

A Computer in the Art Room

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The concept of using computers in art started in a sympathetic social and political climate in the UK. Although in the initial post-World War II period there were no computers available to artists, there was a great wealth of conceptual thinking, informed by cybernetics, which influenced the next generation. With advances in technology and the formation of the polytechnics in the late 1960s, computers became available. In certain institutions, a limited number of artists took up this as a tool, working method or metaphor for practice. The complexity and rarity of computers at the time meant that any artform based around them was bound to be a specialised branch of art, highly dependent upon support and funding to exist, not least because of the expensive, large-scale nature of much early equipment and the resulting technical expertise required to operate it. Due to these unique issues of access, both artists and persons from a technical or scientific background created work during this pioneering period.

This paper is a brief introduction to the role played by a number of British art schools in fostering computer arts activity during the period 1960-1980. Far from being an isolated historical phenomenon, this activity, which largely took place in provincial art institutions, fed into the development of modern art and design pedagogy whilst continuing a tradition established in the Nineteenth century. Founded in 1837, the Government School of Design was the first state supported art school in England, ancestor of the Royal College of Art and the Victoria and Albert Museum. Together with the subsequently established provincial branches, these schools were created to teach design skills using the latest tools in order to stop the decline of industrial art and to compete with Europe. They taught both art (based on the 'high' art of figure drawing) and design (using the latest technology) in one place.¹ This construction of the modern world - the reform of society through the reform of design, notions of education through display and the belief in the power of technology to positively influence these, represents a particularly British engagement with the disciplines of humanities and science, stemming from the Industrial Revolution.

The influence of 'basic design', a new type of art education influenced by Bauhaus concepts, can be traced through art schools from its inception in the 1950s, with artists informed by cybernetics through the 1960s with artists working in programmatic ways, to artists who actually used computers by the 1970s.

Throughout the 1950s and early 1960s, computers were at an early stage in their development, commonly thought of as 'number crunchers' or referred to as 'electric brains'. Not only was it difficult to access this equipment, at this stage it was difficult to perceive of the computer as being an art method or material, let alone one with

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capacity for interactivity. The new scientific development of cybernetics, reinvented in the Twentieth century by the MIT mathematician Norbert Wiener, was to inform the gestation of computer arts in Britain. Cybernetics, the study of how machine, social, and biological systems behave, offered a means of constructing a framework for art production in which artists could consider new technologies and their impact on life.

The so-called Independent Group - young members gathered around the Institute of Contemporary Arts, became interested in the implications of science, new technology and the mass media for art and society. Meeting officially between 1952 and 1955, these visual artists, theorists and critics were inspired by *Scientific American*, Wiener's writings, Claude Shannon's Information Theory, von Neumann's game theory and D W Thompson's book *On Growth and Form* of 1917.^{II} They informed the next generation's interest, not least through their influence on advanced art educational developments in the 1960s.

Richard Hamilton, Rayner Banham and others of the Independent Group were involved with the exhibition *This is Tomorrow* at the Whitechapel Art Gallery, 1956. From the catalogue we can see these artists belief in the power of modern technologies, even emergent ones such as 'punched tape/cards [...] operated or produced by motor and input instructions', for which the exact artistic employment cannot yet have been fully clear.^{III} This ranks as one of the first published allusions to 'the computer' in relation to artistic practice in Britain.

In 1953, Hamilton went to teach under Lawrence Gowing, Professor of Fine Art at King's College, Durham University (at Newcastle upon Tyne). Together with Victor Pasmore, Hamilton set up and ran the 'Basic Design Course', building on the Bauhaus concept of an integrated method of teaching by bridging the gap between the disciplines of the life room and the rigours of basic design.^{IV} This was a unique concept at this time - no more copying from plaster casts, which had dominated art education since the founding of the Royal Academy.

