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ABSTRACT

A study was conducted to test the belief that students would develop a better attitude toward communication models if they were depicted using computer-generated graphics than they would if traditional chalkboard depiction were used. Two hypotheses were tested: (1) that the mean attitude-towards-models score for students exposed to models via computer generated graphics would be significantly higher than the mean for students exposed via the chalkboard and (2) that the mean score for students asked to evaluate the study of communication models would be significantly more favorable for the group exposed to computer generated models than it would be for the group exposed to chalkboard models. Subjects were 75 students enrolled in four sections of an undergraduate speech communication course. Two sections were randomly assigned to each condition and were asked to complete a semantic differentiation instrument at the end of each lesson. Analysis of the results confirmed both hypotheses. These findings suggest that computer graphics can be a valuable learning tool when used to enhance traditional classroom instruction. (JL)

COMMUNICATION MODELS:

A COMPUTER GRAPHICS APPROACH

by

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Edward T. Hall once wrote, "Man is the model-making organism par excellence." We would like to narrow that statement and phrase it to read: "The communicologist is the model-making organism par excellence." For the past three decades or more, theorists have flooded the communication field with a plethora of models whose function it was to help explain human communication processes. As Bormann notes, starting with the early influential schema developed by Shannon and Weaver, "a tradition of depicting descriptions of communication in terms of models flourished and continues to this day."[1] In fact, today there are almost as many models of communication as there are definitions of communication, and like each definition, each model provides us with a different perspective of our field. Additionally, it can be concluded, that like definitions, models are neither right nor wrong. However, we may judge them to be more or less useful in helping us to visualize key communication components, concepts or problems. Also, as Louis Forsdale has aptly observed, some models are more complex or detailed than others.[2] And more importantly, Forsdale continues, when models become worn or outdated they are replaced by more current ones.[3] Perhaps, we are now witnessing the time when "planned obsolesence" has given rise to a need for members of our field to develop even newer or "more stylish" communication models--models that arouse the curiosity and interest of our students--models that trigger the imagination--models that today's students are more likely to seek to

understand and models which they are more likely to respond to. This is where we believe computer graphics enters the picture.

We are convinced that our age is about to witness a communication model revolution, computer graphics style. In fact, we might even subtitle our project: "The First Communication Models for the Atari Generation." What we have done is use computer simulation to augment or replace the work that to date has been placed on the chalkboard or charts. What we have done is to use the video game technology that today's students are so familiar with for our own educational purposes. In other words, rather than retreating from that technology we attempted to "get it before it got us." From our point of view, computer simulation was a tool that could help us in our efforts to express basic communication concepts more clearly.

What is computer graphics? Walker, Gurd and Drawneek in their book Interactive Computer Graphics describe it simply as, ". . .images generated by a computer."[4] They go on to report that,

> The first important manifestation of computer graphics was at MIT in 1963, when SKETCHPAD was demonstrated. . . . Using a device called a light pen, the figures on the screen could be drawn and manipulated. It was an impressive demonstration. . . .[5]

Since the SKETCHPAD project, computer generated imagery (CGI) has become a common sight on television. Indeed, in its July 5th, 1982 issue,

Newsweek reported that CGI enlivens everything from Levi's commercials to the opening of the "NBC Nightly News".[6] In addition, computer generated images are used in science and industry as well:

> Aeronautical engineers now study wind tunnel data with computer drawn pictures of planes. . . . Similarly, electronics companies find color keyed computer representations essential in designing the micro circuits for computer chips. And biochemists rely on CGI to produce detailed pictures of complex DNA molecules.

Thus, it is evident that CGI has exerted an influence on many fields; yet, a recent survey of the literature indicates that to date speech communication instructors have not incorporated CGI into their teaching techniques.

It was during the Fall of 1981 that we turned to the Computer Graphics Laboratory at New York Institute of Technology in order to begin exploring ways to develop computer generated communication models for utilization in NYIT Basic Speech Communication classes. David Lubar in Creative Computing describes the work being done at New York Tech:

> Imagine a speck of light on a television screen. The speck hangs in space for a moment, then dances forward in a graceful arc. The speck moves closer and takes form; a solid object, a piece of plastic molded in abstract form, rotates on the screen, spinning twisting, hovering. But the object isn't real. That's the wonder of it. The above scene is just a small hint of the incredible work being done at New York Institute of Technology. They have what must be the most advanced computer animation facilities in the world.[8]

The NYIT facility is housed in what Newsweek termed a "Pink Farmhouse"[9] on the campus. The two story rambling structure houses a Digital Equipment Corporation VAX 11/780 Computer which is the backbone of the system. Interfaced to that computer are a number of frame buffers or digital image memory systems. The entire graphics operation has output to both film and video tape facilities.

The NYIT computer artist with the electronic tablet and light pen has a pallette of 265 colors selected from a choice of several billion. On command the computer will cause the colors to cycle through the pallette thus changing colors of images almost to infinity.

