ABSTRACT
        There are many sources of professional development for K-6
teachers that help them learn how to use computers, but much less is
available on how to use computers in classrooms to enhance learning. Members
of the Department of Science and Mathematics Education at the University of
Melbourne (Australia) have developed CLICK! (Computers and Learning in
Classrooms: K-6), a professional development CD-ROM resource for teachers
about effective uses of computer in the K-6 classroom. CLICK! comprises 36
professional development modules, 30 associated case studies, and video and
multimedia materials illustrating how computers can be used to enhance
learning. This project involved teachers and academics involved in teacher
education from Australia and the United States and has resulted in a powerful
resource to support K-6 teachers in integrating computers into their
classrooms. (Author/AEF)

Using Technology Effectively in the K-6 Classroom: Professional Development for Teachers

Dr Dianne P. Chambers
Department of Science and Mathematics Education, University of Melbourne, Australia
d.chambers@edfac.unimelb.edu.au

Professor Kaye Stacey
Department of Science and Mathematics Education, University of Melbourne, Australia
k.stacey@edfac.unimelb.edu.au

Abstract: There are many sources of professional development for K-6 teachers that help them learn how to use computers, but much less is available on how to use computers in classrooms to enhance learning. Members of the Department of Science and Mathematics Education at the University of Melbourne, Australia, have developed a resource for that purpose. Included are 36 Professional Development modules and 30 associated Case Studies illustrating how computers can be used to enhance learning. This project involved teachers and academics involved in teacher education from Australia and the USA and has resulted in a powerful resource to support K-6 teachers in integrating computers into their classrooms.

Introduction

CLICK!: Computers and Learning In Classrooms: K-6 is a professional development resource for teachers about effective uses of computers in the K-6 classroom. It was developed by members of the Department of Science and Mathematics Education (DSME) at the University of Melbourne, Australia. The Department of Science and Mathematics Education teaches subjects in computer education and has considerable experience in offering professional development (PD) for teachers. There was a need to develop a professional development resource for K-6 teachers to enhance teaching and learning in classrooms as, although there is plentiful PD for teachers about *using computers*, there is a much more limited offering of PD in *using computers effectively to enhance teaching and learning.*
A key to the development of the resource was consultation with many classroom teachers and principals. At each stage of planning and development an expert group of teachers and principals from K-6 schools advised on the content, form, and look of the resource. In addition, academics (teacher educators) and teachers from Australia and the USA contributed to the resource. In total, almost a hundred academics and teachers contributed. The project was undertaken over 18 months, starting mid-1997 and completed in late 1998.

What is *CLICK!* ?

CLICK! comprises 36 professional development modules, 30 case studies about the effective use of technology in K-6 classrooms, and over an hour of video and multimedia resources. The Professional Development modules on *CLICK!* address issues related to using technology effectively in the K-6 classroom. The Case Studies describe how K-6 teachers are using technology to enhance the teaching and learning processes in their classrooms. Most Case Studies include examples of children's work, both paper-based and electronic. Videoclips show interviews with teachers addressing issues raised in the PD modules and Case Studies, and classroom situations where technology is being used effectively. In addition there are three *Virtual Classrooms* which are a virtual reality environment (using QuickTime VR) that

enables a viewer to 'look around' the classroom, seeing what children are doing, catching a little of their discussion and observing how the computers in the classroom are being used for curriculum purposes.
In brief, *CLICK!* comprises:

- 36 Professional Development modules
- 30 Case Studies
- 3 Virtual Classrooms
- an hour of video clips

Professional Development Modules

- research
- classroom organisation
- professional development
- computer ethics/issues
- catering for differences
- key learning areas
- software choices
- integrated curriculum
- future gazing

Figure 1: Areas of Professional Development modules offered on CLICK!

