SURVEY AND ANALYSES OF ATTITUDES TOWARD USE OF THE COMPUTER

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The potential impact of the Computer Age on education in general and the teaching of reading in particular has been increasingly recognized during the last decade. Refinements in the microcomputer and tremendous growth in the number of corporations marketing the machines for personal use have greatly increased both their availability in the schools and the necessity for making sound education decisions regarding their most effective use. Reese and Gable (1982) emphasize that the prevalence of microcomputers in the schools creates a definite need for the evaluation of student attitudes toward the machines in order to maximize their potential impact on the instructional curriculum. Student attitudes are undeniably influential; however, as with all instructional materials and hardware, the essential key to effective utilization of the computer lies with the teachers in whose classrooms the machines are placed. Mason and Blanchard (1979) point out that when teachers cannot find appropriate ways to incorporate computers into their instruction, they simply "leave the machinery to gather dust (perhaps hiding it in a closet)" (p. 102).

In examinimg the key determinants of teachers' decisions as to whether or not to make use of computers, two primary factors seem to emerge: (1) knowledge of the computer and (2) attitudes toward the computer. If teachers do not understand how computers function, then they may be hesitant or fearful of putting them to use. If teachers' attitudes toward computers are negative and/or irrational, then they are also not likely to use computers as a part of their instruction. In order to make more effective instructional use of computers, it is important to study and understand teachers' attitudes toward them. Such a study would serve to "better understand and correct the fallacious and often *irrational* attitudes toward this integral component of modern life" (Mathews and Wolfe, 1983, p. 4) and would also help to provide a more thorough knowledge base for educating teachers and for changing their attitudes.

The purpose of this study was, therefore, to examine the general attitudes of teachers, future teachers, and students enrolled in computer courses toward use of the computer and to determine the extent to which those attitudes may in fact be influenced by computer literacy. The objectives of the present study were to:

1. Determine the attitudes of reading teachers toward use of the computer.

2. Determine if reading teachers' attitudes toward use of the computer differed significantly from attitudes of undergraduate education students, graduate students enrolled in an educational research course, graduate students enrolled in a computer course, and undergraduate students enrolled in a computer course.

3. Determine if graduate and undergraduate students' attitudes toward the computer improved as a result of having taken a computer course.

4. Determine if undergraduate students' gain scores in attitudes toward the computer significantly related to course achievement in a computer course.

5. Determine if attitude gain scores of graduate and undergraduate students enrolled in a computer course were significantly different from attitude gain scores of graduate and undergraduate students not enrolled in a computer course.

6. Determine if pretest attitudes of students with some computer knowledge were significantly different from attitudes of students with no computer knowledge.

Subjects

A total of 102 subjects participated in the study and were drawn from students enrolled in graduate courses in reading/language arts (N = 12), undergraduate students enrolled in an introduction to education course, an educational psychology course, and a language arts course (N = 33), graduate students enrolled in an educational research course (N = 23), graduate students enrolled in a computer course (N = 16), and undergraduate students enrolled in a computer course (N = 18). For purposes of analysis, subjects were classified as "reading teachers" if on the survey information sheet utilized, they indicated that they currently taught reading. Fifteen subjects were consequently classified as reading teachers. Students were also surveyed to determine those who had prior training in the use of the computer. They were then classified as "computer literate" if their responses indicated that they had either taken a computer course previously or that they had access to and used a computer in their home. Of the students participating in the study, forty-eight were found to be computer literate and fifty-four were determined to be non-computer literate. All subjects were enrolled at North Georgia College during the summer quarter, 1984, and all were willing participants in the study. Subjects were informed of the pre-post test design of the study from its inception and were assured that participation would in no way affect their course grade.

Procedures

The Computer Appreciator-Critic Attitude Scale, designed to measure attitudes toward the computer, was administered to all subjects as a pretest during the first week of classes and as a posttest during the last week of classes. Of the 102 students, 83 students completed both the pretest and the posttest. Students were also surveyed to determine those who would be classified as reading teachers and those who had prior training in or knowledge of the use of the computer. Additionally, course achievement scores were obtained for undergraduate students enrolled in a computer course to ascertain whether or not a relationship existed between course achievement and attitudes toward the computer.