Roy Ascott, a student of Hamilton's and Pasmore's, was encouraged by the process-driven way of working taught on the Basic Design Course. Influenced by the radar technology encountered during his National Service in the RAF and inspired by Pasmore's constructivism, Ascott incorporated an interactive element into his work that reflected his interest in communications. In 1961 he created a revolutionary course at Ealing Art School informed by the principles of cybernetics, which he named the Ground Course – to emphasise 'learning from the ground up'.^V This was among the first of the new Foundation Courses. These were a result of the radical reform of education in the art and design sector put forward in the First Report (1960) of the National Advisory Council on Art Education, under Sir William Coldstream. This replaced the outdated National Diploma in Design and eventually paved the way for the introduction of degree-level (BA) fine art courses.^{VI}

Artists teaching at Ealing included Harold and Bernard Cohen, Adrian Berg, Noel Forster, Ron Kitaj and others. Ascott's way of teaching art was not based in the

traditional 'master and apprentice' system. Instead, behaviour and process were the model for the course, stressing media dexterity, interdependence, co-operation and adaptability. The tutors set the students' projects using analogue devices such as calibrators for selecting human characteristics and behavioural alterations in a random but systematic manner. Ascott brought in a number of important artists and theorists, including artist Gustav Metzger and the English cybernetician Gordon Pask, to give lectures and demonstrations.

Metzger declared his interest in computer controlled cybernetic systems and how computers could be used in sculptures to be auto-destructive in his manifestos, demonstrations and lectures of the early 1960s. He was involved with the Destruction in Art Symposium in 1966, performing his famous acid piece on the South Bank Centre.^{VII} His position countered those who advocated the utopian possibilities of the coming computer age, with sobering details of its origins in military research.

Among the first cohort on the Ground Course was Stephen Willats. Before reaching Ealing, Willats had already been exposed to avant garde art practices through his work as an assistant first at the Drian Gallery and then at Denis Bowen's New Vision Centre Gallery. He became interested in the audience's interaction with the art object and how the gallery might function in society. An early work in the British Museum, *Conceptual Still Life*, of 1962 bears out Ascott's stated assertion, "The studies of communications, including the making of charts and diagrams [...] are an integral part of the Ground Course."^{VIII}

When Ascott became Head of Fine Art at Ipswich Civic College (from 1964 to 1967), Willats joined him on the teaching staff. There, Willats continued his interest in using informed and up-to-date technological models to produce interactive collective projects with students. These ideas were further developed at the Department of Fine Art at Trent Polytechnic, Nottingham where Willats moved in 1969.^{IX} A collaborative work from this period *Man From The Twenty First Century*, was an 'attempt to extend not only the concerns of art practice but also the social territory in which it functioned'. The idea was to build a meta language between two geographically, economically and socially separated communities, actively involving non-traditional art audiences.^X

Stroud Cornock, a Royal College of Art trained sculptor, also worked with Ascott at Ipswich during the middle-60s, later moving to the City of Leicester Polytechnic, where he founded 'Media Handling' in 1968. One of the main principles of this course was the belief that any medium had validity for artistic activity.^{XI} In 1971, The Invention of Problems II event and exhibition was held at Leicester. Speakers at the symposium, *Creativity in a Machine Environment*, included artists, academics, an architect, scientists and engineers drawn from around the country - the cybernetic sculptor Edward Ihnatowicz, Willats, Ernest Edmonds, George Mallen, Cornock himself and others. The Dean of the Polytechnic acknowledged the increasing importance of the cross-disciplinary aspect possible in such institutions stating,

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“...not only do we wish to see our artists share in the skills of their technical colleagues, and vice-versa, but we also seek some overall purpose in these activities through the joint application of such creative collaboration...”^{XII} It is entirely appropriate that Leicester became the first institution in the UK to award the PhD in Fine Art, in 1978, to Andrew Stonyer, an artist working in solar kinetics - what today would be termed New Media. Stonyer’s supervisors were the Head of Sculpture and the Reader in Chemistry, with the Slade School of Art the collaborating establishment.^{XIII} Arguably such an accomplishment would not have been possible outside a polytechnic, with its collaborative research-based culture.

The Invention of Problems II event primed Cornock’s student Stephen Scrivener, at the time working on kinetic and light pieces, for the idea of using the computer in art. Scrivener went on to be among the first cohort at the newly set up ‘Department of Experiment’ (later known as the Department of Experimental and Electronic Art) at the Slade in 1972.^{XIV}

Concurrent with these educational developments was the 1968 exhibition *Cybernetic Serendipity*, curated by Jasia Reichardt and opened at the ICA by Tony Benn, as Minister of Technology in Harold Wilson’s ‘White Heat’ government.^{XV} This represents the culmination of the great interest in cybernetics and art in Britain during the 1960s. It is still considered to be the benchmark ‘computer art’ exhibition for its influence on many pioneers as well as introducing the subject to a wider audience.

One of the main characteristics of British computer arts of the 1970s, was that it involved artists who either learned to programme and write code themselves or built up a working relationship with scientists, engineers or technicians, at a time when the computer itself was at a formative stage. This was made possible largely by the creation of Polytechnics, which concentrated expensive resources into fewer, but larger multi-disciplinary centres. The first ones were designated in 1967 and many art schools were amalgamated into them.^{XVI} In a few institutions, at least, the result was that artists had the opportunity to access expensive and specialist computer equipment and technical expertise (generally belonging to science or maths departments) for the first time. These provided not only education and training but, in some cases, career incubation, employment, research facilities and networking opportunities. This was a unique feature of British education at this time - as an art student, one could learn to programme. Thus, at the Polytechnic, it was theoretically possible to study art and craft (technology) together again, as in the first public art school opened in the Nineteenth century.

At Coventry School of Art (then in the process of becoming Lanchester Polytechnic), people from the two backgrounds of design and fine art were able to meet in computing.

Clive Richards, coming from a technical illustration background, worked with Ron Johnson, Head of Computer Science, on an Elliott 803. In 1970, writing in Algol, Richards created *Spinning Gazebo*, a three-dimensional wire frame representation of

a gazebo rotating in space and the first computer animation produced in a British art school. Richards later created the CACTI (Computer-Aided Construction of Technical Illustrations) software package.^{xvii}

In 1968, the conceptual art group Art & Language (A&L) started at Coventry with Terry Atkinson, Michael Baldwin and Dave Bainbridge teaching. One of their students, Graham Howard, became interested in cybernetics and excited by 'the idea that art wasn't just painting and sculpture, but could be something else entirely.' A&L became a body of activity, which didn't have any output to computer graphics, but its more conceptual aspects, based on computational methods, certainly tuned into the same notions of technology. A&L's *Index* exhibited in *New Art* at the Hayward Gallery in 1972, represents the first full manifestation of their endeavours to develop a second order or meta level of discussion about their conversation, using 'markers' ('tags' in today's computer terminology), as a way of making data searchable. Conversational analysis and mapping, using a logic-semantic sieve or grid with a range of modalities indicated a potential for the future in computing^{xviii}.

In 1983 the Electronic Graphics Course was set up at Coventry. At a time when mainframes were considered the best way to do things, it was the art and design studio, equipped with a PLUTO II frame store, which was essentially the first to have personal computers in the institution. This introduced the idea that large groups of students could work on affordable computer hardware, producing graphics to at least television standard.

At Coventry, artists and designers inserted themselves into computing, but at Middlesex, it was the converse - a programmer recognised the opportunities and inserted himself into the art community.

John Vince, a programmer before becoming Lecturer in Data Processing, was in charge of the Honeywell 200 computer and a rare 12" Calcomp 565 plotter. In 1973 Middlesex Polytechnic was formed from Enfield College of Technology, Hendon College of Technology and Hornsey College of Art. Vince taught languages - Basic, Fortran, Cobol, as well as computer technology to students studying a wide variety of courses. Realising that artists and designers were interested in this device, but recognising that they didn't necessarily want to write high level programming, he developed one of the first packages for artists - PICASO (Picture Computer Algorithms Subroutine Orientated). Written in Fortran, he was forced to drop the second 'S', due to the language's six-letter rule for names.

During this period, Vince would visit Hornsey's Cat Hill campus, writing PICASO on a blackboard with chalk and indicate to students how they could control the size and position of their images, and the nature of the shading effect. They, in turn, would copy down the program, which included their own modifications, onto coding sheets, which he then took back and ran through the computer. Artists who worked with him at Hornsey include Darrell Viner and Jullian Sullivan (both of whom who later went to

the Slade). In the late 1970s, Vince and his colleagues ran training courses for the television industry, teaching graphic designers who had never seen a computer before how to do animation in a short one-week course.^{XIX}

By 1980, PICASO contained about 500 subroutines and together with its complementary rendering system PRISM, was being used by over 25 academic institutes in the UK. In 1985, with a grant from the Thatcher government, Middlesex became the National Centre for Computer Aided Art and Design under Paul Brown, a graduate of the Slade's programme. By 1986 Middlesex had secured an international reputation for computer animation, setting up the UK's first MSc course in Computer Graphics. In 1988, the Centre was headed by John Lansdown, an architect by profession and major pioneer of computer-aided design and graphics (later became The Lansdown Centre).

That computer arts should have prospered at the Slade during this early period, is perhaps at first glance somewhat surprising. As we have seen, the beginnings of the application of technology to the arts took place mostly in provincial institutions, within the context of design and the applied arts, with a few exceptions, rather than fine art, which we might associate with a metropolitan institution like the Slade. However, a brief look at the founding history, indicates its sympathy toward new art forms. The foundation was made possible by a bequest from Felix Slade in 1871, who envisaged a school where fine art would be studied within a liberal arts university.^{XX} The first Professor of Fine Art was Sir Edward Poynter.^{XXI} Trained in Paris, he introduced the more open and creative methods employed by the French academy system, which had less distinction between fine and applied art, thus paving the way for artists to engage with the modern world. The Slade has a long tradition of educating fine artists including, around the turn of the century, Wyndham Lewis, the most prominent of early British modernists. Hamilton, Eduardo Paolozzi and other members of the Independent Group had attended the School in the 1940s. Perhaps tellingly, Coldstream, educational re-former as well as artist and filmmaker in his own right, was Professor of the Slade during this period (1949-1975).

The pioneering computing curriculum at the Slade was founded in 1972 by Malcolm Hughes as Head of Post-Graduate. As a member of the Systems group from Chelsea School of Art, Hughes employed various kinds of frequently mathematical system to provide ordering and structural principles to his work, predominately realised in painting.^{XXII} This Renaissance concept of the arts postulated that artists could be scientists too. Hughes was also a great enabler and facilitator who realised that he could get more money into the Slade by broadening its base. He wanted to make Fine Art part of a real University and believed the Slade could play a greater role and thereby gain respect within the University. He had a vision to try and do something British, but coming out of the European vision of arts and sciences and the Bauhaus example. Filmmaker Chris Welsby joined the course in 1973, because he, "wanted to be part of the University".^{XXIII} In fact, Welsby did some work with the astronomy department. Also during this period, Viner created animated films using the University College London mainframe, which could output direct to 16mm film.

Thus demonstrating that there was some interaction with other sections of the University of London.

The Slade's Department of Experiment was largely driven by Chris Briscoe, a technician/tutor at that time and a brilliant engineer. He taught Fortran programming and circuit building, in addition to constructing a large (8 x 8 ft) XY plotter and persuading management to purchase a Data General mainframe, which he customised. Eventually, Chris designed his own 35mm slide scanner so that he could integrate computer-generated images with live action.^{XXIV}

Scrivener was influenced by the ideas and work of the Systems group, many of whom visited the Slade as tutors. He saw that formalism offered great control over image making, and with programming, he thought, "here is a system that can implement systems".^{XXV} Assisted by Briscoe, Scrivener built all of the computer hardware and programmed it for his Higher Diploma Show work. The Slade's course ran until 1981.

Efforts in educational institutions impacted technological developments in the wider world. As the Polytechnics had the equipment and the practitioners within had the expertise, they took on commercial work for advertising agencies and clients such as BBC Television. As the decade continued and into the 1980s, the field started to grow commercially. Computer animation techniques in particular were in high demand. Some pioneers migrated from educational institutions to found commercial production houses. Digital Pictures was formed by Brown and Briscoe, initially in partnership with the Slade, as a way of running and maintaining the computer there. System Simulation was founded in 1977 by Mallen (who had worked with Gordon Pask) and Lansdown, both founder members of the Computer Arts Society in 1969. System Simulation worked on computer-generated projects such as graphic elements within Ridley Scott's motion picture *Alien*. Although part of the service industry, such ventures were also important places of research and development while their participants continued to make art and in some cases, teach. Other pioneers were involved with artist-led initiatives and/or held down day jobs in the computing industry. In this way crucial links between the upcoming generation and the latest technological developments were created.

Conclusion

In the early days, the notion of working with computers as an artist was quite groundbreaking. Almost the only access to computers for artists was in academic institutions. Out of this grew modest commercial work from clients such as the BBC. Although the polytechnic hierarchy was generally fairly receptive to computer work, occasionally even introducing concepts like 'study leave' for its practitioners, by the late 1970s, it became clear that the level of investment these institutions could make, just could not match that made by the commercial sector. With changes in institutional management, it is all too easy for projects to find they no longer fit the remit and be closed down.

In Britain, with its historically fairly conservative attitude towards modernist art practices, it is not surprising that by the mid-1970s, computer arts activity had gone largely underground. This is, in the main, to do with the nature of computer arts itself and its problematic relationship to the institutional structure of the artworld. Production of artwork by practitioners without formal art school training made it difficult for the field to be embraced wholeheartedly in an official capacity.

However, it continued, largely unseen, outside the mainstream artworld of dealer/gallery networks. Partly because of this, many of the pioneers in my study continued their careers as academics or set up commercial ventures where they remain today, manipulating technology and continuing to influence upcoming generations. The cross-disciplinary work done in this period has proved of lasting impact on arts education, particularly with regard to notions of freedom of materials as well as a manner of working which takes into account the relationship between artist and audience and material and environment.

The commercial sector developed its own approach and venues for practice and exhibition, for example America's SIGGRAPH - a special interest group of the ACM, annual conference and exhibition and that tended to overshadow artistic developments until the late 1980s when a renewed enthusiasm can be seen with the rise in popularity of New Media art. That there is little direct connection between this pioneering period and the start of, for example Net Art in the 1990s, is in itself interesting. Net Art was more involved with the computer as a platform for communications and issue based ideas, sometimes deconstructing the technology itself. Whereas early computer arts was about specificity of material and technique.

Much of the technology used by pioneers became ubiquitous. It may now be rare for artists to be taught programming, but many of the pioneers' ideas became integrated into the mainstream – the rise of proprietary software such as Photoshop means that one no longer has to write code to achieve many similar effects. However, the interactive, responsive aspects of much early computer art continues to dominate contemporary New Media-based practice.

NOTES

ⁱ Frayling, C., *The Royal College of Art: One Hundred & Fifty Years of Art & Design*, London, Barrie & Jenkins, 1987, p.9.

ⁱⁱ Massey, A., *The Independent Group: Modernism & Mass Culture in Britain 1945-1959*, Manchester and New York, Manchester University Press, 1995, p. 54

ⁱⁱⁱ Alloway, Banham, Lewis, *This is Tomorrow*, London, Whitechapel Art Gallery, 1956, Section 12

^{iv} Hamilton, R., 'About art teaching, basically', *Motif*, No 8, Winter 1961, pp. 17-23

^v Ascott, R., interview with author, 02/09/03

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- ^{VI} Strand, R., *A Good Deal of Freedom: Art and Design in the Public Sector in Higher Education, 1960-1982*, London, Council for National Academic Awards, 1987, pp. 9-10
- ^{VII} Metzger, G., interview with author, 11/07/03
- ^{VIII} Ascott, R., 'Introduction to the Ground Course', *Prospectus*, Ealing Art School, 1961
- ^{IX} Willats, S., interview with author 06/07/04
- ^X Willats, S., *Beyond the Plan: The Transformation of Personal Space in Housing*, Chichester, Wiley-Academy, 2001, Introduction
- ^{XI} Cornock, S., interview with author 09/03/04
- ^{XII} Pountney, A., 'Opening address', *Creativity in a Machine Environment*, Leicester, City of Leicester Polytechnic, 1971, p.2
- ^{XIII} Stonyer, A., communication with author 10/04/03
- ^{XIV} Scrivener, S., interview with author 04/11/03
- ^{XV} Reichardt, J., interview with author 13/02/03
- ^{XVI} Government White Paper 'A Plan for Polytechnics and other Colleges: Higher Education in the Further Education System', 1966, quoted in Strand, R., *A Good Deal of Freedom*, London, Council for National Academic Awards, 1987, p.54.
- ^{XVII} Richards, C., interview with author 22/07/03
- ^{XVIII} Howard, G., interview with author 22/10/03.
- ^{XIX} Vince, J., interview with author 05/06/03
- ^{XX} The Quality Assurance Agency for Higher Education, *Subject Review Report, University College London (The Slade School of Fine Art)*, Dec 1999
http://www.qaa.ac.uk/revreps/subj_level/q101_00.pdf (Nov. 04)
- ^{XXI} *A Brief History of the Slade*. <http://www.ucl.ac.uk/slade/aboutus/history.html> (05.11.04)
- ^{XXII} Scrivener, S., communication with author 10/04
- ^{XXIII} Welsby, C., interview with author 02/10/04
- ^{XXIV} Vince, J., communication with author October 2004
- ^{XXV} Scrivener, S., communication with author 10/04

Biography:

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