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ABSTRACT
        This paper presents some of the results from a course
in art and design. The course involved the use of simple computer
programs for the arts. Attention was geared to the development of
graphic components for educational software. The purpose of the
course was to provide, through lectures and extensive hands on
experience, a basic introduction to microcomputer based computer
aided design. No prior experience with the computer was required. The
course was designed to give students a foundation in computer
knowledge. The course provided students with: (1) the fundamental:
associated with microcomputers and operating systems using IBM PCs,
XTs, and ATs; (2) the concepts associated with computer programming
for graphic design; and (3) familiarity with computer graphics
software, specifically Dr. Halo and HANDY. The first project
described was an exploration of the use of color in design. This was
a sequence of four interactive lessons on color which were designed
to be used with young children. These units introduced the child to
the general world of color, and what could be done with the limited
range of colors in the program. The paper explains that the HANDY
program provided 16 colors that could be combined in foreground as
well as in background sequences. The focus of the lessons as a unit
was to show what happens when colors are changed in both figure and
ground. Another sequence of lessons was a program that created a
series of images that were varied according to design principles and
elements. (DK)

Art & Design Software Development Using IBM Handy
(A Personal Experience)

by

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Abstract

The IBM project which is described in this paper is called "HANDY" and it involved tl e use of a new authoring language for the development of interactive teaching lessons for use with adults as well as children. This project includes series of lessons exploring various aspects of color and motion in relation to general principles of basic design.

This new IBM language will soon be on the educational market. It is to be called "Experimental Playmaker Language" and as the title implies it is designed so that the teacher can write a script, create graphic images, and call'upon video disk, audio tapes, and music to create a drama or event upon the screen.

As my own design work with this new language began to evolve, I saw almost unlimited possibilities for the artist and designer. The computer became my electronic sketchbook. It became the essential artistic vehicle in which I could state the idea, vary that idea, try all possible combinations of color, texture, and movement and finally produce an almost endless series of variations upon the basic theme. The output has assumed many forms. It can be outputed from the computer onto hard disk files. With a color printer it can produce hard copy. A series of slides can be used as the basis for paintings or design; a sequence of images which, when combined with text, can serve the basis for book and story illustrations of children's literature.

Abstract

It is yet another basic tool for the creative artist and designer. The computer, like the camera, can extend the perceptual limits of the artistic imagination. With it, the creative artist can function at yet another level of reality and awareness.

This paper will present some of the results from a course that I have taught for several years in Art and Design. This course involved the use of simple computer program for the arts. Attention was geared to the development of graphic components for educational software. The purpose of this course was to provide, through lectures and extensive hands-on experience, a basic introduction to microcomputer-based computer-aided design. No prior experience with the computer was required. The course was designed to give students a foundation in computer knowledge.

The course provided students with:

1. The fundamentals associated with microcomputers and operating systems, using IBM PCs, XTs, and ATs.

2. The concepts associated with computer programming for graphic design.

3. Familiarity with computer graphics software, Dr. Halo and HANDY.

"The Micro-Computer as Interactive Technology"

INTRODUCTION

Like many artists and designers, I too had, for a long time resisted involvement with the personal computer. I had conceived of the micro-computer as being too impersonal, remote, non-creative, and certainly less then "user-friendly". I did not view it as a possible design tool.

In the Summer of 1985, due to an IBM project called HANDY, my own attitude towards the computer took a dramatic change. I became "hooked" on this new technology. This IBM project involved the use of a new authoring language for the development of interactive teaching lessons for use with adults as well as children. I began to create a series of lessons exploring various aspects of color and motion in relation to general principles of basic design.

This new IBM language will soon be on the educational market. It will be called "Experimental Playmaker Language" and as the title imples it is designed so that the teacher can write a script, create graphic images, and call upon video disk, audio tapes, and music to create a drama or event upon the screen.

The motivation (on the part of IBM) for the development and testing of the Handy software as an authoring language was to be in a position to compute in the growing educational microcomputer market that has focused upon the use of interactive video disks.

The Handy language was designed so that relatively unsophisticated (computer-wise) teachers and children could develop their own individual software application.

