Computers and Early Childhood Inservice Teachers: A Ten-Year Follow-up Study

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This study examined the extent to which computers were used within the instructional environment by inservice early childhood majors who were former students at a large Southeastern university. It spanned a decade from 1983 to 1993. Grade and educational level responses were analyzed for respondents in preschool and kindergarten classrooms compared with those in first through fifth grades. Results indicated statistically significant differences between grade taught and response on two of the items comprising the Pre-Survey Instrument, and between educational level and response on six items of the Instrument. Likewise, statistically significant relationships were also found on six other measures related to the use of computers in primary schools.

Over a period of ten years, students in different classes taught by the first author were exposed to seven NovaNET applications of computers in their undergraduate program and curriculum development course (Board of Trustees of The University of Illinois, 1990; Powell 1989-90; Powell, 1992-93; Powell & Reiff, 1993). The lessons were selected because of their innovative relationship to the scope and contents of a required course for early childhood preservice teachers. The following is an annotated description of each lesson:

1. **Tenure: A Simulation of a First Year of Teaching** encourages users to make decisions similar to those of a first-year teacher in order to attain
tenure and a salary increase. Average completion time ranges from 30 minutes to 2 hours, and the intended audience includes new teachers. Experiences related to teaching are grouped under six areas during the course or the simulation: classroom management, discipline, criteria and issues related to pupil evaluation, teaching techniques, extracurricular activities, and interpersonal relationships with coworkers.

2. *Statistics for Teachers* presents a discussion on simplified statistics, including descriptive measures and correlations, that aids the teacher in effective pupil evaluation.

3. *Questioning* is designed to introduce the teaching strategy of questioning. Student teachers are the targeted audience.

4. *Basics of Test Item Construction* provides users with practical aspects related to the development and revision of objective tests. Users are exposed to a variety of situations in which decisions are made on how to improve item writing.

5. *Domain-, Criterion-, and Norm-Referenced Tests* teach the basic differences between criterion- and norm-referenced tests. Exercises are provided in which they have to determine under what conditions would each evaluation type be appropriate.

6. *Accommodating Individual Differences* helps the user to understand the importance of addressing individual needs within the teaching-learning environment. Application activities are provided to encourage decision making in dealing with individual differences.

7. *Instructional Procedures* provides exercises and practical situations on how to: gain attention, present the objective, review prerequisite material, provide direction, present information, present practice and feedback, and assess learning.

Exposure of preservice teachers to interactive computer lessons was intended to influence their utilization of them and other appropriate information technologies in their own future practice. With this in mind, a survey instrument, containing two sections with five areas each, was developed to collect data. Section I contains response items for demographics including name, identification number, grade level and school where employed, county, complete address, highest level of education, number of years in the teaching profession, number and duration (if any) of staff development programs (using computers) taken since graduation. Section II of the instrument consists of an item which requires the participants to check up to five applicable phrases on how they use computers, another item has up to eight phrases related to experience in using computers, and another has up to five descriptors intended to elicit “feelings” about any coursework that involved computers. The third item in Section II offers a choice of four statements
about one’s degree of satisfaction with computer experiences, item four provides up to nine “value” judgments about what one “thinks” about computers, and item five elicits up to twelve responses regarding descriptive feelings about computers. Respondents were asked to check “yes” or “no” to indicate their willingness to participate in a 3 - 5 year periodic staff development and research-based computer utilization project. Data from all inservice respondents to the item described above are included in this paper.

The researchers determined that a focus on “grade” and “education” levels could best yield the type of analyses needed to determine which level of interest (preschool and kindergarten; grades 1-5) provided the most computer related experiences for undergraduates, the type of these experiences, and how future staff development programs for primary teachers could be organized.

TECHNOLOGY UTILIZATION IN ELEMENTARY SCHOOLS

Papert (1993) states that technological applications should be integral components of learning, instead of merely add-ons to a predetermined process of education. Other researchers also contend that technology is most beneficial to the teaching-learning process once it has been innovatively integrated into daily classroom practice and into subject matter curricula (i.e., Bruce & Rubin, 1992; Pea & Sheingold, 1987).

