USING MICROCOMPUTERS IN TEACHING

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Abstract—Although microcomputers are now common in classrooms throughout the United States, it is not clear what their most effective role is in the teaching-learning process. This study compared the effects of microcomputer-assisted instruction and traditional lecture-discussion on the performance of graduate students enrolled in an agricultural education course. Students in the control group performed significantly better on a written test than either of the two treatment groups. Students having previous experience with computers did not perform significantly better than

The findings indicated that the lecture-discussion method of teaching was more effective than the microcomputer-assisted technique in teaching the principles and concepts presented under the conditions described. Given a choice, students in the microcomputer groups spent less time than did the students in the control group. Students in the control group were taught during regular hours while the treatment groups participated during laboratory time.

Since most studies indicated that students using CAI have generally performed as well or better than students under conventional instruction, the implication is that the difference in performance found in this study should be carefully evaluated. The findings might have been different if all students had spent a minimum of four hours using the computer program. Additional studies should compare groups using a mix of traditional instruction and CAI and should require groups to spend a specific amount of time on task. The challenge for agricultural educators is to better utilize the capabilities of microcomputer assisted instruction in the learning environment.

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WHAT HAVE YOU OBSERVED?

1. How many major sections does this experimental research report contain? Are all of these sections indicated by headings? Which major section does not have a heading?
2. What kind of information does each major section contain? Do any major sections have more than one kind of information? Which ones?
3. How does the format of this report compare with the general model in Figure 1.1?

INFORMATION CONVENTIONS

The Five Stages

In order to better understand the function of Stage I, the setting, let us begin by briefly looking at all five stages of an introduction. Following is the introduction to the research report about computers in education. Notice that it contains five distinct stages.

USING MICROCOMPUTERS IN TEACHING

Stage I

During the past 40 years, the United States has experienced the integration of the computer into society. Progress has been made to the point that small, inexpensive computers with expanded capabilities are available for innumerable uses. Many schools have purchased and are purchasing microcomputers for infusion into their directed learning programs.

Stage II

Most individuals seem to agree that the microcomputer will continue to hold an important role in education. Gubser (1980) and Hinton (1980) suggested phenomenal increases in the numbers of computers both in the school and the home in the near future. Schmidt (1982) identified three types of microcomputer use in classrooms: the object of a course, a support tool, and a means of providing instruction. Foster and Kleene (1982) cite four uses of microcomputers in vocational agriculture: drill and practice, tutorial, simulation and problem solving.

The findings of studies examining the use of various forms of computer-assisted instruction (CAI) have been mixed. Studies by Hickey (1968) and Honeycutt (1974) indicated superior results with CAI while studies by Ellis (1978), Caldwell (1980) and Belzer (1976) indicated little or no significant effect. Although much work has been done to date, more studies need to be conducted to ascertain the effects of microcomputer-assisted instruction in teaching various subjects in a variety of learning situations.

Stage III

Stage IV

The purpose of this study was to ascertain the effect of using microcomputer-assisted instruction as compared to a lecture-discussion technique in teaching principles and methods of cost recovery and investment credit on agricultural assets to graduate students in agricultural education. This topic was identified as being of importance to teachers in providing them the necessary background to teach lessons in farm records.

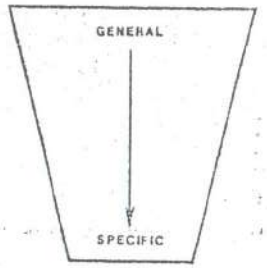
Stage V

WHAT HAVE YOU OBSERVED?

1. What do you think is the purpose of each of the five stages in this introduction?
2. Why do you think the writers put the five stages in this particular order?
3. Do you think this order of information could be used for writing introductions in other fields, or is it valid only for education?
4. Which stage is the longest? Can you see any reason for this?

Ordering your Information

The preceding example is typical of introductions to experimental research reports in many different fields in terms of (1) the *kinds* of information it provides to the reader and (2) the *order* in which the information is sequenced. Figure 2.2 illustrates this sequence.



FIRST STAGE: General statement(s) about a field of research to provide the reader with *a setting* for the problem to be reported

SECOND STAGE: More specific statements about the aspects of the problem *already studied* by other researchers

THIRD STAGE: Statement(s) that indicate *the need for more investigation*

FOURTH STAGE: Very specific statement(s) giving *the purpose/objectives* of the writer's study

FIFTH STAGE: Optional statement(s) that give a *value* or *justification* for carrying out the study

FIGURE 2.2 The fives stages of the introduction.

Analysis

Following is an example of an introduction from the field of psychology. After reading it, identify which sentences correspond to four of the five stages we have discussed.