As my own design work with this new language began to evolve, I saw almost unlimited possibilities for the artist and designer. The computer became my electronic sketchbook. It became an essential artistic vehicle in which I could

state an idea, vary the idea, try all possible combinations of color, texture, and movement and finally produce an almost endless series of variations upon the basic theme. The output has assumed many forms. With a color printer it can produce hard copy. A series of slides which can be used as the basis for paintings or design; a sequence of images which, when combined with text, can serve the basis for book and story illustrations; and films or video tapes which can exist as their own creative statements. It became an image processor. As an image processor, I was able to create a very large series of related visual images and then by a series of annimation commands change the visual and aesthetic contents of the images as the program was run on the computer screen.

I also designed methods by which as the Handy sequences were in, new images were generated and stored with each running of a particular program. The possible variations were endless.

The HANDY Project

In the summer of 1985 I began the use of this new authoring language for the development of some lesson prototypes for use in art and design education. This report shall be an account of my experiences with not only HANDY, but with computers as well. I will try to present a rather personal document. I will discuss not only my involvement with this new software but with computer graphics.

The HANDY project evolved over time and my essential focus changed several time as I discovered more about the possibilities which HANDY could give the artist and designer. I will discuss what I feel to be the strengths and weakness of HANDY as a language, as well as my own plans as to how I would use HANDY in the future.

The Beginning

My approach to HANDY was very different from the other members of the group of 12 who worked on this project. I did not develop a conceptual model nor

review the research for what I planned to do; instead I went directly to the computer and the program to see what I cold create. On the one hand this methodology may have been somewhat wasteful of time, but I believe that I gained a great deal of intuitive insights concerning the nature of computer graphics.

Our most recent (and hopefully the last) version of the Handy software is designed to function with the IBM inforwindow system, with the Touch screen, and with a video disk player. A special graphics form of Handy now makes it possible to combine keystroke graphics with pixel inputs so that curves, freehand drawing, and circles can be created. This seems to be a significant step forward for now it is possible to have a greater freedom in the graphics components such as possible in the paint packages such as Dr. Halo and yet have the annimation and multi-tasking features that was possible with the earlier Handy programs.

Has the machine taken away my personal and creative vision? Has the "life of the studio" with the smell of the paint, the taste of the clay and plaster dust come to be replaced by the blinks, beeps, and shakes of my electronic images? Am I, a slave of the machine? I think not! For me, the personal computer has become creative tool. It, like the camera, can extend the perceptual limits of the artistic imagination. With it the creative artist can function at yet another level of reality and awareness.

1. **Adventures in Color:**

    My first project was an exploration of the use of color in design. This is a sequence of four interactive lessons on color which are designed to be used with young children. These units introduced the child to the general world of color and to what can be done with the limited range of colors in the program. HANDY provides 16 colors which can be combined in foreground as well as in background sequences. Those 16 colors can be combined in many color variations. The focus of the

three lessons as a unit was to show what happens when colors are changed in both figure and ground. This lesson introduced the image of the Totem. The Totem is a symbol that has emerged from my own work as a printmaker, ceramic artist and designer.

Handy assigns colors to figures and to background for each of the individual display units that are created. Simple color commands included in the program scripts can change the assigned colors while the programs are running. Animation commands also included in these scripts can cause the colors to become more varied. While 16 colors do limit the range of color effects that can be achieved, texture and animation effects can lend some variety to the designs produced in this system.

This specific script is mainly concerned with the movement effects that are possible in the more general HANDY system. I found early in my research that both color and movement were the best aspects of the HANDY system which could be applied to this sequence of lessons in color.

Handy software has been under development for the past 3 years. It first focused upon it's ability as a simple authoring language rather then as a graphic design tool. The first software prototypes were only designed with the keystroke graphics and use of a PC mouse or other input measures was not possible. More recent software updates have featured the use of the PC mouse. Finally a new combination of character stroke graphics with pixel graphics has been developed. This new version presents a significant innovation. Now the annimation features of "Old Handy" can now be combined with more flexible pixel graphics.

While Handy as a graphic package is not flexible as other paint packages such as Dr. Halo, PC Paint, PC Paintbrush, etc., it does have one advantage which the paint packages do not possess and that is the potential for movement and animation. This combination of keystroke with pixel graphics is a very promising

new development.

Adventures in Color was done in 3 parts which were:

Adventures in Color A

This project was the first unit which I completed in the Handy sequence.

It was an attempt to use some of the existing Handy demo images and show how by the use of a few simple color change commands those images could be used to show a student what might happen with the use of a very few simple elements in a design composition.

I have gone far beyond this in my own research and I include it only as an example of where I began in my own use of Handy in the Summer of 1985.

This sequence used Handy software as of June 1985 called "Old Handy".