The Professional Development (PD) Modules cover a range of topics within nine broad areas (Fig. 1), with a number of PD modules within each of these areas (Fig. 2). For each Professional Development module there is text of the module (which is also available in portable document format [PDF] for printing), a PowerPoint presentation of the PD module to support a teacher deliver professional development to their colleagues (also available in PDF), and each Professional Development module is hyperlinked to relevant Case Studies and video clips.
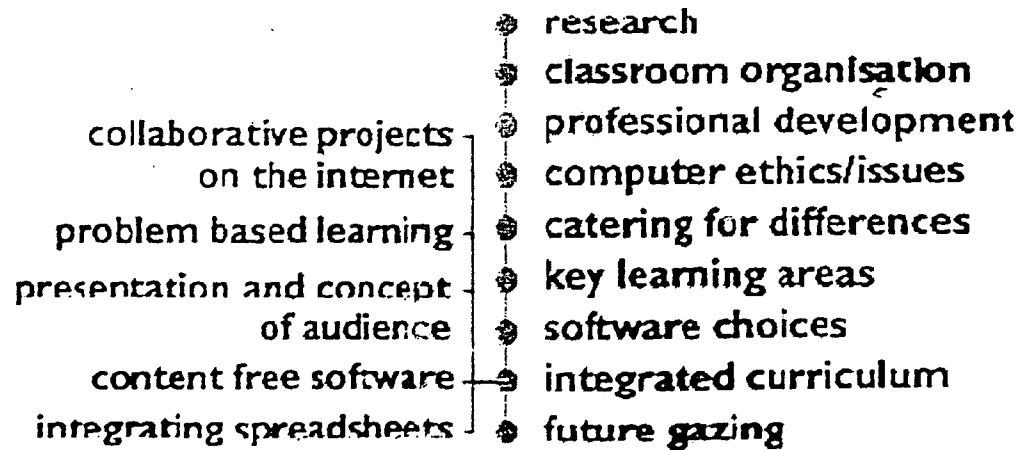
collaborative projects ┐   ● research
    on the internet | ● classroom organisation
            ● professional development
problem based learning ┤   ● computer ethics/issues
            ● catering for differences
presentation and concept ┤   ● key learning areas
     of audience | ● software choices
content free software ──● integrated curriculum
integrating spreadsheets ┘   ● future gazing

Figure 2: Professional Development modules in the 'Integrated Curriculum' area.

Case Studies

There are 30 Case Studies which have been prepared by practising teachers. The Case Studies cover all major curriculum areas and levels (junior, middle and senior) of K-6 schools. The 'units' described in the Case Studies range from a single lesson to a term long unit. Sections of each Case Study include the curriculum focus of the unit, the teacher's planning for the unit (including lesson plans), the teacher's reflection on the unit, hyperlinks to related Professional Development Modules and related video clips and examples of children's work (Fig. 3).
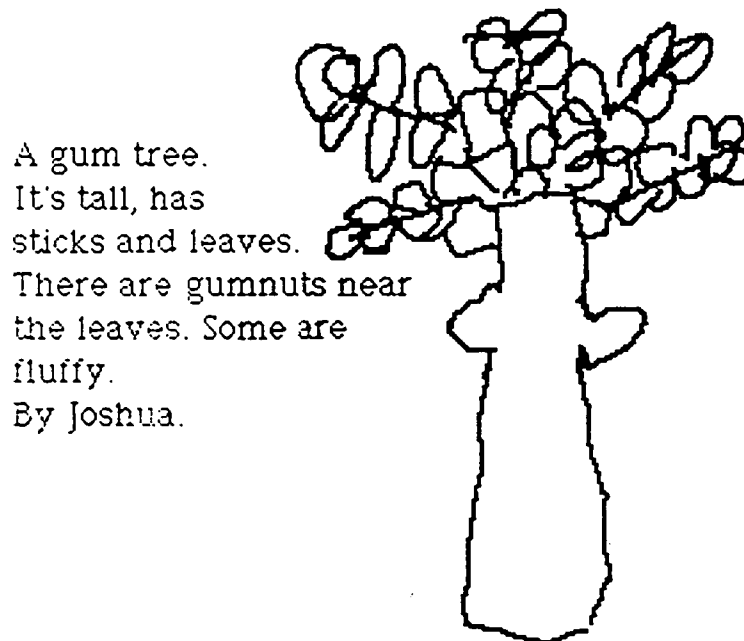
A gum tree.
It's tall, has
sticks and leaves.
There are gumnuts near
the leaves. Some are
fluffy.
By Joshua.