We took our ideas to computer artist Paul Xander, Sr. and worked with him to develop the project. Quite simply, by working with Xander we sought to do with Communication Models what Disney Studios did with the Hollywood feature Tron--be the first to use optical special effects, that is, eye-popping computer generated graphics. We hope that just as Tron signals the possible beginning of a revolution in filmmaking, so this project signals a revolution in modelmaking. Like Larry Elin, Disney consultant and member of the Mathematics Application Group, Inc., we would like to be able to say: "Every day we are breaking new ground and doing things we didn't do yesterday."[10]

Permit us to now share our work with you. The models we selected to use are representative of "standard" basic communication models. Each in its way either attempts to clarify what is meant by the term communication and/or emphasizes the labeling, identification, or description of key segments of the communication process. Figure 1 presents a typical example of a linear model.

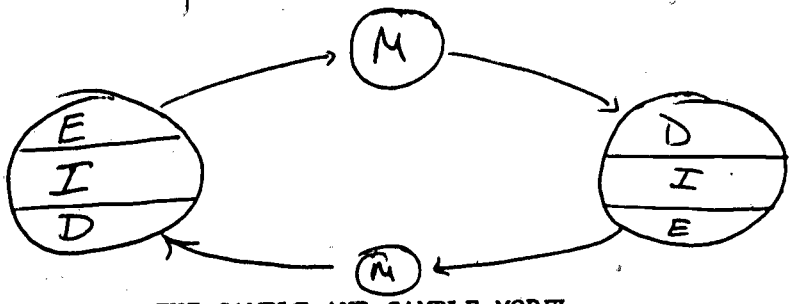
Figure 1

THE ARISTOTILIAN MODEL

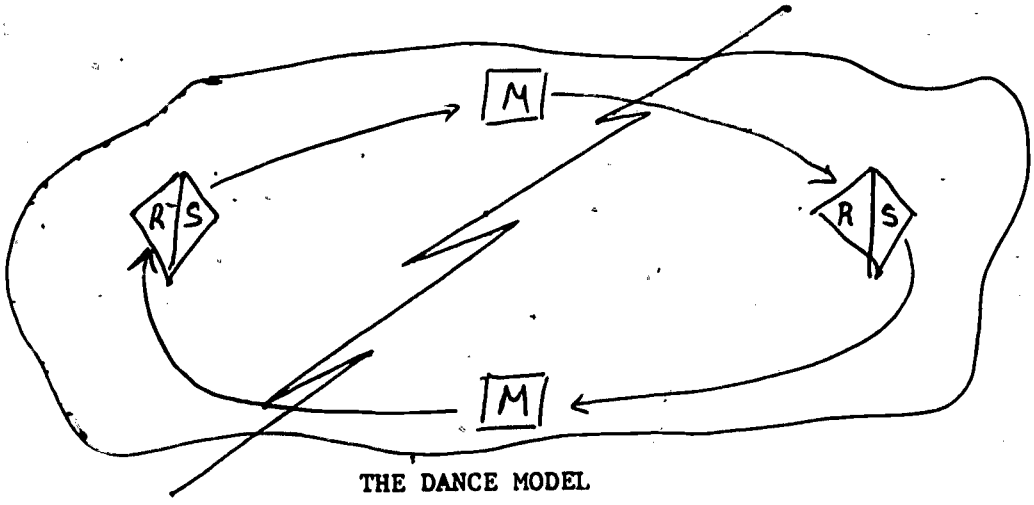
Figure 2 presents some models aimed at overcoming this linear depiction of the communication process.

Figure 2

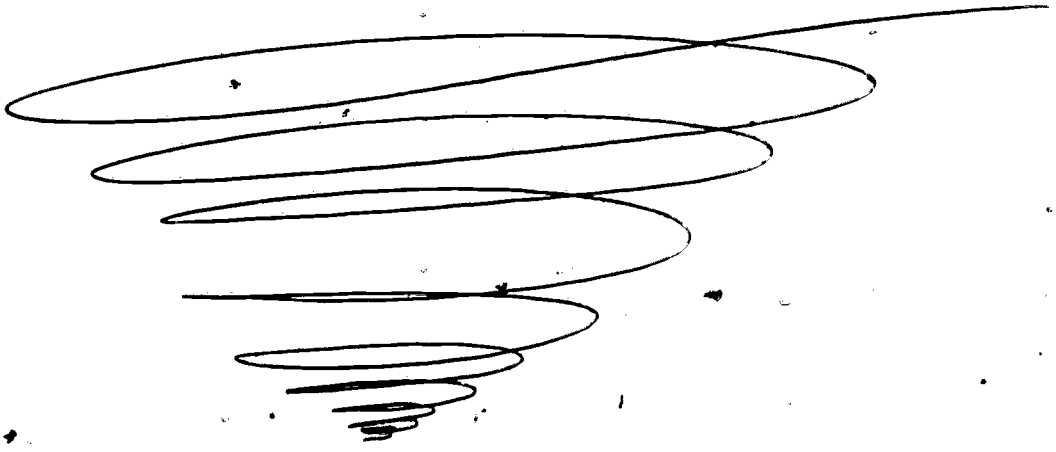
THE SCHRAMM MODEL



THE GAMBLE AND GAMBLE MODEL



THE DANCE MODEL



Finally, captured on videotape are computer graphics generated models--models for the 1980's and beyond.