Adventures in Color B

The various sequences in "the Adventure of Color Series" continues with those methods of computer assisted graphics that were explored in the first sequence.

In this sequence the Totem figures were once again used and background scenes were developed so that the element of figure and ground could be more directly studied in this sequence.

I began to study the idea of entire patterns of color change in which one Totem figure was first changed in color and then all the rest were changed in order to imitate the first figure.

I also experimented with changes in the color of the screen itself. The variables of the figure and the ground interact with these color variables.

This sequence continued the use of the Totem figures as a basic image along with the color changes which were outlined in the first sequence.

This employed Handy software as of August 1986, called "Middle Handy".

The children can watch the entire sequence at the micro-computer and questioning procedures can be developed as a part of these instructional programs to ask questions about color and record the student's responses. In this mode, the micro-computer seems to function very much like the teaching machine of the 1960s. A unit using computer color images were incorporated into the department's core course on the subject of color in the summer of 1986.

The typical College level color course uses either color-aided papers or paints in which the student learns to make use of color concepts for art and design problems by either reproducing color combinations in paint or by selecting color with the color-aided papers. Many times the student perceives these color exercises as less then revelent to the task of the designer.

The computer provides another alternative. Color can be explored as light as well as pigment and many of the theoretical conceptions of color can be better addressed in this mode of instruction. For the color course my students took some of the standard color exercises that they had done with the color aided papers and prepared solutions to those problems that involved the use of light as well as pigment.

My next major project was to develop a series of slides based on my computer images.

2.   **Totem Figures Dance**

This sequence of lessons explored movement in design and how variations on figure and ground relationships might be created. Slides were used for a series of colored pencil drawings which were exhibited in 1986-87 in a one person show.

What Handy provided here was the means to create, animate, and store a large number of separate graphic images that could be combined into a slide show by means of the commands written into the basic Handy script. I used this attribute of the Handy software to create my first series of computer images which I called "the Garden of the Golden Section".

3.   **Garden of the Golden Section**

The Garden of the Golden Section was a program which created a series of images that were varied according to design principles and elements.

A series of 12 sequences were developed in which both color and motion are used.

The design elements that have been explored in this sequence are:

    Shape
    Color
    Texture
    Value

The design principles are:

    Balance
    Harmony
    Rhythm

The design principle of Balance is achieved by changing the relationships of the shape elements on the screen by the use of a HANDY script and annimation program that are a part of the total software package.

What happens for the viewer is that as this sequence is run on the computer, the basic design relationship continually changes and one kind of balance, harmony,

and rhythm replace another kind. The basic design relationship become like ever changing variables.

Harmony is achieved by the change in color achieved by handy color commands.

Rhythm is achieved by both the spacing of the program in time and the various annimation features permitted in Handy. The purpose of these lessons was to demonstrate an ever-changing nature of design. It was to show how designs might be altered and the variety that could be achieved with similar elements.

Multi-Tasking Capacity of Handy

In the fall of 1986 IBM introduced its' infowindow hardware system so that video disks, video tapes and audio tapes, can be used in one complete workstation. Inforwindow also has touch screen possibilities which enhance the interactive video uses. It is a complete and flexible hardware system for which Handy is in many ways the ideal software package.

As of February 1987, a new graphics version of Handy has been developed which is designed for use on the infowindows system.

This new "graphics Handy" permits a user to not only access a video disk by means of the infowindows hardware system but to be able to make use of a pixel graphics that include lines, curves, circles, ovals, and squares.

The infowindows hardware provides for three levels of projection from the computer screen. Video disk projections are made upon the third level, user created graphics on the second level, and touch screen inputs on the first level. Then Handy software allows the user to function on all three of these levels at the same time. while the video disk is running, graphic inputs can be made on the middle level and combined with the materials from the video disk levels.

The multi-tasking feature of "new Handy" also allow the user to make input via audio tape, video tape as well as touch screen. At the heart of the Handy system are the user created scripts, written in plain English (no computer language here) and designed to co-ordinate the total Handy environment no matter how many tasks might be happening at the same time.

Conclusion:

Most of the developmental projects described in this paper are still under development. To date we have been somewhat handicapped by the many changes in the Handy software. We are now ready to complete the first developmental phase and are now ready to explore in depth the use of the video disk.

We believe that the Handy software offers the artists a new generation of authoring system that can be very flexible and which can be problem oriented.

Software development in the future shall become less linear, or from the top down operation and will employ software which is more wholesitic and can emphasis several solutions to problems.

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