

THE DEVELOPMENT OF AN INSTRUMENT TO MEASURE  
TEACHER ATTITUDES TOWARD THE COMPUTER

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During the last decade the use of the microcomputer in the classroom has increased as the ramifications of the Computer Age have reached the educational setting. A recent survey conducted by Market Data Retrieval (cited in Miller, 1985) revealed that while only 18% of the public schools in the United States had one or more microcomputers in 1981, more than 85% of the schools reported having acquired them by 1985. While these figures indicate the widespread availability of computers, the key to their effective utilization, as with any instructional material, rests with the teachers in whose classrooms the machines are placed.

Miller (1985) suggests that the effectiveness of the computer cannot be evaluated until the factors determining its acceptance or rejection for classroom learning are examined. Among the primary factors which may influence the extent to which teachers accept or reject utilization of computers in their classrooms are: (1) knowledge of the computer and (2) attitudes toward the computer. In an examination of those variables, Long and Benton (1984) found that "computer literate subjects displayed significantly more positive attitudes than did their non-computer literate counterparts" (p. 10). This finding would seem to suggest that because computer literate teachers are likely to have more positive attitudes toward the computer than they are likely to utilize computers in their classrooms.

If teachers' attitudes are indeed crucial determinants of their decisions as to whether or not to make use of computers, then it is important to study and understand their beliefs and attitudes in order to foster an environment that would maximize the potential for effective use of computers in instruction. A limited number of instruments examining attitudes toward the computer are available. The Computer Appreciator-Critic Attitude Scale (CACAS), a 40-item Likert-type instrument developed by Mathews and Wolfe (1983) and validated by Furr and Davis (1984), is one such evaluative instrument; however,

the CACAS examines general attitudes toward computers and computer use rather than attitudes toward the educational uses of the computer. Likewise while the Reece and Gable (1982) ten-item Likert-type attitude instrument, Attitudes Toward Computers, is more school specific in that it was designed to measure student attitudes, the instrument still does not include items which would accurately reflect specific teacher attitudes toward the uses of the computer. Mitchell (1984) has developed a reading attitude instrument that has a section on student attitudes toward the computer, but again teacher attitudes cannot be extrapolated from the instrument. Therefore, it appears that if teacher beliefs and attitudes are to be examined, a more specific instrument to address those attitudes and beliefs is warranted. The purpose of this study was to develop such an instrument in order to measure teacher beliefs about and attitudes toward the educational uses of the computer.

### Procedures

For the development of the instrument the investigators planned an empirical approach with two major phases. In the first phase, the goal was to obtain a large pool of items written by teachers. The items were then to be reviewed by the investigators for the purpose of categorizing the items and deleting or improving items. The items were then to be revised in terms of analyses and comments from a panel of judges. In the second major phase a principal components analysis was to be used to categorize the items. This second phase has not been completed and is not discussed in this report.

In the first phase of the study, the present investigators determined five rational areas that they thought reflected teachers' beliefs about and attitudes toward educational uses of the computer. These areas were instruction, remediation, enrichment, management systems (including testing, record keeping, and grading), and general attitudes.

Students in two graduate educational research classes (N=36) and one graduate/undergraduate class of reading education in the middle and secondary schools (N=12) were asked to develop items that reflected these five rational areas. They were to make one-half of their items reflect positive positions and one-half of their items reflect negative beliefs or attitudes. All of the students in these classes were either pre-service or inservice teachers. In addition, they had all received instruction in the development and the scoring of attitude scales. A total of 201 items were thus generated.

Two of the present investigators then sorted the items into the five categories and eliminated items that were considered to be duplicates. Items that the researchers deemed to be unclear or poorly written were also eliminated. In addition, minor word changes were made in some of the other items--thus, the original 201 items were narrowed to 85 items.

All ten students enrolled in the Reading Education Doctoral Seminar at the University of Georgia were asked to act as a panel of judges to answer the following questions with regard to each of the 85 remaining items: 1. Does the item belong in the category to which it is assigned? 2. Is the item essentially a duplication of another item? 3. Would the item be clearly answerable in the format of a semantic differential? 4. Does the item represent an attitude, or does it represent a belief? (Definitions of these terms appear later). 5. If answered as "Wholly agree," would the answer represent a positive attitude or belief or a negative attitude or belief? This panel of judges was told about how the instrument was developed, up to the point of their input, and what the authors hoped to have as a final instrument. They were asked to respond to all of the above questions and to make any comment on the instrument that they thought would be helpful to its developers. The responses of this panel were utilized to establish the content validity of the instrument.

In response to the question of whether the items were in the right categories, the majority of the panel recommended that only two items be moved to another category. One was moved as suggested. The other was deleted because it was deemed to be essentially the duplicate of another item in the category to which it was recommended that the item be moved. All other items were left in their original categories since no fewer than eight of the ten judges held that they were appropriately classified.

In response to the question of duplication of items, the majority of the panel recommended that four items be deleted because they were duplicates of other items. All four were deleted. The panel was in total agreement that all other items were not duplicates.

To check the question as to whether the statements generated by the item originators might have represented beliefs rather than attitudes, the present authors presented the panel with definitions of the two concepts. Attitude was defined by Wolman in his Dictionary of Behavioral Science (1973) as "A learned predisposition to react consistently in a given manner (either positively or negatively) to certain persons, objects or concepts. Attitudes have cognitive, affective and behavioral components" (p. 34).

English and English, in their Comprehensive Dictionary of Psychological and Psychoanalytical Terms (1958), defined belief as "An emotional acceptance of a proposition or doctrine upon what one implicitly considers adequate grounds. The grounds for belief, however, are often not examined, nor does the believer imply that others need have the same grounds. Beliefs have varying degrees of subjective certitude" (p. 64).

In not one case out of the total of 85 items was there 100% agreement as to whether the items represented an attitude or a belief. There were two cases in which one panelist said an item represented an attitude while eight said it represented a belief. There were ten items in which the split was two to eight. In all other cases the split was more nearly equal.

Since Wolman (1973) did not define belief and English and English (1958) did not define attitude, it is possible that the definitions were inadequate. No definitions were found that adequately explicated differences in the two concepts. Since the present writers, in their own minds, could not clearly distinguish between attitudes and beliefs nor even determine if such a distinction was necessary, it was decided to eliminate no item based on judgment that it represented a belief rather than an attitude.

The instrument was originally envisioned as a Likert-type scale. The designers of the instrument felt that a five-point scale was appropriate given the rather divergent feelings teachers seem to have about computer use in the classroom. Since the assumption of the equality of the intervals on scales having more than two intervals could not be adequately addressed otherwise, the instrument developers wanted to meliorate a possible problem by using a semantic differential format as utilized by the instrument at the end of this article. The panel of doctoral students were instructed as to the nature of a semantic differential and asked to indicate whether each item on the original instrument could be responded to adequately in a semantic differential format. The semantic differential format was judged to be inappropriate for three items by two out of the ten judges. In all other cases the judges were nine to one or 100% in agreement that the format was appropriate. Because a clear majority of the judges indicated that the semantic differential was appropriate for all items, no items were eliminated because of response format.

A further validity check was run on each item by having the panel of judges indicate whether the items represented a negative or a positive attitude or belief. It was decided that any item on which more than two judges disagreed with the key would be revised or eliminated. Using that criterion, only one item was eliminated, and one was revised. In the present instrument there are two items on which there was 80% agreement among the judges with the key. All others have stronger agreement.

The panel of judges was asked to make any comments on the instrument they thought might be helpful to the instrument developers. On the basis of these comments minor wording changes were made in some items. As a result of the analyses of the

items by the panel of judges, the 85 items were narrowed to 79 items reflecting the five rational categories. The categories and the numbers of items in each category were: instruction-20, remediation-14, enrichment-11, management systems-23, and general-11. The 79 items were then taken out of their categories and randomly assigned to a position within the instrument. See a copy of the instrument at the end of this article.

The investigators are currently involved in the second phase of the development of the instrument. During this second phase plans are being implemented to eliminate, modify, and categorize the items as a result of a principal components analyses. It is anticipated that a later report will provide additional information about the development of this instrument.

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