EYE MOVEMENTS WHILE WATCHING A BASEBALL PITCH

[1]Many motor skills require action based on rapid change in the environment. [2]One such skill is baseball batting. [3]The baseball batter relies most heavily on vision for pertinent information. [4]Moreover, a good pitcher will attempt to give the hitter misleading cues during the wind-up and delivery. [5]Visual-search strategies must be used by a batter to sample relevant locations in the visual display so response can be made at the proper time.

[6]Research has shown that visual-search patterns can be governed by a variety of factors including experience. [7]Mourand and Rockwell (1972) examined the visual-search strategies used by six novice and four expert drivers. [8]Novice drivers sampled their mirrors and instruments more frequently than did expert drivers. [9]On the freeway, novice drivers made smooth pursuit movements while the experts made only eye fixations.

[10]Bard, Fleury, Carriere, and Halle (1980) examined the visual-search patterns of expert and novice gymnastic judges. [11]They found that the expert judges had 27% fewer fixations than novice judges. [12]Eye fixations also differed for novice and expert basketball players. [13]Bard and Fleury (1976) showed slides of typical offensive basketball situations to players and recorded their eye movements/fixations. [14]Expert players made fewer fixations than novices.

[15]The informational content of various portions of a baseball's trajectory from pitcher to batter has been debated but most of the research has focused on the terminal portion of the ball flight. [16]The purpose of the present study was to examine the visual-search strategies of expert and novice baseball players during the preparatory phase (wind-up and release of the pitch) of baseball hitting. [17]A second goal was to document the existence of an eye-movement reaction time prior to the eyes tracking the pitch.

Guided Writing

Here you are given a background paragraph (Stage I) from the introduction to a research report about students learning English as a second language. The final part of the introduction (Stages III, IV, and V) is also given. Stage II, the literature review, is represented in *outline form*. Using the information in the outline, write a literature review appropriate for this introduction. Refer to the list of references at the end of the outline for your citation information.

DIFFERENTIAL GAIN RATES IN INTENSIVE ESL PROGRAMS: WHO GAINS THE MOST?

Stage I

Students entering intensive English as a second language programs at various proficiency levels may make comparatively greater or lesser gains in proficiency over the same period of training. The problem of predicting rates of progress is particularly interesting for teachers and administrators in intensive programs where some of the students have had little or no previous instruction in English language skills, but where all students are preparing to take university courses in English after a brief period of language instruction. The organization and teaching strategies of such a program are crucial to the future academic success of the students.

Stage II

Literature Review

A. Several studies—individual characteristics of language learners, environmental variables (classroom, school, community)

1. CARROLL: Affective variables of students—predict success in foreign language learning?
   Findings: a. motivation—yes
   b. aptitude—yes
   c. IQ—no

2. FATHMAN: External variables—affect the successful learning of English as a second language?
   Findings: a. class size—yes
   b. school size—yes
   c. school location (urban/rural)—yes

B. Other studies—use standardized English language tests to predict students' academic success

1. MASON: Compare students' initial scores on Michigan Test of English Language Proficiency with students' grade point average (GPA) after one year
   Findings: Michigan not a good predictor

2. MORAN and ERION: Use *Comprehensive English Language Test* (CELT) as a possible predictor of students' academic success in university classes
   Findings: CELT predicts GPA—no
   CELT predicts number of credits earned—yes

C. Effect of students' initial proficiency on later progress in English—few studies

1. NEVO, SIM and BENSOUSAN: Non-intensive English program, Middle Eastern university
   Findings: Students with higher initial scores on proficiency test—more progress than students with lower scores

2. MARTON: Non-intensive English program in Scandinavian university
   Findings: results similar to Nevo et al.

Stage III

However, little information is available in the literature on predicting success of students enrolled in intensive English programs in this country.

Stage IV

This study was carried out in order to determine if students' scores on two standardized tests of English language proficiency could serve to predict whether they would make greater or lesser progress in English during a one-year intensive program. It was hoped that a systematic analysis of relative rates of progress among beginning, intermediate and advanced students would

Stage V

indicate if the program was benefiting some types of students more than others. Significant differences in progress, if found, would indicate the need for a thorough re-examination of program organization and instruction.

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Transformation. Here you are given several research points. Convert each point into stages III, IV, V statements of purpose and justification.

Stage III

Unfortunately, these theories are difficult to test since written references to the distribution of hand preferences throughout history are rare. There are, however, other sources which can be used to investigate historical trends in the distribution of hand preference. Nearly all cultures have art forms that depict human beings engaged in various activities. We might expect that such drawings and paintings would imitate the distribution of hand use that the artist actually observed in his culture.

Stage III (continued)

This possibility:
already suggested (5)
no systematic studies yet

Stage IV

This study:
1. examine works of art—various cultures
   —various periods of history
2. describe history of hand preference, 5000 years

Stage V

May clarify:
two theories of hand preference—which valid?
—physiological theory
—social pressure theory