of significance mentioned in the professional development literature.

This paper comprises the second part of an examination of factors realign to professional development in the situation of whole school change.

Research Method.

This research involved the study of a single case of a school's computing development program. Reference to other schools was not logical in that, to this date, no other school in Australia has such an intensive computer program.

Procedures Information was obtained both from a simple survey, designed to highlight through frequency of response those issues of particular interest or significance, and from a series of in-depth interviews designed to explore motivations, feelings, their causes and their inter-connections.

Forty questionnaires were distributed to teachers at MLC in a rather random manner except to say that all teachers concerned had been at the school for at least one year and, with four exceptions, they had not played significant roles in the establishment of the computer program

There was no control over age, sex, department, position, or any other variable. Much pressure was needed to ensure the return of the questionnaires, due to a clash with urgent school duties, but in the end there was a 100% return rate, although many responses were sparse. The survey questions were derived from the substance of the "10 Principles for Good Practice" contained in Teachers' Learning.

Following this, twelve in-depth interviews were held with staff who had not been included in the questionnaire group and who had been more heavily involved in the laptop computer program, usually since its inception. These respondents were those who had borne the brunt of the process of innovation and could now look back (from a position of strength to a range of professional development activities and their varying levels of usefulness. The interviews were open-ended, although information obtained through the questionnaires was utilised as the basis for questions in the interviews, to seek clarification.

Outcomes

Items 1 and 2 sought to establish the extent to which participants felt their computer expertise had improved since the computer program began, and the extent to which this was attributable to MLC professional development activities/programs. Whilst 3O of the 40 respondents felt that their expertise had improved significantly within the time frame, only 2O attributed the improvement to MLC professional development programs. The explanation for this appeared to be partly that staff had gone outside the school to improve their skills, and partly that staff did not think of the assistance rendered in casual ways by more expert colleagues as being "MLC initiated," but rather as constituting help between friends. The questionnaire was not clear enough in this regard. Interviews revealed, however, that assistance rendered on the spot by colleagues was, for several reasons, highly valued.

Item 3 on the questionnaire sought to establish the number and range of activities / courses /programs run by MLC that staff had actually availed themselves of, along with some approximate level of value ascribed by participants to the various types of courses. Respondents listed an extensive range of courses undertaken, the majority of which had been offered by the school's Community Education sector, an after-hours community-oriented service to which MLC staff have ready access. Most courses taken had consisted of one or two 2-hour sessions, and were related to either basic knowledge about computer use or to specific software packages. Other courses undertaken by most respondents were those of two or three days' duration, those of in residential mode by an overseas expert brought to Australia by MLC. The majority of respondents had undertaken such a course at one time or another. of those staff interviewed, all had attended such a course, although at different times and venues.

The value attached to the short-term programs was generally high. The sessions dealing with particular software such as "Microsoft Works" or "Pagemaker", and offered by the Community Education department of the school, were generally well received. of particular note were some sessions run towards the end of the year on the use of computers for report-writing. These sessions, conducted during lunchtimes by a few expert staff for their colleagues, were

greatly valued. The sessions offered by outside experts brought in by MLC received mixed reactions.

Item 4 sought to determine the part played by various factors in motivating the respondent to take part in the professional development activities. The survey results indicated that the greatest single motivating factor was personal challenge, followed by personal need, to enhance teaching. The general school ethos was significant, while job security and promotional prospects were of relatively low significance. A similar response came from those interviewed. People had their attention drawn to computing because the school valued it, but they took the learning tasks upon themselves because they felt a personal need to 'master' the skills and knowledge involved. If this is so, one might ask why most staff involved had not stated any computer training prior to MLC's role. Did staff underestimate the importance of the school's 'drawing their attention to computing' or had their prime motivation changed as they proceeded from beginning to more advanced status? That is, as they became more proficient, did the intrinsic nature of the activity provide more of the motivation? Several interviewees thought that perhaps motivation did change with time and increasing expertise, and that the school ethos had probably been a strong motivate for many at the beginning. It must also be remembered, however, that several of the survey respondents would have been at the school for only one year, and at the time of their appointment, computer expertise had possibly become an informal criterion for selection, so that initial motivation could perhaps have been expected to be higher amongst this group, or at least not so closely linked to MLC initiatives.