On behalf of the National Education Association, a national telephone survey of 1,206 regular education teachers was conducted by Princeton Survey Research Associates (1993). Findings of this study showed that computers across grade levels in elementary schools have normally been distributed in single classrooms; whereas they have been mostly centralized in laboratories at the secondary level. Two-thirds of elementary school teachers have at least one computer in their classroom. However, classrooms with more than one or two computers used by students are more prevalent in higher grades.

Many also believe that the vast majority of teachers prefer four to six computers in the classroom instead of computer laboratories; and if computers are going to be supplied for elementary schools as part of the restructuring process they may be more effectively integrated into the curriculum by being placed in the teachers’ classrooms (Read, Ervin, & Oughton; 1995). The Princeton Survey Research Associates study (1993) also determined that elementary teachers believe that computers have become an integral part of the instructional process and should be used in their classrooms on a continuous basis.

Similarly, Hadley and Sheingold (1993), launched a nationwide survey which included 608 teachers who were integrating computers into their
teaching. Findings indicate that the majority of elementary teachers are “enthusiastic beginners.” Although their entry level knowledge of technology is less than that of their secondary-level peers, these teachers indicate that they are more likely to believe that computers are the key for improving the quality of education and are more likely to feel that their own teaching has been influenced by computer technology.

Meanwhile, other research studies conducted by the first author of this paper are relevant here. For example the application of “Tenure: A simulation of a first year of teaching” (Powell, 1985), included 36 undergraduate early childhood majors. Categorical scores received on the simulation were compared with ratings given on the Teacher Performance Assessment Instruments. Data analysis using the \( t \)-statistic and Product-Moment Correlations revealed significant differences \((p < .05)\) on these measures after student teaching. Another investigation focused on affective response to Computer Based Instruction (CBI) in which the Tenure simulation was also used (Powell, 1987). Seventy-six subjects responded to semantic differential instruments used to measure perception of CBI and the course units in which the simulation was integrated. Findings revealed significant differences on overall scale values \((p < .001)\), and on a number of subscales within both instruments. Similarly, another study with 70 participants investigated the relationship of this simulation to attitudes toward computers, composite teaching units, and achievement in the program and curriculum development course (Powell, 1989-1990). ANOVA yielded a number of significant differences including overall scale values \((p < 0.0001)\) and subscales within the measures used.

In addition, the use of computers by beginning teachers has been the research focus of other writers (e.g., Novak, 1991; Handler & Marshall, 1992). Such studies conclude that computers and new technologies included within courses designed for teacher educators may not be a reliable predictor of future use by graduates of these programs. In fact, these studies have reported that beginning teachers employ technology in their teaching at a significantly lower level than would be expected from graduates who had previously demonstrated competence and positive affective behavior with technology through college-level education courses. However, research also substantiates that many factors may contribute to the extent to which beginning teachers use computers in their classrooms. First, lack of access to computers and appropriate software was often found to be a primary drawback (Novak & Knowles, 1991); but with the increased availability of computers in the schools over the years, the lack of equipment and software programs does not appear to be a prevailing problem at the present time. Second, the lack of resources to provide adequate training can also contribute to limited or no use of computers by beginning teachers. School systems
across the nation are attempting to address these problems by selecting and providing more appropriate equipment, software, and the necessary resources to plan and implement ongoing staff development programs.

**RATIONALE AND RESEARCH QUESTION**

There is a need to investigate what teachers are doing with computers, other technologies and software which have become available to them in the school environment. Given this basic rationale, our research questions were, (a) How do graduates use computers who had been previously exposed to the NovaNET instructional delivery system? (b) What were their prior experiences with computers including NovaNET? (c) What were their feelings about coursework that included computers? (d) What was their present level of satisfaction related to knowledge about computers? (e) What role(s) should computers play in society? and (f) What feelings are communicated about computers? In response to these questions, we wanted to determine the extent of agreement among two categorical variables—grade taught and educational level.