Figure 3: An example of a child's work using an eMate computer on a field trip to the Botanic Gardens (from the 'Life and Living' Case Study).

Video

There is almost an hour of video on the CD-ROM including the *Virtual Classroom* (as described below), video provided by the 'Apple Classrooms of Tomorrow' project and video from the 'Technology In Learning and Teaching' (TILT) series developed by the New South Wales' Department of School Education.

In each of the three *Virtual Classrooms* the user can explore the classroom using QuickTime VR (virtual reality) technology. The user can look around the classroom from a central location and zoom into areas of interest and click on aspects of the image of interest to see a video clip of what is happening. Video taken in these classrooms shows exemplary use of technology and illustrates aspects of classroom management that facilitate effective uses of the technology to enhance learning. The three teachers from these classrooms discuss how different models (two computer classroom, computer laboratory, and a mixed model combining both computers in the classroom and a computer laboratory) work for them and the strengths of each model and classroom management techniques that make them work well.

The *CLICK!* Model

Based on the university's extensive experience with teacher training and professional development and the expertise of the consultancy group of teachers and principals, we were confident to assume that:

- Some teachers know about using technology in the classroom;
- Most teachers want to know about using technology in the classroom;
- Teachers learn well from other teachers in their own school environment.

In this situation, and given the magnitude of the problem of skilling the teaching workforce to use technology for curriculum goals, it seemed most valuable to provide a resource that could be used individually but also facilitated school-based professional development. Site-based, peer-assisted professional development that is supportive of a clearly articulated vision for children has been found likely to raise student achievement (Rényi, 1996). That this 'train the trainer' model is effective has also been found in Australia for professional development involving information technology (Smart, 1996). *CLICK!* therefore aims to support professional development which is presented by a colleague in the school environment and which is focussed on enhancing student learning. It can be used individually, but it specifically aims to support 'technology leaders' who, after expanding their own knowledge of an area using *CLICK!*, will provide professional development for their colleagues.

1□ Using the language of *Teachers and Technology: Making the Connection* (OTA, 1995) these technology leaders are the innovators or early adopters (Fig. 4), while most teachers fall into the early majority and late-majority groupings. It is envisaged that in the first instance *CLICK!* will be used by technology leaders to strengthen their own knowledge and to support them in delivering professional development to their colleagues. The PowerPoint presentations and the associated print materials can be used as they are or easily modified. Further use of *CLICK!* by some teachers in the majority groups is envisaged to follow up what has been learnt by exploring the Case Studies and perhaps undertaking related Professional Development modules by themselves.
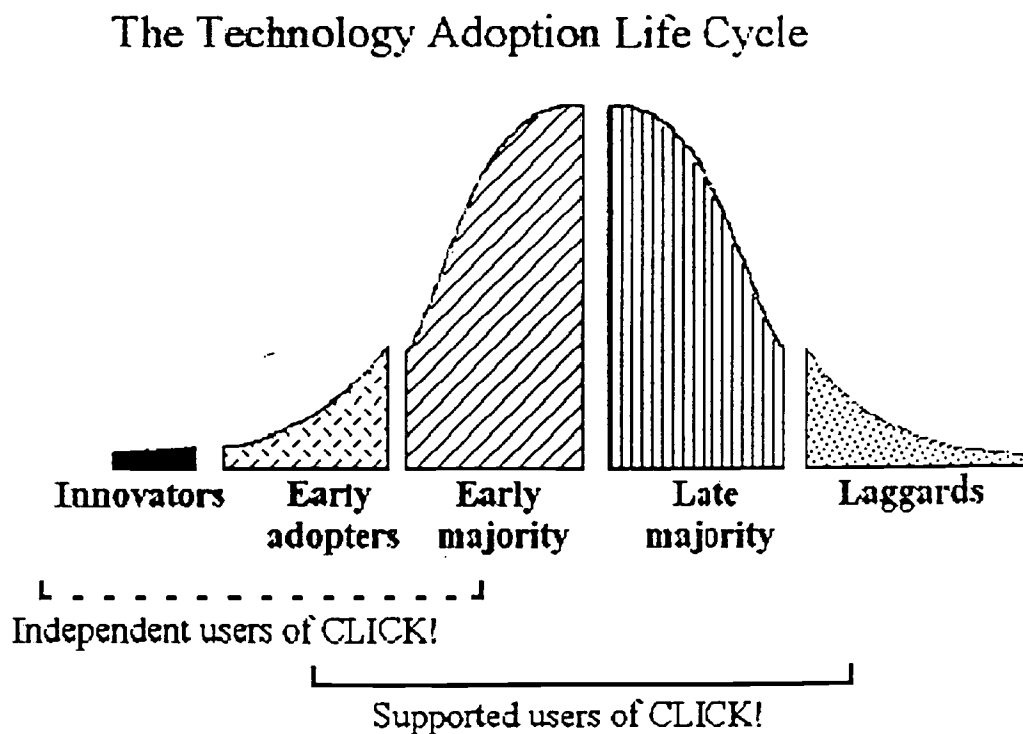
1□

Conclusions

There is ever-increasing pressure for teachers to include technology in their classrooms. Most current teachers completed their formal education before computers were a standard part of the classroom experience and thus many teachers are uncertain about using technology in their teaching. Other teachers, however, have grasped the potential that technology offers for enhancing learning. They use technology extensively both in their lives and their classrooms. For another large group of teachers the mechanics of using computer technology remains a barrier. These three groups of teachers have different needs and will play different roles in transforming education.

There are many resources and professional development sessions offered to teachers about how a particular piece of software or hardware is used. This is a major need as teachers who do not feel comfortable with a tool are unlikely to use it in their classroom or to use it well. However, considerably less is available on using technology effectively in the classroom to enhance children's learning and this is what CLICK! addresses.

Feedback from teachers thus far is that there is a real need for a resource such as this. Teachers particularly like the balance between the Professional Development modules, where background information and research findings are presented, and the Case Studies, where classroom teachers describe and reflect upon

□ **Figure 4:** The Technology Adoption Life Cycle showing where users of CLICK! would fit in this life cycle.

The Technology Adoption Life Cycle

| Innovators | Early adopters | Early majority | Late majority | Laggards |

Independent users of CLICK!

Supported users of CLICK!

Adopted from Teachers and Technology: Making the Connection. OTA (1995)

how they have successfully used technology to enhance learning in their classroom. The inclusion of lesson plans and electronic examples of children's work enrich these Case Studies in a way that is not possible in a textbook. Another feature strongly praised by teachers is the material provided that support teachers in presenting professional development sessions to their colleagues. The inclusion of PowerPoint presentations for each Professional Development module and printable versions of all Professional Development modules and Case Studies make the resource easy for the Professional Development coordinator to use to share knowledge through a school. The major strengths of the resource reflect those features that the teachers in the development group defined as important to them, which reinforces the practice of having members of the target audience as part of the development team for a project such as this.
1□

References

OTA (1995) *Teachers and Technology: Making the Connection.* U.S. Congress, Office for Technology Assessment.

Rényi, Judith (1996) *Teachers Take Charge of Their Learning: Transforming Professional Development for Student Success,* The National Foundation for the Improvement of Education. Available: http://www.nfie.org/takechar.htm [1998, December 7].

Smart, Laurence D. (1996) *The KITTEN experience: Action research into the ACT's school-based information technology train-the-trainer program.* ACEC 96 Australian Computers in Education Conference, Canberra, April 1996. Available: http://www.eliz.tased.edu.au/acec96/disk1/smart.htm [1998, December 7].