As with the survey respondents, few interviewees attached much significance to promotional prospects and job security. Indeed, one respondent who occupies a over high position within the school noted that "my interest in extending my expertise with computers came as a consequence of the position I held rather than as a pathway to promotion".

(Of note, however, is the perception amongst several of those interviewed, that other staff saw computer expertise as an avenue to promotion, either at MLC or at another school, where experience gained at MLC would be most valuable . There was a definite perception on the part of older participants, both male and female, that the younger males saw their future as lying in this direction.

Item 5 sought to determine the level of significance attached to each of several factors in determining the value to the learner of the professional development activities. Fifteen factors were listed and a rating scale of 1 to 5 was used in which 1 = low significance and 5 = high significance. By adding the number of respondents who gave a 4 or 5 point rating a brief guide to the levels of significance shows the following order of factors:

- Factor Ratings of 4 or 5 (40 respondents)
- Access to human resources 38
- Personal control over learning experience 32
- Your feelings about computing / the program 32
- Relevance to current work 31

- Nature of the activity itself 31
- Collaboration with colleagues 30
- Access to physical resources 29
- Location (at MLC or not) 28
- Your prior computer knowledge 26
- School leaders' attitudes/actions 26
- Timing of activity/program 23
- Learning environment 22
- Structure of learning experience 18
- Your prior perceptions of the program 16
- Presence of an external facilitator (non-MLC) 13

Additional points from interviews.

Issues raised in the twelve in-depth interviews covered the range of issues explored in the questionnaire. However, due to the fact that these issues arose through generally undirected discussion of MLC' s professional development, albeit with some prompting questions, the relative natural weightings of issues of interest or concern are perhaps easier to identify.

It should be remembered that the staff interviewed were from the group who had been involved in the computer program for along time and who had generally borne a burden of responsibility for the success of the program

Those interviewed talked a great deal about the importance of being able to work with other people whose computing knowledge was of a similar standard. They acknowledged the view, supported in the survey, that there was a need for "helpers" to be scattered around the school so that those in trouble, with a small problem to solve, could have immediate assistance at the point of need in order to avoid frustration.

These staff, however, were all of a sufficient level of experience that such minor problems no longer caused them concern, but rather became a puzzle to solve. These staff did not want "assistance". What they wanted, instead, was the regular opportunity to sit with a group of colleagues to work out interesting new ways of using the computer in their teaching programs. This necessitated three factors, they said. First, the colleagues had to be of a similar level of expertise, so that the group was not constantly delayed by someone asking basic questions. Second, the colleagues had to be working in a similar field, or at the same student age/ year level, so that there was a mutual understanding of the aims of the exercise, the interests and abilities of the students concerned, the demands of the subject matter and the problems associated with developing the material through the computer. Third, the material dealt with had to be of direct relevance to what was happening or about to happen in the classrooms. Interviewees considered it highly desirable that a regular professional development session be built into the timetable as a normal part of the working week for suitable groups.

Finally, from the interviews there emerged some views about the effort that staff were prepared to make in terms of undertaking professional development activities. They were happy to attend residential programs held from Sunday to Tuesday, for example, because their own forfeit of weekend and evening time was being met by the school's provision of pleasant accommodation and meals as well as two days out of the classroom. In addition, senior staff joined in the exercise whenever possible, thus indicating that the task of learning computing was a shared exercise. A general view was that if the school was prepared to give, then staff were also prepared to give.

Limitations of the Research.

Four limitations of this small piece of research must be taken into account in assessing the validity of conclusions drawn. First is the rather random distribution of the 40 questionnaires amongst staff, to ensure that a sufficiently large number of respondents could be obtained at a difficult time of the school year. Second is the paucity of explanatory comment provided by most of the respondents, for the same reason. Third is the lack of parity in nature between the questionnaire group and the interview group, the latter staff being selected for their extensive experience, and often authority, within the MLC computing program Fourth is item 2 on the questionnaire, which failed to make provision for the acknowledgment of incidental or informal learning opportunities as opposed to formal programs and activities, a distinction which proved to be significant.