**METHODOLOGY**

**Sample**

The population for this study included 901 inservice early childhood teachers who had graduated from a Southeastern university between the years 1983-1993. Subjects to which the instrument was mailed are broken down on an academic year basis as follows: 1983-84 \(n = 90\), 1984-85 \(n = 94\), 1985-86 \(n = 85\), 1986-87 \(n = 92\), 1987-88 \(n = 92\), 1988-89 \(n = 84\), 1989-90 \(n = 91\), 1990-91 \(n = 96\), 1991-92 \(n = 85\), and 1992-93 \(n = 92\). The numbers indicate those who were members of the first author’s classes over the years stated. They had previously taken 3 - 5 NovaNET lessons during their undergraduate matriculation in a program and curriculum development course, a required prerequisite to student teaching. Ninety-nine percent of the subjects were white female with grade point averages at least 2.75 on a 4.0 scale; the vast majority of students who major in early childhood education at this university is always female. During their undergraduate education covering the years identified, the NovaNET lessons were integrated into the scope and sequence of the methods course with appropriate debriefing sessions held in small or large groups at least twice for
each lesson during each quarter. In addition to the NovaNET lessons, a small percentage of the participants reported minimal exposure to computers (e.g., word processing) upon entering the course.

Computer laboratories with NovaNET access were available to these undergraduates in the College of Education and elsewhere on campus. Assistance for accessing the lessons was also available as needed. As reported, 46% (410) of the surveys were returned (see Figure 1). The grade levels taught in preservice elementary classrooms included preschool through fifth grade; and the numbers reported by education levels were B.S./B.A., 214, M.Ed., 148, Ed.S., 26, and Ph.D./Ed.D., 7.

![Figure 1. Number of surveys returned by years and grade levels taught](image)

### Instrumentation

The instrument called a Pre-Survey on Computer Utilization in Primary Schools was developed within the Department of Elementary Education. It was described earlier.

### Procedure

The Survey instrument was mailed out by support personnel over a period of three months (December 1992 - February 1993) with self-addressed, stamped return envelopes. All participants were currently teaching in pre-kindergarten through fifth grades (see Table 1). Statistical analysis for the items in the survey are reported in Table 2.
Table 1
Participants

<table>
<thead>
<tr>
<th>Grade Taught</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preschool &amp; Kindergarten</td>
<td>31</td>
<td>12.4</td>
</tr>
<tr>
<td>First Grade</td>
<td>40</td>
<td>16.1</td>
</tr>
<tr>
<td>Second Grade</td>
<td>47</td>
<td>18.9</td>
</tr>
<tr>
<td>Third Grade</td>
<td>47</td>
<td>18.9</td>
</tr>
<tr>
<td>4th &amp; 5th Grade</td>
<td>35</td>
<td>14.1</td>
</tr>
<tr>
<td></td>
<td>49</td>
<td>19.7</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>249</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

RESULTS

Highlights of Findings

Chi-square analyses were used to examine the association between grade and education level and item responses. The following are statements based on results from the application of the Chi-square Test of Independence (Association). Statistical analysis was performed using the SPSS software package. These results are based on a .05 significance level. Please note that an asterisk indicates that a particular statement was found to be statistically significant.

1. Responses to the statement, “I think computers should play a part in the education of every child.” (Survey: Section II; 4/4 and Table 2).

   **Grade Level and Responses.** There was no statistically significant difference between the grade level that the teacher taught and his or her response to this question.

   **Educational Level and Responses.** There were no statistically significant differences between the educational level (graduate or undergraduate) of the teacher and his or her responses to this question.

2. Responses to the statement, “I think computers allow teachers to individualize learning.” (Survey: Section II; 4/9 and Table 2).

   **Grade Level and Responses.** There was no statistically significant difference between the grade level that the teacher taught and his or her response to this question.
Educational Level and Response. There was a statistically significant relationship between the responses and educational level of the teachers at the .05 level. In particular, the number of those with only an undergraduate degree that responded “yes” was less than expected, and the number of those with one or more graduate degrees who responded “yes” was more than expected.

3. Responses to the statement, “I think computers have practical value, but are being overemphasized in our society.” (Survey: Section II; 4/2 and Table 2).

Grade Level and Response.* There was a statistically significant relationship between the grade level that the respondent taught and the response of the respondent. In particular, less preschool and kindergarten, first grade, and third grade teachers responded “yes” to this statement than was expected. Additionally, more second grade, fourth and fifth grade teachers responded “yes” to this statement than was expected.

Educational Level and Response. There was no statistically significant difference between the educational level and the respondents’ responses.

4. Responses to the statement, “I have had a brief introduction to computers in a college course.” (Survey: Section II; 2/1 and Table 2).

Grade Level and Response. There was no statistically significant difference between the grade level that the teacher taught and his or her response to this question.