Instrument

Attitude toward the computer was measured by the Computer Appreciator Critic Attitude Scale (CACAS). The CACAS is a 40-item Likert-type scale, designed by Mathews and Wolfe (1981). The validating sample of Mathews and Wolfe consisted of 410 undergraduate students from four universities. The students were enrolled in education, liberal arts, or computer science courses. Results of a principal components analysis yielded two factors: Computer Appreciation and Computer Criticism. Mathews and Wolfe reported Cronbach Alpha coefficients of .88 and .89 for the two factors, indicating a high degree of internal consistency on the two factors.

Typical items from the Computer Appreciation factor are "The world is better because of computers;" "I appreciate computers;" and "Computers simplify life." Items such as "Computers reduce people to numbers;" and "People are becoming too dependent on computers" are from the Critical Attitude factor.

Furr and Davis (1984) reported three validity studies of the CACAS. In the first study the instrument was administered to 420 undergraduate education majors at two universities. Results of a principal components analysis yielded the same factors as those of the Mathews and Wolfe study (1983). In the second study 120 school psychologists responded to the CACAS. Again results of a principal components analysis yielded the same two factors. Finally in the third study the CACAS was administered to 25 educational psychology graduate students prior to and following a six-hour course on the microcomputer. The two sets of data were again factored using a principal components analysis. After the course there was a shift away from the criticism factor and toward the appreciator dimension. As a result of these three studies Furr and Davis concluded, "The instrument appears to be factorialily pure and stable across several populations. It . . . apparently is sensitive to attitude shifts due to instructional treatment" (p. 9).

Analyses

1. To determine whether the attitudes of the reading teachers were positive or negative about the use of the computer, CACAS pretest scores were examined.

2. A one-way analysis of variance was used to determine if the five groups differed significantly on the attitude pretest.

3. A dependent t-test was used to determine if the mean pretest attitude scores of the graduate students enrolled in a computer course was significantly different from the mean posttest attitude scores. A dependent t-test was also used to determine if the mean pretest attitude scores of the undergraduate students enrolled in a computer course was significantly different from the mean posttest attitude scores.

4. A Pearson Product Moment Correlation was used to determine if gain scores in attitude for the computer class undergraduate students was significantly related to their achievement in the course.

5. A one-way analysis of variance was used to determine if mean gain scores in attitude for graduate and undergraduate students enrolled in computer courses were significantly different from graduate and undergraduate students not enrolled in computer courses.

6. An independent t-test was used to determine if the mean pretest attitude scores of the students with computer knowledge were significantly different from the mean pretest attitude scores of students with no computer knowledge.

The level of significance was set at .05 for statistical analyses 2-6 above.

RESULTS

Data from this study indicate that reading teachers have positive attitudes towards computers. The mean score for these 15 subjects on the CACAS was 146.53 out of a possible 200. Scores of the reading teachers ranged from a high score of

164 to a low score of 125. Thus none of the teachers scored below 120, the neutral position on the scale.

It was hypothesized that students enrolled in computer courses would have higher attitudes toward computers than students not enrolled in computer courses. This hypothesis was not supported ($F = 2.29$). There were no significant differences on the average pretest CACAS scores for five groups: reading teachers, undergraduate education students, graduate students enrolled in an educational research course, undergrduate students enrolled in a computer course, and graduate students enrolled in a computer course. Table 1 contains the means, standard deviation, and ranges of the CACAS for the five groups. A summary of the results of the one-way analysis of the variance is presented in Table 2.

It was also hypothesized that both graduate and undergraduates who completed computer courses would have significantly higher attitude scores on the CACAS than they had at the beginning of the course. This hypothesis was supported for the 16 graduate students ($t = 2.14$, $d.f. = 15$, $p < .05$, one tailed test). The average CACAS at the beginning of the course for the graduate students was 152.31, and the average at the end of the course was 157.69. The average gain score was 5.38. The attitudes of the graduate students were apparently improved by having taken the computer course. The hypothesis was not supported for 11 undergraduate students ($t = 0.87$). The average CACAS at the beginning of the course for the undergraduate students was 154.45, and the average at the end of the course was 150.45. The average gain score was -4.00.

Results of correlating the achievement in the computer course for these undergraduate students with their gain CACAS scores yielded a Pearson correlation of -0.04. This correlation was not significant at the .05 level. The average achievement for the students was 75.69.

Table 3 contains means and standard deviation for gain scores on the CACAS for undergraduate and graduate students not enrolled in computer courses and undergraduate and graduate students enrolled in computer courses. A summary of the results of the one-way analysis of variance is presented in Table 4. There were no significant differences in the average gain scores on the CACAS for the four groups ($F = 1.27$).

Finally it was hypothesized that the 48 students who were classified as computer literate would have higher pretest scores on the CACAS than the 54 students who were not computer literate. This hypothesis was supported ($t = 3.29$, $d.f., = 100$, $P < .05$, one tailed test). The average pretest score on the CACAS for the computer literate students was 149.46, and the average pretest score for the students who were not computer literate was 137.41.

Summary

In examining the variables of knowledge of and attitudes toward the computer, the findings of this study supported the assumption that computer literacy is influential in determining attitudes toward computers. Computer literate subject displayed significantly ($p. < .05$(more positive attitudes than did their non-computer literate counterparts. Further, the fact that positive attitudes of graduate students enrolled in a computer course showed significant ($p < .05$) increases after completion of the course lends additional credence to the supposition that computer literacy influences attitudes toward the computer. If it can be assumed that the teacher is indeed one of the primary determining factors in the success of an instructional program, then the results of this study would seem to suggest that providing teachers opportunities to become computer literate may be one of the key variables in the successful implementation of computer assisted instruction in the schools.

While data from this study did inicate that reading teachers have positive attitudes toward computers, it must also be noted that their pretest CACAS scores were not significantly different from other groups. All subjects appeared to hold similar views about the computer initially. Additionally, the assumption that undergraduates' attitudes would increase significantly after completion of a computer course was not supported by the data. This finding tends to suggest that undergrduates' attitudes may have been colored by their lack of experience and their lesser ability to see direct relevance of computer applications in their future. Such a supposition, however, would need to be researched further for substantiation.

Since the availability and use of microcomputers in classrooms across the country is increasing at an almost phenomenal rate, further research into teacher knowledge of and attitudes toward computers is warranted. Future studies might address the atttitudes of teachers not enrolled in college or university courses as well in order to examine those attitudes on a more widespread basis outside an academic setting. Knowledge of teacher attitudes toward computer use should prove to be of benefit to teacher educators and curriculum planners alike as they attempt to implement a more effective program of computer assisted instruction.

TABLE 1

Descriptive Statistics on the CACAS Pretest Scores for Five Groups of Students (N = 98).

Group	n	$\bar{x}$	SD	Range
Reading Teachers	15	146.53	10.58	39
Undergrad. Educ. Students	33	139.30	15.39	64
Grad. Educ. Research Students	16	136.50	21.45	96
Undergrad. Computer Students	18	146.78	23.08	86
Grad. Computer Students	16	152.31	17.70	76

TABLE 2

Significance Test for Differences among Five Groups of Students on the CACAS Pretest Scores

Source	d.f.	M.S.	F
Groups	4	734.75	2.29
Error	93	320.44	

TABLE 3

Descriptive Statistics on the CACAS Gain Scores for Four Groups of Students (N = 83)

Group	n	Mean Gain	SD
Undergrad. Education Students	26	2.58	13.00
Grad. Education Students	30	3.20	12.62
Undergrad. Computer Students	11	-4.00	15.21
Grad. Computer Students	16	5.38	10.03

TABLE 4

Significance Test for Difference among Four Groups of Students on CACAS Gain Scores

Source	d.f	M.S.	F
Groups	3	203.93	1.27
Error	79	160.32	

REFERENCES

Furr, J.D., & Davis, T.M. (1984, April). *The validation of an instrument to measure attitudes toward computers.* Paper presented at the annual meeting of the National Council on Measurement in Education, New Orleans.

Mason, G.M., & Blanchard, J.S. (1979), *Computer applications in reading.* Newark, New Jersey: International Reading Association.

Mathews, W.M., & Wolfe, A.W. (1983, April). *Measuring attitude toward computers: The Computer Appreciator - Critic Attitude Scale.* Paper presented at the Annual Meeting of the American Educational Research Association, Montreal. (ERIC Document Reproduction Service No. ED 231 886).

Reece, M.J., & Gable, R.K. (1982). The development and validation of a measure of general attitudes toward computers. *Educational and Psychological Measurement, 42,* 913-916.