Discussion of outcomes in relation to Principles of Good Practice

The purpose of this piece of research was to explore the validity of the "Principles of Good practice" contained in Teachers' Learning, in relation to the whole-school move towards computing at Methodist Ladies' College. The principles were described as falling into four main groups, namely those dealing with characteristics of adult learners. those dealing with the setting and focus of the professional development exercise, those related to the nature of the learning in terms of substance, delivery and evaluation and, finally, those dealing with the school culture, such as leadership, climate, control, support and commitment.

The principles relating to adult learners are supported in the strongest manner by the weightings given by research participants to the various factors that determine the value of a professional development activity. Staff were most concerned to have personal control over their own learning experience but to have access to human resources if and when they wanted such people. They felt that the initial feelings about the program (and most had undertaken P.D. because of personal challenge) were very significant to the value they derived from the exercise, and that the opportunity to discuss and reflect with colleagues aided their learning process. The normal desire of adult learners to match theory and concept to relevant problems was also reflected in the high rating given to relevance.

The principles relating to setting and focus were not readily assessed, possibly because the focus, by definition, was on MLC as the change agent. Perhaps a school that operates within a

system might need to draw greater attention to the school's individual identity when planning a school-based innovation, but in the case of MLC, staff already related strongly to the school itself as the change agent. Even so, the significance attached to "school ethos', in motivating staff to learn computing, fell well below the significance attached to personal reasons.

In short, it would appear that many staff engage in the learning of computing primarily for themselves rather than for the school. It seems significant that no respondents or interviewees drew attention to the school's generosity in helping staff to obtain their own computer and software, and none acknowledged that the school had done something for them in terms of developing their computer expertise at no financial cost to themselves.

The physical location of most computing development activities at MLC seems to have been well received. It would appear that whilst residential programs must, of necessity, be placed off-site, the location at MLC of short term programs is appreciated for its proximity, lack of transport problems and availability of familiar personnel and equipment.

The principles relating to the substance, delivery and evaluation of the learning exercise are well supported by the research data. The importance of the relevance of the learning exercise to teaching work or administrative work being undertaken at the time not only received a high rating but also caused more explanatory comment amongst survey respondents than any other single item. Staff who were beyond the "technical survival level of expertise viewed support people as being of value only if they could offer something relevant to the classroom.

Views relating to the delivery of the learning experience need clarification. Whilst participants generally said that they wanted to control their own learning experience and also listed "structure" as a less significant factor in determining value, nevertheless there was heavy criticism of the more recent residential programs on the basis of lack of structure. Further exploration reveals that to staff, "structure" largely meant knowing who was responsible for whom or for what at any given time so that all could get on with their own task. They did not necessarily want content organised, unless they had come to learn about specific computer functions, but they did want the context structured in order to maximise their learning.

The principles relating to school culture are also well supported by the data gathered in this research, although they do not appear generally to be as highly significant as factors related to adult learning and to the nature of the learning exercise. School leaders' attitudes and actions were rated as being of medium significance, although a readiness to commit resources and a willingness to share in the learning were highly desirable. It might seem odd that "access to physical resources" and the school's provision of such were not considered to be of greater significance, but this may well be due to the fact, mentioned above, that the school has helped staff to obtain their own hardware and software, to the extent that by now the majority of teaching staff possess a laptop computer. In terms of other kinds of support, staff felt that school leaders and colleagues created a happy learning environment which only disappeared when staff were required to learn major computer functions at short notice and under pressure(eg. report-writing), even though the immediate relevance to work might be there.

The one outstanding requirement related to school culture was for collaboration with colleagues. Respondents felt that this had been highly significant to the value of their professional development in computing, particularly where they had been working with colleagues of similar computing ability, but had access when desired to someone with a higher level of expertise. Collaboration also seemed to be more strongly related to the teaching side of computing rather than technical matters. Collaboration also seemed to be more necessary to the more advanced staff, especially where several staff had similar work functions and could share ideas.

Conclusions.

The findings from this research are of interest chiefly to MLC. Generalisability to other settings cannot be determined, due to the limitations of the data; however, the results do tend to confirm the significance of the "Principles of Good Practice" as elaborated in the publication Teachers' Learning.

Essentially, the findings bad to the conclusion that, at MLC, certain factors have been highly influential in determining the value, to the learner, of professional development activity geared to serving the whole-school move toward computing. Most significant of all factors are those that relate to the characteristics of adult learners and to the nature of the material being learnt. The adult learner values personal control over the learning process, with access to human resources if required, and likes to focus on a well-defined area of great importance is the relevance of the material learnt to other tasks, along with the immediacy of application, provided that there is no pressure situation. Personal challenge is the greatest factor in motivating staff to improve their computing knowledge.

Aspects of school culture are also significant. School leaders must be supportive but, more than this, there must be a climate of willing collaboration amongst staff. Collaborative groups should normally be of staff with similar computing abilities.

The message for MLC, or perhaps for other schools that commence similar programs, is that it is to their advantage to think of their staff as learners, in terms of computing, and to give close thought to the dimensions of adult learning. The school culture should be one which values and supports its staff as they proceed through the learning process. Clearly, in the case of a major computing innovation in a school success depends on paying as much attention to the staff as to the hardware and software.

College Computing Policy

MLC Mission Statement

MLC will remain at the forefront of education by providing a challenging, enriching experience for girls in a Christian environment and will share its vision with others".

This computing policy provides guidelines and principles for current practice and for future planning and resource management within the College.

Our vision

- To move from an organisation for learning to a learning organisation.
- To develop a College setting in which all students and teachers will have access to and use computers and other powerful technology to maximise their learning.
- To enhance and expand the learning opportunities for students and staff and their ability to access, create and communicate information.

Philosophical Underpinning

- Knowledge is personal and evolutionary in nature.
- A constructionist approach to teaching and learning is fundamental to the MLC philosophy.
- Personal computing is helping to change a teacher centred classroom to a learner centred environment.
- The portability of the laptop and its use as a personal tool has expanded the nature and place of learning.

Aims

- To empower learners to take an active, creative and responsible role in a technologically changing society.
- To enhance the learning environment by providing another medium with which to construct learning and thus achieve greater understanding.
- To enable every learner to become a confident and competent computer user. To use computing technology to help create and maintain an environment within the College:

- Which is learner centred;
- Which caters for individual differences in learning styles and abilities;
- Which will strengthen and refine problem solving and logical reasoning skills;
- Where learners are supported and encouraged to become independent their learning habits;
- Where learners work together and support and assist each other in a collaborative way;

- Where learners are willing to take risks and explore new ideas;
- Where learners reflect on their learning experiences and identify the strategies they use in their learning;
- Where technology is used across the full range of subject areas.

Software

Responsibility for choosing software shall be the same as for other teaching and learning resources. Selection of software will reflect the constructionist philosophy and development needs of each school, while being cognisant of the needs of other schools.

Funding

It is the responsibility of each school to prepare for the Principal a budget statement which reflects their needs for the following year. Staff Assistance Individual College staff will be assisted in their purchase of computing needs through provision in an annual budget. Professional Development opportunities will be provided by the College to assist staff.
Computing Policy Committee

The Computing Policy Committee is a sub committee of the Board of Studies.

The role of the sub committee is:

- Advice on coordination of resources, professional development.
- Thinktank, dreams and policy coordination.
- Spending on equipment and software, review of budget submissions.
- Conduct of Computing Forums (in order to allow all staff to make their views known on computer policy matters.)

Meetings

The committee meets at least twice per term, and as needed. The committee should conduct three Computer Forums per year. These forums should be advertised to all staff and be open to all to attend. The committee shall determine their agenda, and requests from staff should be included in the agenda.

Membership:

- Two members from each school, appointed by the school for a period of one year - (usually the Curriculum Co-ordinator and one other, often the head of School)
- The Computing Consultant
- The Computer Centre Manager
- The Information Technology Co-ordinator
- The Principal

A quorum is more than 50% of members.

Program

The committee should publish its program for the year at the beginning of each year.

1. Learning organisations," organisations people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to live together. Peter M. Senge: The Fifth Discipline, The Art & Practice of the Learning Organisation, Random House Australia, 1992 page 3.

Constructionism at MLC

By Jeff Burn, Di Fleming & Margaret Fallshaw

A key aspect of the changes taking place at MLC is the change of focus from instruction of students by the a teacher, to learning by doing, where the student constructs her own learning, with the help of the teacher.

The traditional focus on instruction has cemented teachers ' tendency to see their world through subject centred eyes. "It is endemic in school thinking to suppose that learning is facilitated by a process of micro dissection of a domain of knowledge into dozens or hundreds, or thousands of fragments of knowledge that will be strung together as curriculum"'

At MLC we hold the view that students are not passive recipients of information, but are active constructionists creating their own view of the world by linking together new information and skills and building them into the concepts and abilities they already have.

Defining constructionism is difficult, but Seymour Paper, the author of the term, provides a definition and explanation. "The word was chosen to evoke, and put together, two connotations: the psychological term constructivism...and the image of the construction set (whose reference to things like Tinker Toys or Lego has a natural extension to software construction as in Logo Programming)."

"When Papert describes himself as a constructionist he is referring to a view that knowledge structures are built by the learner rather than transmitted by the teacher. When we describe ourselves as constructionists we subscribe to this view but add the idea that building knowledge structures ("in the head") goes especially well when the subject is engaged in building material structures ("in the world") as children do with construction sets.

Constructionism is about cognitive and affective processes. In "Mindstorms", Seymour Papert argues "that the understanding of learning must be genetic", that we need to understand the genesis of knowledge. "What a girl can learn and how she learns depends on what models she has available." The "laws of learning" must be about how intellectual structures grow out of one another, and how, in the process, they aquire both logical and emotional form.3 This concern for the affective provides a basis for our understanding of girls, and particularly how they learn.

According to Fosnot4, the following principles define constructivism: "Knowledge consists of past constructions - we come to know the world through our logical framework, which transforms, organises and interprets our perceptions. Learning is an organic process of invention, rather than a mechanical process of accumulation. A constructivist takes the position that the learner must have experiences with hypothesising and producing, manipulating objects, posing questions, reaching answers, imagining, investigating and inventing, in order for new constructions to be developed. Learners must construct knowledge. Teachers serve as

creative mediators in this process. "Ridgeway & Passey examine the relationship between constructivist theory and information technology and what this means for teachers and their education:5 "It is hoped that there will be: student access to learning resources and sources of information which do not depend on to teacher, an increase in the variety of styles of teaching and learning; greater metacognitive awareness in students; more student planning of and implementation of their own work programmes; greater student IT capability, for example accessing information, communication (such as data presentation, persuading and reaching agreement); and skills such as self-monitoring, generalising theorising and verifying concepts."

Walter Dick writes, "Instructional designers are being challenged by constructivists...Perkins presents an interesting contrast between the classroom of the past and present, and the electronic classroom of the future. He indicates that computer based classrooms will support the use of databases, micro worlds, word processors, intelligent tutors, and laboratory simulations. The roles of teachers and students in learning will change dramatically as learning becomes more an interactive process." 6

The MLC curriculum is designed to use computer technology to enable girls to become more independent and interdependent in their learning. The College has adopted a constructionist approach in that students are encouraged to build and expand their learning from their information and experiences available to them.

References:

- Harel, Idit. Children Designers, MlT Media Laboratory, Foreward by Seymour. Papert, P xii
- Harel, Idit. Children Designers, MIT Media Laboratory, Foreward by Seymour. Papert, P xi
- Papert Seymour Mindstorms, The Harvester Press GB 1980ISBN-71080- 472-5 Pp vii-viii
- Fosnot, C T. (1987) Inquiring Teachers, Inquiring Learners: A Constructivist Approach for Teaching. New York: Teachers College Press
- Ridgeway, J. & Passey, D. A Constructivist Approach to Educational Computing" Australian Educational Computing, September 1991 4-9
- Walter Dick. An Instructional Designer's View of Constructivism Educational Technology, May 1991.