Educational Level and Response.* There was a statistically significant relationship was found between the educational level of the respondent and his or her response. In particular, the number of those with only an undergraduate degree that responded “yes” was more than expected, and the number of those with one or more graduate degrees who responded “yes” was less than expected.

5. Responses to the statement, “I have had one course which focused entirely on educational uses of computers.” (Survey: Section II; 2/4 and Table 2).

Grade Level and Response. There was no statistically significant difference between the grade level that the teacher taught and his or her response to the question.
**Educational Level and Response.** A statistically significant relationship was found between the educational level of the respondent and his or her response. In particular, the number of those with only an undergraduate degree that responded “yes” was less than expected, and the number of those with one or more graduate degrees who responded “yes” was more than expected.

6. Responses to the statement, “I am more or less satisfied with my present level of knowledge about computers and my experience with computers, but would probably learn more if I had the opportunity.” (Survey: Section II; 3/2 and Table 2).

**Grade Level and Response.** There was no statistically significant difference between the grade level that the teacher taught and his or her response to the question.

**Educational Level and Response.** There was a statistically significant difference between level of education of the respondent and his or her response. In particular, the number of those with only an undergraduate degree that responded “yes” was less than expected, and the number of those with one or more graduate degrees who responded “yes” was more than expected.

7. Responses to the statement, “I use (or have in the past used) computers in my everyday life.” (Survey: Section II; 1/1 and Table 2).

**Grade Level and Response.** There was no statistically significant difference between the grade level that the teacher taught and his or her response to the question.

**Educational Level and Response.** A statistically significant relationship was found between the educational level of the respondent and his or her response. In particular, the number of those with only an undergraduate degree that responded “yes” was less than expected, and the number of those with one or more graduate degrees who responded “yes” was more than expected.

8. Responses to the statement, “I use (or have in the past used) computers for playing games.” (Survey: Section II; 1/3 and Table 2).

**Grade Level and Response.** There was a statistically significant relationship between the grade level that the respondent taught and the response of the respondent. In particular, fewer preschool and kindergarten and third grade teachers responded “yes” to this statement than were expected. Additionally,
more first, second, fourth and fifth grade teachers responded “yes” to this statement than were expected.

**Educational Level and Responses.** There was no statistically significant difference between the level of education and responses of participants.

9. Responses to the statement, “I own a computer.” (Survey: Section II; 1/5 and Table 2).

**Grade Level and Response.** There was no statistically significant difference between the grade level that the teacher taught and his or her response to this question.

**Educational Level and Response.** A statistically significant relationship was found between the educational level of the respondent and his or her response. In particular, the number of those with only an undergraduate degree that responded “yes” was less than expected, and the number of those with one or more graduate degrees who responded “yes” was more than expected.

**Further Grouping of Statistically Significant Results**

A statistically significant relationship was found concerning the following statements that relate to how teachers use or have used computers.

1. “I use (or have in the past used) computers in my everyday life.” (Survey: Section II; 1/1 and Table 2).
2. “I own a computer.” (Survey: Section II; 1/5 and Table 2).
3. “I use (or have in the past used) computers for playing games.” (Survey: Section II; 1/3 and Table 2).

A statistically significant relationship was found concerning the following statements that relate to how teachers view the educational value of computers.

1. “I think computers should play a part in the education of every child.” (Survey, Section II: 4/4 and Table 2).
2. “I think computers allow teachers to individualize learning.” (Survey: Section II; 4/9 and Table 2).

A statistically significant relationship was found concerning the following statement that relates to how teachers view the practical value of computers
and the emphasis on computers in society. This question is different from the above two questions in that it does not address specifically the educational value of computers.

1. “I think computers have practical value, but are being overemphasized in our society.” (Survey: Section II; 4/2 and Table 2).

