Art and the Information Revolution

Paul Brown

ABSTRACT

The author expresses his opinion that new imagemaking technology is providing an interdisciplinary language and creating a requirement for generalists rather than specialists. This new technology is also initiating a paradigm shift in those disciplines that make use of it. Lack of acknowledgment of such effects, particularly in the area of higher education, could lead to significant problems that, in the longer term, could affect manufacturing industry and national economic performance. One solution is to involve practitioners of non-applied disciplines (such as fine arts and pure science and mathematics) that have already adapted to a similar paradigm change and whose perception of the new tools and techniques is likely to be less parochial and more flexible.

COMPUTER GRAPHICS—A COMMON LANGUAGE

The 1980s have been the decade of the personal computer. The decade began with the IBM PC and it is likely to end with the introduction of affordable personal supercomputers. The more widespread use of supercomputers is likely to exacerbate significant problems concerned with human data overload and data pollution.

As has already been suggested by many commentators, this problem can be ameliorated by the use of computer graphics. The visual cortex operates at speeds that would tax even the most powerful modern supercomputers; thus graphics communication is powerful and effective. Computer graphics can optimise the human-computer interface and maximise the communication potential of the relatively limited input/output channel bandwidths (relative to central processing bandwidth) of all computing machines. It is only recently that the computing community has recognised the value of involving professional imagemakers in the development of computer graphics. With few exceptions artists and designers have also been slow to realise the power and potential of the computer.

Scientists and technologists often underestimate the contribution of creative imagemakers to business, communication and the environment and consider their work to be 'mere' play. Many are unable to distinguish between the work of children and amateurs and that of professionals who may have spent upwards of 7 years in higher education learning their craft. Conversely, many artists perceive scientists as short-sighted and unethical dabblers who are responsible for a variety of 'undesirable' discoveries that now threaten the stability of the earth's ecosystem. Computers are their tools, and they are cold and intimidating.

Despite these differences, a small international community of interdisciplinary workers has developed. Its origins lie in systems art and the art and technology experiments of the fifties and sixties. In many cases these workers have discovered each other and a common language as a consequence of sharing the same tools—the multi-user central computing facilities of education and research institutes.

At the junior end of the spectrum, low-cost microcomputers have been introduced into primary and secondary education and are producing a new generation of individuals who combine art and scientific skills with no pretention of title. That many amateurs are now active in the development of the medium has prompted Patric Prince to coin the label 'Volksart' to distinguish high-tech primitivism from its low-tech counterpart [1].

Paul Brown (researcher, teacher), Computer Image Program, P.O. Box 218, John Street, Hawthorn, VIC 3122, Australia.

REACTION IN HIGHER EDUCATION

The higher education sector, however—steeped in tradition, tenure and tightening budgets—is responding slowly. Far too often, and in a wide variety of subjects, it is failing to recognise the fundamental importance and consequence of the new interdisciplinary tools and media.

Typical symptoms are the belief that studies in the area have limited application and should be at the postgraduate level (i.e. introduced after the student has achieved the mind-set associated with undergraduate specialism) or that new methods are merely simple extensions of existing technology (for example, computer drafting or paint systems) and can be dealt with in the same way that the old technology was. The basic assumption is that the discipline is secure and that it will not be changed by new technology. As a consequence, higher education continues to promote specialism at a time when industry is gearing to a requirement for generalism.

This sector is not helped by its paymasters—local and national government. Both higher education and government are failing to learn from those successful and long-lived multi-national corporations that have succeeded by the acuity of their long-term vision and planning. IBM's support of the research of Benoit Mandelbrot is one example. Seemingly 'philanthropic' support has produced some very lucrative ideas. Thus it is particularly important that the current higher education model, which produces tightly focused specialists, be modified to encourage greater breadth of learning in graduates who will need to communicate as a matter of course with colleagues from diverse fields.

PARADIGM SHIFT IN THE IMAGEMAKING DISCIPLINES

A key aspect in this evolution from specialist to generalist will be the increased use of visual communication methods. It is likely that the common interdisciplinary language of the future will be graphical and, as often as not, the product of computer graphics. This will be accelerated by the increased

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use of high-band graphics networks. As a consequence, the role of visual imagemakers will change dramatically. Currently often a part of service industries, they are responsive rather than initiative, being concerned for example with styling, packaging, advertising, entertainment, etc. However, in a few innovative centres they have become full-fledged collaborators [2]. Since they exercise a great deal of control over the media and channels of communication, it is conceivable that these artists will evolve into leaders in the entire process that leads from pure research and development via manufacturing to marketing and promotion [3].

This has been the experience of graphic designers in current affairs television. In 1979 the British Broadcasting Corp. (BBC) employed five designers in this area. They worked a 40-hour week, produced about 150 diagrams using traditional media and had very little responsibility. Five years later, after the introduction of two electronic studios based on Quantel Paintboxes, effects devices, character generators etc., the same department employed 50 designers and the studios worked 24 hours per day to produce over 2000 images per week [4]. The designers' responsibilities had also increased significantly. Since they now produced the skeletons for live on-air shows, they were amongst the first to be consulted when producers were planning new programmes. This improvement, which was echoed in salaries and further job opportunities, was a direct consequence of the adoption of computer graphics technology.

All this happened in just 5 years. If we accept that the introduction of new technology in other design disciplines will lead to a similar paradigm change, it is particularly important that art and design education urgently respond. Currently enrolling undergraduates need to be prepared for a workplace that will, by the time they graduate, offer opportunities that are considerably different from current practice.

Models in Fine Art and Pure Science

International experience demonstrates that it is practitioners of the fine arts who have most successfully managed this change in fundamental paradigm and who may therefore also provide a model for colleagues in areas of applied design. Here perhaps there are similarities with pure mathematicians and scientists who have also adapted quickly to fundamental change. An example is the development of the science of chaos [5], which has overthrown many of the 'self-evident' truths of determinism. This new science is based on a relatively trivial, though previously impossible, development—the rapid and repetitive iteration of simple functions made possible by computing machines.

Engineers have proved more reactionary than their scientist colleagues; they have been criticised by Mike McGrath [6] for perceiving new technology as a tool to expand their current discipline, whereas experience elsewhere suggests that it is a process that will, perhaps subtly though fairly rapidly, undermine and change that discipline. McGrath has also suggested that the fine artists' use of computers showed a much better grasp of its unique potential.

There are similarities here between engineering and the applied arts. Graphic designers happily use electronic page-make-up and typographers use tools like Fontographer whilst totally rejecting any concepts of paradigm shift.

Truth to the Medium

The major problem associated with this misapprehension of a new medium was highlighted some years ago by the cybernetician Stafford Beer [7]. Systems developers tend to produce computer-based productivity tools that amplify traditional patterns of work instead of optimising new and unique methods. This amplification can cause major problems and have catastrophic results for the application area and end-user. The packaging and promotion of most computer-aided design/computer-aided manufacturing (CADCAM) and graphic arts systems and software packages encourage these misleading beliefs and practices. A typical example is the sales pitch based on the verisimilitude of a computer simulation: . . . our airbrush looks and handles just like the real thing." The implication is that no change in perception or method (or special training) is necessary to use the system. Nevertheless a computer simulation of an airbrush is quite clearly not an airbrush and this falsehood contrasts with the claims of the design disciplines to retain 'truth to the medium'.

This single aspect of the problem would seem to me to be self evident, of extreme importance and amongst the more interesting enigmas facing art and design theory at the current time [8,9]. However, it seems that little is being done to address these problems. As I have mentioned here and elsewhere [10], the education system, particularly in art and design, is finding it difficult even to recognise the potential of such problems, let alone address them.

One aspect of this problem can be expressed concisely: practitioners who work in a manufacturing discipline must, of necessity, be conservative; the more closely practitioners are allied with manufacturing, the more reactionary they are likely to become, and the more remote they are from manufacturing, the more freedom they will have to experiment.

This suggests that, when a major change causes a fundamental paradigm shift in an applied discipline, the wrong people will be at the helm. They, understandably, will try to maintain 'traditional' values. Unfortunately this approach is only likely to increase the magnitude of the problem. The inadequate integration of new technology has already been claimed as the cause of several major bankruptcies and, with the acceleration in price-performance of systems and their growing applicability, it is likely that 'we ain't seen nuthin' yet'.

A Return to the Classical Vision

Leaders of industry, government and academia should be encouraged to give way to less conservative opinion; in particular they should be encouraged to look to the practitioners of the pure sciences and fine arts, who are likely to be formulating better strategies. Unfortunately, during our current recession, governments worldwide perceive such non-applied activities as easy game for budget cuts. This is a short-sighted and extremely dangerous attitude.

Many believe that the 1987 stock market 'crash' was caused by ill-considered and unmonitored high-bandwidth data exchange: that it was caused by data pollution. To suggest that the solution to this kind of disaster lies with eccentrics like artists and pure scientists will not please those who are shoring up the already weakened defences of order and common sense. Nevertheless it is likely that the artists and pure scientists are closer to an understanding of the problems if not yet capable of proposing solutions.

To threaten these areas with cuts in expenditure at this time is ill considered. Governments and industry should instead be encouraged to work with artists and pure scientists. The days of the artist as a romantic outsider have outlived their usefulness. Now we should return to the classical vision of the artist as participant and polymath, perhaps even as catalyst, as the new age of information evolves.

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