VTR SHOWN HERE

At this point we felt we had to conduct a pilot study that would enable us to make a pre liminary assessment as to whether we were using techniques that would permit us to accomplish requisite learning objectives in the communication classroom more readily. The purpose of the pilot was to determine if computer generated graphics enhanced the student's appreciation and evaluation of communication models.

HYPOTHESES

Based on our belief that today's students would develop a better attitude toward communication models if they were depicted using computer generated graphics than they would if they were depicted as they traditionally are during classroom instruction, that is, on the chalkboard, the following research hypothesis was formulated and tested:

H_1: The mean attitude toward models score for students exposed to models via computer generated graphics will be significantly greater than the mean for students exposed to models via the chalkboard.

Since we were interested in determining not only the meaning students had for the concept "communication model" in general, but also whether or not students taught via these methods viewed the study of

communication models favorably or unfavorably, this second research hypothesis was formulated:

H_2: The mean score for students asked to evaluate the study of communication models will be significantly more favorable for the group exposed to computer generated models than it will be for the group exposed to models via the traditional chalkboard method.

METHOD

To test hypothesis$_1$, we employed the technique of semantic differentiation. In this procedure we asked students to rate their meaning for the concept "communication model" on the following selected bipolar seven point scales:

good	____ ____ ____ ____ ____ ____ ____	bad
happy	____ ____ ____ ____ ____ ____ ____	sad
strong	____ ____ ____ ____ ____ ____ ____	weak
honest	____ ____ ____ ____ ____ ____ ____	dishonest
hot	____ ____ ____ ____ ____ ____ ____	cold
active	____ ____ ____ ____ ____ ____ ____	passive
valuable	____ ____ ____ ____ ____ ____ ____	worthless
fast	____ ____ ____ ____ ____ ____ ____	slow
pleasant	____ ____ ____ ____ ____ ____ ____	unpleasant
ugly	____ ____ ____ ____ ____ ____ ____	beautiful
sharp	____ ____ ____ ____ ____ ____ ____	dull

Using "7" for the positive end of each scale and "1" for the negative end, the various judgments elicited from the students were added together to yield summary figures.

To test hypothesis$_2$ we employed the following Likert type scale:

Extremely Favorable	Fairly Favorable	Neutral	Fairly Unfavorable	Extremely Unfavorable

This time a value of "1" was assigned to the extremely favorable position and a value of "5" was assigned to the extremely unfavorable position.

PROCEDURES

The subjects participating in this pilot study were enrolled in four sections of Speech 1023, "Basic Speech Communication" at New York Institute of Technology. Two class sections containing a total of 34 students were randomly assigned to "the chalkboard method" of communication model instruction; the other two class sections containing a total of 41 students were assigned to receive "the computer graphics method" of communication model instruction. For both "chalkboard" and "computer graphics" groups, the basic content shared with students was identical.

At the completion of each group's lesson, students were asked to fill out the previously described scales.

RESULTS AND DISCUSSION

With regard to hypothesis$_1$, a two-tailed "t" test revealed that the mean attitude held toward the concept "communication model" was significantly more positive for the computer graphics group than it was for the chalkboard group. ($p < .01$).

With regard to the second hypothesis, a two-tailed "t" test revealed that the computer graphics group evaluated the study of communication models with significantly more favor than did students in the chalkboard group ($p < .01$). Thus, the pilot study's hypotheses were confirmed.[11]

These preliminary findings can be of great benefit to educators and model builders alike. The data suggest that computer graphics is a viable learning tool that can be of value when used to enhance traditional classroom instruction. While the novelty of viewing a computer graphics presentation may account for the high level of significance, and a more moderating influence may be expected over time due to a wearing off of the initial aesthetic appeal of the computer graphics, we do expect that follow-up studies will probably tend to confirm these results.

Further, more rigorous research needs to be conducted to provide a fuller understanding of how computer graphics techniques can be used to help teach these and more complex communication models as well as other related communication concepts.

Footnotes

[1] Ernest G. Bormann, Communication Theory (New York: Holt, Rinehart and Winston, 1980), p. 30.

[2] Louis Forsdale, Perspectives on Communication (Reading, MA : Addison-Wesley Publishing Company, 1981), p. 18.

[3] Ibid.

[4] B.S. Walker, J. R. Gurd, and E.A. Drawneek, Interactive Computer Graphics (New York: Crane Russak Publishers, 1976), p. 4.

[5] Ibid., p. 2.

[6] "The Creative Computers", Newsweek, July 5, 1982, p. 58.

[7] Ibid., p. 61.

[8] David Lubar, "Pictures for an Exhibition", Creative Computing, January, 1982, p. 21.

[9] "The Creative Computers", Newsweek, July 5, 1982, p. 60.

[10] Tim Onosko, "Tron: A Dazzling Breakthrough From Disney", Video, July, 1982, p. 50.

[11] A special thanks to Warren Adis, Ph. D., and the Office of Research in Education of New York Institute of Technology.