<table>
<thead>
<tr>
<th>Item</th>
<th>Grade Taught</th>
<th>Overall Percent agreement with Item</th>
<th>Educ. Level</th>
<th>Overall Percent agreement with Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think computers should play a part in the education of every child</td>
<td>5.496 4 .248</td>
<td>88.5</td>
<td>893 1 .344</td>
<td>88.5</td>
</tr>
<tr>
<td>I think computers allow teachers to individualize learning</td>
<td>4.720 4 .317</td>
<td>75.5</td>
<td>5.82 1 .015</td>
<td>75.3</td>
</tr>
<tr>
<td>I think computers have practical value, but are being over emphasized in our society</td>
<td>13.135 4 .010</td>
<td>4.0</td>
<td>0.1 1 .916</td>
<td>3.6</td>
</tr>
<tr>
<td>I have had a brief introduction to computers</td>
<td>3.869 4 .423</td>
<td>67.5</td>
<td>9.240 1 .002</td>
<td>67.6</td>
</tr>
<tr>
<td>I have had one course which focused entirely on educational uses of computers</td>
<td>4.044 4 .410</td>
<td>28.0</td>
<td>17.315 1 .000</td>
<td>28.0</td>
</tr>
<tr>
<td>I am more or less satisfied with present level of knowledge about computers... but would probably learn more if I had the opportunity</td>
<td>6.426 4 .169</td>
<td>39.0</td>
<td>8.562 1 .003</td>
<td>39.0</td>
</tr>
<tr>
<td>I use (or have in the past used) computers in my everyday life</td>
<td>6.827 4 .245</td>
<td>46.0</td>
<td>8.404 1 .003</td>
<td>46.0</td>
</tr>
<tr>
<td>I use (or have in the past used) computers for playing games</td>
<td>11.097 4 .025</td>
<td>38.0</td>
<td>1.194 1 .659</td>
<td>40.1</td>
</tr>
<tr>
<td>I own a computer</td>
<td>1.699 4 .790</td>
<td>40.5</td>
<td>4.797 1 .028</td>
<td>41.3</td>
</tr>
</tbody>
</table>

Additional Commentary on Findings

The following three questions relate to the question that we posed in our previous conversation. “How in need of experience with computers do teachers see themselves?” The responses to these statements were statistically significant (as indicated on the previous pages).
1. “I have had a brief introduction to computers in a college course.” (Survey: Section II; 2/1 and Table 2).
2. “I have had one course which focused entirely on educational uses of computers.” (Survey: Section II; 2/4 and Table 2).
3. “I am more or less satisfied with my present level of knowledge about computers and my experience with computers, but would probably learn more if I had the opportunity.” (Survey: Section II; 3/2 and Table 2).

During our discussion, we talked about comparing how excited, happy, and confident teachers were, as well as how unsure, insecure, and apprehensive teachers were. Using the Chi-square test of association, there was no statistically significant difference or relationship at the .05 level concerning responses to the following section given to respondents that addressed their feelings towards computers.

“The words which best describe my feelings about computers are:
- excited (Survey: Section II; 5/2)
- happy (Survey: Section II; 5/4)
- confident (Survey: Section II; 5/9)
- apprehensive (Survey: Section II; 5/7)
- insecure (Survey: Section II; 5/8)
- unsure (Survey: Section II; 5/10).”

The following question is one that was posed in the authors’ discussion. It relates to two questions in the survey and concerns teacher attitudes (positive and somewhat negative) towards computers.

“For those that have had any coursework which involved computers, to what extent does the grade level that they teach or educational level relate to their positive feelings toward computers?” (Survey: Section II; 3/1 and 3/4). There was no statistically significant difference between the grade level that the teacher taught and his or her responses to this question.

**SUMMARY AND IMPLICATIONS**

The rationale for this study lead to the development of a survey instrument essentially designed to determine the extent of inservice teachers’ use of computers and related information technologies, experiences in using computers, level of satisfaction, role of computers, and affect related thereto. Data analysis grouped responses based on grade and educational level of
preschool-kindergarten teachers and first through fifth grade teachers. A summary of statistically significant differences were determined as follows: Regarding responses made to a statement (Survey, Section II), “I think computers allow teachers to individualize learning,” a statistically significant relationship between the responses and educational level of the teacher was found. On responses to a statement, “I think computers have practical value, but are being overemphasized in our society,” (Survey, Section II), there was a statistically significant relationship between the grade level that the respondent taught and the response of the respondent. Responses to the statement, “I have had a brief introduction to computers in a college course,” (Survey, Section II), a statistically significant relationship was found between the educational level of the respondent and his/her response. Responses to the statement, “I have had one course which focused entirely on educational uses of computers,” (Survey, Section II), a statistically significant relationship was found between the educational level of the respondent and his/her responses. On the statement, “I am more or less satisfied with my present level of knowledge about computers and my experience with computers, but would probably learn more if I had the opportunity,” (Survey, Section II), there was a statistically significant difference between the educational level and the response of the respondents. Regarding the statement, “I use (or have used in the past) computers in my everyday life,” (Survey, Section II), a statistically significant relationship was found between the educational level of the respondent and his/her response. On another statement, “I use (or have used in the past) computers for playing games,” (Survey, Section II), there was a statistically significant relationship between the grade level that the respondent taught and the response of the respondent. Finally, in response to the statement, “I own a computer,” (Survey, Section II), a statistically significant relationship was found between the educational level of the respondent and his/her response.

