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Computers, Art And Creativity

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This paper has been written in an attempt to clarify some of the operating links between art, computers and creativity, as they apply to art education. I will firstly comment on the definitions of my title: I will then consider links between these concepts.

Computers need no introduction – they are now so much part of our lives: our systems of communication, administration and entertainment rely heavily on bits and bytes. One of the major applications of the computer is in the production of visual images (or computer graphics). They are used extensively by the business, the publishing, and the scientific communities. Applications which have emerged in the last decade are pop videos and computer games. These are now a firmly established part of youth culture. Along with sophisticated advertising designs these video performances are at the "cutting edge" of computer graphic technology.

To link the computer to the art-making process one needs 4 basic elements:

hardware – the computer itself (to process information and carry out art-making tasks)

These come in many types and capacities, some more suited to computer graphics than others.

software – the graphics programmes which help one to draw, paint, design on the computer.

inputs – (for getting data into the computer)

These can include a graphic tablet, a scanner, a video camera, a keyboard and a "mouse"

outputs – (for seeing what the computer has done)

These can include a printer, a camera, an OHP tablet, a projector, and a monitor screen

Art is a phenomenon of human activity; it is governed by social and institutional expectations, and is the vehicle for transmitting and preserving traditional and contemporary values. As well as the fine arts in the museums and art galleries, the clothes we wear, the buildings we inhabit, the cars we drive, the household ceramics we

use, and the *computer graphics* we see on television, all reflect our tastes, our values and our cultural background. They are, in this broader definition, all part of the world of art. *Designers* use computer graphics to create new forms, images, patterns and performances. They are used in advertising, in product design, in publishing, in education, and in entertainment. Artists use computers to create their original art works, either to generate, develop and resolve ideas for other media (such as printmaking or sculpture) or as computer art in its own right.

Alongside such art forms as painting, printmaking, and sculpture, computer art relies on the basic "art language" elements of line, tone, shape, texture, colour, space, volume, movement and time, to make its impact on our senses. The main difference is that instead of drawing with a medium like paint, the computer enables one to draw with light – with points of light called *pixels*.

Creativity is as hard a word to define as Art. At one time creativity was thought to be exclusively the domain of the arts (art, music, dance, poetry, literature, drama). It is now increasingly recognised that one can be "creative" in any sphere of human activity, or within the educational domain of any school subject. But how does one define it? Writing in the overview to REACT No 1, recently published by the IE, Lee Tiong Peng and Jay Yap Ye Chin state:

Theories on Creativity vary widely in scope and methods and we believe none of them could be considered as providing comprehensive and completely persuasive theoretical explanation of creativity.

In art education, there have been several mythologies relating to creativity and the arts with theorists suggesting that it had more to do with some form of innate, god-given talent which one was either born with or lives forever without. It was also felt at one time that children were so naturally creative that any exposure to adult forms would contaminate their pure creative instincts. A great deal of research has been done on creativity and the arts in recent years, particularly in the United States and Great Britain. A British report entitled "The Arts in Schools", published by the Gulbenkian

Foundation in 1982, contains an overarching definition combining many aspects of current thinking. The Gulbenkian report asserts:

that creativity is not a special faculty with which some children are endowed and others are not, but that it is a form of intelligence and as such can be developed and trained like any other mode of thinking

It also suggests that:

creativity is something which requires discipline, previous experience and a firm grounding in knowledge

As one of its 7 conditions of creative activity, the report comments that:

- creative work must be, in some way, novel, original, different or distinctive from anything previously created in that sphere. It can also be an extension or elaboration of what exists or is known already.*

Computer art or graphics is a facet of contemporary life. It can express culture values and communicate ideas and feelings using the language of the visual arts. Creativity has been described as action, based on knowledge, skill and experience; action which breaks new ground, finds new solutions and extends existing ideas. The computer is therefore an ideal tool to facilitate the creative process in art. Computers can be used to readily create new forms, images, patterns and performances. The computer shows what you draw as you draw it, and recent developments in screen definition makes the images more acceptable aesthetically than the earlier "chunky" computer-generated edges.

Computer art, in this regard, should not be compared with other art forms such as painting, just as printmaking should not be compared with photography. Each art form has its peculiar characteristics, and an appreciation of the aesthetic qualities inherent in each form must be based on these characteristics. A spontaneous brush-stroke of ink can never be replicated on a computer. However, the point of light used as the building block of

art-making on the computer (*the pixel*) has its own artistic precedents. It could be said to relate aesthetically to the *tessera* of mosaic art from early Roman times and from the Middle ages, and also to relate to the *stitch* in tapestry weaving. In all 3 art forms, the combination of multiple points (tessera, stitches or pixels) creates the image and determine the overall visual qualities. Another aesthetic that should be considered as an artistic precedent is that of film – the moving image. The time and movement potential of computer graphics have adopted film-making procedures, and could be considered aesthetically alongside that art form.

Computer graphic programmes are now "user-friendly". There is no necessity to plot complex mathematical formulae into the computer to create simple geometric shapes. Just as fewer motorists now have a working knowledge of the mechanics of their car engine, so it is now becoming unnecessary for computer artists to write essays of instructions to make their art. *They still, however need basic artistic skills.* Computer graphics, as part of an art education programme, can enable students to generate and develop as many alternative solutions as they wish before they resolve their ideas. Students can quickly alter shapes, colours, textures, movements, timings and complete 3 dimensional environments to *match their artistic and critical skills.* The only restraints are their own imagination and artistic skills, and the controls and memory of the computer and its programme.

Computer graphics can also enable teachers to present visual art ideas in a direct, stimulating manner. Teachers can demonstrate basic design principles, colour theory, and advanced animation skills to groups of students. Instead of relying on imported "clip-art" pictures imported from another culture, computer graphics can also enable schools to integrate students' creative visual into publishable documents using desktop-publishing programmes.

So why is it not happening in education now? Computer graphics is, in fact, now accepted internationally as a tool for art education. It features as an option in the 'O' Level (Cambridge-Singapore) Examination Prescription, although no Singaporean school has so far taken advantage of this option. In the English-speaking world, computer graphics has been introduced in many

schools in the United States, Canada and in Great Britain, and is now being introduced into Australian and New Zealand schools. The problems of introduction are two-fold. They are to do with the confidence and acceptance of the teachers and with the politics and finances of the schools. Through effective in-service, teachers can be inducted, and can gain confidence. Acceptance can be encouraged through the development of appreciation in the new aesthetic of computer-generated imagery.

Can schools afford to spend money for graphics-capable computers? Schools have to recognise that it is not enough to use computers only as glorified typewriters or business machines. To *not* introduce the potential of computer graphics to students is to deny them access to a powerful tool for image creation – a tool which will also help to demistify the medium which is such a prominent feature in their culture. Some existing machines in schools, although designed for business application, can run basic graphics programmes. The newer generation of graphics-capable computers cost no more than existing machines and can run sophisticated, powerful programmes. Schools will constantly need to update, to extend their computer capability, to broaden their educational applications. With the educational advantages in terms of the relevance of computer graphics to contemporary student life, and of its ability to facilitate creative work, can schools afford not to?