

Computer-based learning in schools

The environments in which students learn, and the ways in which people work and live, are constantly being transformed by existing and emerging technologies. To be well informed and active participants in our changing society, students will need to be self-directed learners, able to identify issues, pose questions, synthesise ideas, determine solutions to problems and develop capabilities and confidence with a range of technologies.

If these are the knowledge, skills and understandings that we are aiming to give to our learners, what implications do they have for the provision of computer-based learning in schools?

The first key point is that the use of computers alone will not improve learning. The advent, over the years, of other technologies, including television, the tape recorder and the overhead projector, which were each heralded as the panacea to teaching and learning, have provided us with ample evidence to support this view. We have had enough experience by now to know that technologies can be valuable tools and can transform the way we do things, but simply having access to them is not enough for students to improve their learning.

Computer-based learning needs to be driven by what students can do with the software rather than what the software provides. The critical factor in the successful introduction of computing activities into

the school curriculum relates to teachers and how they ensure that learning with computers is meaningful to students.

Principles

The following interrelated principles serve as a useful guide to explore a possible interpretation of what constitutes “meaningful engagement”. Each of these principles of learning has implications for the design, development, implementation and evaluation of teaching and learning programs incorporating computer-based technologies.

- Learning involves the active construction of knowledge through the process of inquiry, thinking, problem solving, creating and communicating.
- Learning is purposeful. It derives from a desire to make sense of the world and act upon it.
- Learning is based on previous knowledge and requires challenges to the initial conceptions which students bring from their home and other familiar environments. The challenges lead to new insights which require students to reorganise or extend their existing framework of knowledge.
- Learning is interactive. It is more effective when students are engaged in interaction with the teacher, other students and resources, including technology.
- Learning occurs in a context of use, i.e. the situational and interactional circumstances in which knowledge is constructed and used.
- Learning is most effective when conceptual content is interrelated. It involves making connections and forming knowledge structures.



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- Learning is holistic: it involves undertaking tasks as a whole rather than breaking them down into parts.
- Learning is spiral, not linear; concepts are developed at differing levels of depth and require revisiting in new contexts, thereby extending and elaborating students' frameworks of knowledge.
- Learning requires support or scaffolding. Support may be provided in instructions or through resources, including technology.
- Learning depends upon students' attitude and disposition to learning.
- Learning can be enhanced through reflecting and developing conscious awareness of patterns underlying knowledge and strategies used to activate knowledge: planning, undertaking, monitoring and evaluating action.

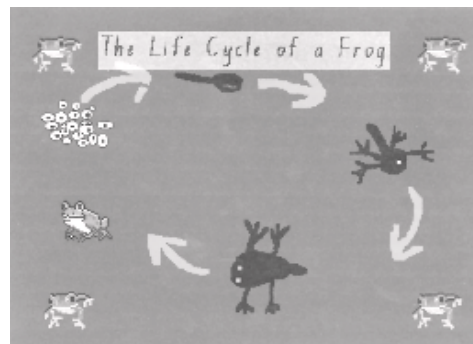
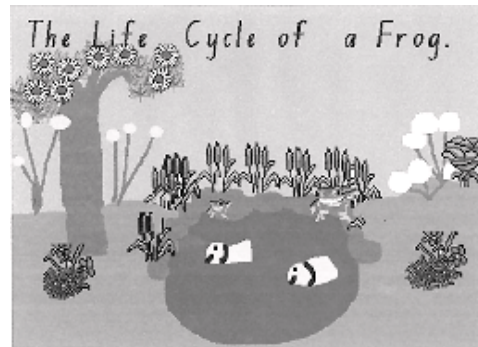
Scarino, A. (1996) *The implications of Technology for language teaching*. Commissioned Report No. 55. National Board of Employment, Education and Training, pp. 37-61. Australian Government Publishing Service, Canberra.

These form a particular set of beliefs of learning. They are in line with current thought on learning; however, they are not universal. Learning materials, including computer software, implicitly reflect and embody learning theory. The way in which they are conceptualised and built is not simply the result of objective descriptions of the instructional sequence, but rather they reflect the authors' beliefs about how learners learn and what the goals of learning are.

Much of the commercially available computer-based software is lock-step and doesn't allow students the scope to undertake interactive tasks beyond doing multiple choice. This kind of software is not flexible enough to assist students to develop the types of skills, knowledge and understandings which were outlined at the beginning of this article, nor are they in line with the principles of learning which Scarino has articulated.

In choosing software appropriate for students, it is important that teachers evaluate it, not only in terms of its content, but particularly in terms of how effective it is in fostering learning. Many teachers find open-ended software packages, such as *HyperStudio* or *Kid Pix*, particularly effective in assisting them to integrate computer-based learning activities into their teaching programs in a meaningful way. These software packages are useful because they are relatively content-free and provide students with tools to create, import and export text, images, sounds and animations in response to a particular learning task.

The following samples of students' work from a Year two class at Mount Riverview Public School, for example, show an innovative approach to the use of *Kid Pix*.



The class teachers, Gail Etheridge and Janene Cordrey, have integrated the use of *Kid Pix* into a unit of work on frogs. One of the activities involves students writing their factual text and drawing diagrams depicting the life cycle of frogs. In this way the students are developing computer-based capabilities, in addition to achieving syllabus outcomes.

Gail and Janene have written one of the snapshots featured in a document currently being developed by the Curriculum Support Directorate, *Computer-based learning in P-2 settings*.



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Choosing software

Questions to reflect on when choosing software to incorporate in your teaching and learning programs include the following:

- ***What are my students' current needs and what is the best way for them to achieve the learning outcomes these needs entail?***

The value of computer-based tasks is enhanced by the complementary activities completed away from the computer.

- ***At what points in the unit will the students use the software and for what purpose?***
- ***Will students use the whole software package or only a part of it?***
- ***Will students know how to use the package? If not, what scaffolding techniques will be used to support their learning?***

One way to support students' learning is to have a whole-class demonstration of the software package. This is particularly effective if you have access to a projection system. The whole-class demonstration can be combined with the joint construction of a procedural text about the use of the software package.

Students can also be trained as mentors to assist other learners. The support of parent helpers can also be drawn on.

- ***How does the students' use of the software relate to the other learning experiences in the unit?***
- ***Will students use the software in groups or alone? If they use it in groups, is there a way to ensure that all students are actively engaged and taking turns?***
- ***Are students using different types of software?***
Some types to consider include simulations, spreadsheets, encyclopedic packages, word processing, paint and draw packages, databases, task-based packages, adventure games, image manipulation packages, and multimedia authoring tools.
- ***Are students gaining an awareness of the range of uses of computer-based technologies?***
- ***Are students critically analysing the computer software which they use in terms of its purpose, its navigation, its design, and its strengths and weaknesses?***

This may be useful in assisting them to discriminate in the choice and use of computer-based technologies for particular purposes, to increase their ability to adapt and apply their current understanding of technologies to new situations, and to shape their work in designing their own digital texts.

- ***How will the computer-based learning activity be assessed?***

Ways in which peers, parents and the teacher can assess the draft and final versions of students' work should be considered. Also explore the possibility of incorporating computer-based activities into a portfolio and reporting on the students' development of computer-based capabilities, as well as their achievement of KLA outcomes.