It is our ultimate endeavor to assist elementary classroom teachers in further realizing the impact which computer technology can have upon curriculum content and process, as instructional and managerial options. More specifically, the scientific benefits of our study can be articulated from the following perspectives: (a) new information on motivating undergraduate future teachers to embrace and adapt new technologies for classroom effectiveness, (b) encouragement of a wide audience of teachers to embrace the use of computers in classrooms, and (c) the interactive development of innovative course designs for current and future elementary education teachers.

Based on this study, it is highly important for educators to develop and implement an ongoing staff development program focused on computer utilization in teaching and learning practices in elementary schools from preschool
through fifth grade. Additionally, a research agenda should also include appropriate designs that will determine the effects of computer technology on the learning outcomes of inservice elementary and middle school teachers and their students.

References

Board of Trustees of the University of Illinois. PLATO (trademark of Control Data Corp.) and NovaNET Systems Service mark of University of Illinois Communications, Inc., 1990.


APPENDIX A
PRE-SURVEY ON COMPUTER UTILIZATION IN PRIMARY SCHOOLS

NAME ___________________ SS# __________________________

Section I
Please provide the following demographic data.

1. What grade level do you teach in the primary (or middle) grades? _________
2. Name of school where you presently teach ________________________________
   County ___________________ Address _________________________________
3. Identify your highest level of education: _______ B.S./B.A. _______ Masters
   _______ Specialist _______ Ph.D./Ed.D.
4. How many years have you taught?
5. Have you been involved in any staff development programs on the use of
   computers since graduating from The University of Georgia? _____ yes _____ no
   If yes, how many? ___________ Length of time in weeks _____________

Section II
Check ALL statements which apply to you.

1. I use (or have in the past used) computers
   ___ in my every day life.
   ___ in my school work.
   ___ for playing games.
   ___ in a business where I work(ed).
   ___ I own a computer.

2. I have had
   ___ a brief introduction to computers in a college course.
   ___ only one computer science course.
   ___ more than one computer science course.
   ___ one course which focused entirely on educational uses of computers.
   ___ more than one course which focused entirely on educational uses
     of computers.
   ___ one course in which instruction was delivered by computer.
   ___ more than one course in which instruction was delivered by computer.
   ___ absolutely no course in which computers were utilized for any
     reason whatsoever.
If you have had any coursework which involved computers, describe your feelings about that coursework.

__Very Positive__
__Somewhat positive__
__Neutral__
__Somewhat negative__
__Extremely negative__

3. I am
__completely satisfied with my present level of knowledge about computers and my experience with computers.
__more or less satisfied with my present level of knowledge about computers and my experience with computers, but would probably learn more if I had the opportunity.
__not sure I know enough about computers. I would like to work with computers more and learn more about them.
__badly in need of more experience with computers because I know very little about them.

4. I think computers
__are a very important part of our world.
__have practical value in our society.
__should have no place in our society.
__should play a part in the education of every child.
__should be kept out of schools and classrooms.
__may replace teachers someday.
__will never replace good teachers.
__dehumanize the education of young children.
__allow teachers to individualize learning.

5. The words which best describe my feelings about computers are

__angry__ __apprehensive__
__excited__ __insecure__
__frightened__ __confident__
__happy__ __unsure__
__apathetic__ __distrustful__
__worried__ __confused__
Would you be willing to participate in a 3 to 5 year periodic staff development and research-based computer utilization project? _____yes _____no. If yes, please provide a mailing address where you would like to be contacted if different from your school address:

_________________________________________________________________________

COMMENTS: