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An investigation of changing concerns toward instructional computer use during student teaching

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AN INVESTIGATION OF CHANGING CONCERNS TOWARD INSTRUCTIONAL COMPUTER USE DURING STUDENT TEACHING

A Dissertation

Submitted

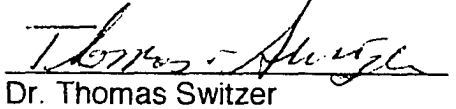
In Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Approved:

Dr. Sharon Smaldino



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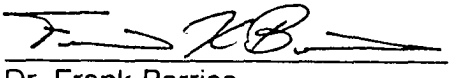

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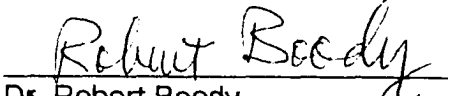

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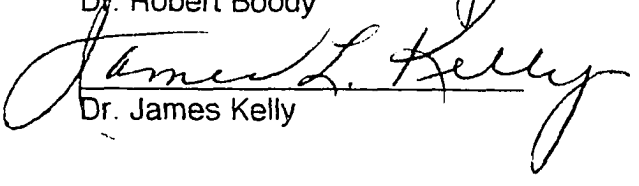

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AN INVESTIGATION OF CHANGING CONCERNS TOWARD INSTRUCTIONAL COMPUTER USE DURING STUDENT TEACHING

An Abstract of a Dissertation

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ABSTRACT

This study investigated hypothesized change in the concerns of student teachers toward instructional computer use during an eight week student teaching experience. In Phase 1, information concerning seven variables which have the potential to influence teacher computer utilization was collected from student teachers and their cooperating teachers. In addition, seven dimensions of concern toward employment of instructional computer use were examined by administering the Stages of Concern Questionnaire (SoCQ) before and after the student teaching experience.

Multiple regression analysis indicated that change in only one of the seven stages of concern (concerns toward collaboration) could be predicted by any of the independent variables. Post hoc partitioning of data resulted in construction of a 2 x 2 matrix. SoCQ profiles, constructed for each cell, revealed that change patterns differed greatly depending on the relative level of the two independent variables: (a) student teacher computer competence and (b) instructional computer use by the cooperating teacher.

Phases 2 and 3 of the study employed focus group discussions with student teachers and cooperating teachers. Phase Two data yielded a picture of student teachers with modest technical computer knowledge and high concerns for the role of the computer in the classroom. Students teachers looked to their cooperating teachers and university evaluation criteria for direction in establishing a priority of competing concerns. Neither source appeared to place a high priority on competence with instructional computer use. However, the opposite was true for student teachers when they underwent job interviews with school district administrators. Cooperating teachers, aware

of the gap between their own university preparation and the computer capabilities they find themselves increasingly expected to utilize, looked to their student teachers to arrive with more up-to-date computer backgrounds.

Based on the post hoc partitioning of data, it was concluded that changes in the concerns of student teachers toward instructional computer use do differ as a function of (a) the prior computer competency of student teachers and (b) the amount of instructional computer use employed by cooperating teachers. Focus group discussions revealed that expectations for computer use play a critical role in student teaching experiences and that computer use may present a role reversal within some student teaching triads, as student teachers share personal computer competence.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

STATEMENT OF THE PROBLEM

This study focused upon hypothesized changes in the concerns of student teachers toward instructional computer use in the classroom. More specificall, the research investigated the relationship between such changes and several factors present in the student teaching setting.

Of all preservice experiences, student teaching has historically been perceived as holding a unique position in its ability to influence the classroom instruction of future teachers (Appleberry, 1976; Haring & Nelson, 1980). Recent calls for the placement of student teachers with cooperating teachers who employ a high degree of instructional computer use (Bruder, 1989; Ingram, 1991; Oke, 1992; Willis, 1993) have renewed questions concerning the adoption of technology-based innovations and the influence of various aspects of the student teaching experience.

Considerable support exists for the assertion that the quality of the student teaching experience depends heavily on the cooperating teacher--in particular the cooperating teacher's professional abilities and attitudes (Turney, 1985). However, recent research has raised questions about the role of other, less obvious forces at work in the student teaching setting.

The investigation of ecological context by Tabachnick and Zeichner (1984) led to interest in the effects of underlying support structures in student teaching settings. In addition, recent research by Reed (1990) indicated that the prior knowledge of student teachers may be an especially important factor in any attitudinal changes to be expected from preservice technology experiences.

Given that several authors have called for placement of student teachers with cooperating teachers who employ a high degree of instructional computer use (Bruder, 1989; Ingram, 1991; Oke, 1992; Willis, 1993), a review of the recommendation and its underlying research base are in order. The recommendation rests on the assumption that a relationship exists between such placements and the likelihood of future employment of this particular innovation by student teachers. The purpose of this study was to investigate this assumption and to attempt to clarify understanding of the role which other variables may play in mediating the assumed benefit of such placements.

Introduction

The problem to be considered in this study was whether a relationship existed between changes in the concerns of student teachers toward instructional computer use and several factors involving student teachers themselves, cooperating teachers, and the broader institutional context of the classrooms in which student teaching experiences take place. In particular, the study was concerned with movement across the Stages of Concern as outlined by the Concerns-Based Adoption Model (Hall, George, & Rutherford, 1977).

Variables for investigation were grouped into three clusters: those relating primarily to cooperating teachers; those relating primarily to student teachers; and finally, a measure of overall institutional context and its role in facilitating or inhibiting instructional computer use. Four variables were identified which related most directly to the cooperating teacher: (a) amount of instructional computer use employed by the cooperating teacher, (b) length of employment of instructional computer use, (c) perceived educational impact of

computers, and (d) the amount of instructional computer use employed by pupils in the classroom.

Three variables were investigated which related primarily to the student teacher: (a) the entering Stage of Concern toward instructional computer use, (b) the prior computer capabilities of student teachers, and (c) the student teacher's perceived degree of instructional autonomy. Finally, the degree of facilitation provided by institutional context was examined.

Purpose of the Study

The purpose of this study was to provide field experience supervisors and policy makers with information concerning the effect of placement of student teachers with cooperating teachers employing a range of degrees of instructional computer use. In addition, the study explored the role previously identified factors play in mediating the effect of such placements and provided a basis for further exploration of this issue by future researchers.

Statement of Need

This study was based on three primary areas of need. They were: (a) widespread concern that recent graduates of teacher preparation institutions are not adequately prepared for classroom computer use, (b) recent calls for changes in the computer component of preservice teacher education pertaining to student teaching, and (c) a need for research on previously identified variables which have the potential to mediate the effects of placement with a cooperating teacher who employs instructional computer use to a greater or lesser extent.

Adequacy of Preservice Computer Preparation

Criswell (1989) reported a growing sense of failure in preservice education programs to prepare first-year teachers who feel confident about using computers in their classrooms. In a similar vein, Ingram (1991) concluded that the use of computers in elementary teacher education programs is inadequate for training teachers for the 21st Century.

Reports raising questions about the technological preparation of U.S. teachers began arising in the late 1980s and have continued. In 1988, the U.S. Congress' Office of Technology Assessment released the results of a survey of recent graduates of teacher preparation institutions across the nation. The results indicated that two thirds of the graduates questioned did not feel themselves to be adequately prepared to use computers in teaching (Office of Technology Assessment, 1988).

More recent reports have highlighted similar findings. A 1989 survey of deans, faculty, and computer coordinators at the 15 largest U.S. schools of education found little evidence that computers and other forms of technology played any major role in a student's typical preservice education (Bruder, 1989). The editors of Electronic Learning concluded that minimal emphasis upon preservice computer knowledge "is a major impediment to technology use once [preservice teachers] become teachers" (Bruder, 1989, p. 21).

Calls for Reform of Computer Education

Such critcisms have not gone unnoticed. In response, several authorities (Glenn & Carrier, 1989; Handler, 1993; Oke, 1992) and some teacher preparation organizations, such as The Holmes Group (1993), have called for

special emphasis upon the placement of undergraduates in student teaching environments which employ a high degree of instructional computer use.

Previous studies have reported that the teaching of most student teachers closely reflects the methods used by their cooperating teachers (Wragg, 1970; Yee, 1969). Therefore, there is reason to believe that the amount of time that cooperating teachers are actually engaged with instructional computer use might impact the teaching of student teachers. However, studies to date have not provided any direct evidence of such an effect.

Variables with Potential for Mediation

Earlier research on computer education has identified several other competing and sometimes overlapping variables present in the teaching environment. Some of the identified variables have the potential to mediate the effects of a high degree of employment of instructional computer use by cooperating teachers upon student teacher concerns toward instructional computer use.

The development of positive attitudes toward computer use is a goal of many computer education efforts. However, in a review of a statewide teacher training program's impact on computer usage in participants' classrooms, Stieglitz and Costa (1988) found that positive attitudes toward the use of the computer did not always lead to a high level of classroom use. The possible effect of this disjuncture of cooperating teacher attitudes and actions upon student teachers has not previously been explored.

In addition, a recent study of exemplary computer-using teachers by Sheingold (1991) raised questions which extend beyond the sheer number of

minutes of employment. Documenting trends in the teaching practices of 600 teachers nominated from across the nation for their efforts in integrating the computer into their instructional program, Sheingold reached the conclusion that "It takes time for these teachers to master computer-based practices and approaches--fully five to six years of teaching with computers" (Sheingold & Hadley, 1990, p. viii). As teachers gain experience employing instructional computer use, there appears to be an evolution in not only the amount of computer use, but also evolving patterns in the ways of using computers. The number of years of cooperating teacher involvement with instructional computer use, as one means of measuring this variable, has not been addressed in the literature as a possible mediating variable on concerns of student teachers.

Likewise, the literature provides reason to believe that the prior background experience which the student teacher brings to the student teaching experience has the potential to significantly mediate the effect of cooperating teacher employment of instructional computer use. In measuring the effect of computer integration in methods classes, Reed (1990) found very different shifts in concerns toward classroom computer use, depending upon the levels of prior computer use which students brought into the methods class. It seems plausible that prior experience with computers, as evidenced by computer capabilities, would play a similar role in the impact of the student teaching experience. While the presence or absence of such a relationship has been alluded to in the literature (Handler, 1993), no attempt at direct verification has been attempted.

Looking beyond the immediate classroom setting, research by Copeland (1977), and Tabachnick and Zeichner (1984) indicated that broader institutional

context exerts considerable influence upon classroom employment of instructional computer use. Basic availability of hardware and software is often a barrier for teachers. In a recent survey by the International Association for the Evaluation of Education Achievement (IEA), 53% of elementary teachers cited insufficient numbers of computers as a significant problem, and 33% of secondary teachers cited the lack of appropriate software as a problem (Pelgrum & Plomp, 1991).

Aside from the procurement of hardware and software, the extent of training is an obvious aspect of the school environment which can affect employment of instructional computer use. Given that isolated computer training efforts seldom result in altered instructional patterns (Glenn & Carrier, 1989), the availability of repeated or extended training opportunities may act to facilitate the employment of instructional computer use.

Long-term support encompasses more than training sessions, however. Teachers attempting technology innovation often have specific questions which need to be answered on the run. While less experienced users of classroom computers often express the need for support with technology questions, experience tends to bring different requests for support with questions increasingly related to pedagogy and curriculum (Sheingold, 1991). Therefore, the availability of on-site support personnel may be a critical variable facilitating or inhibiting instructional computer use in a given setting.

Linked to the questions about technology and pedagogy, the need for time to realign the teaching of content with new technology is ever present. Insufficient time to plan for the employment of instructional computing use has

been repeatedly identified as a barrier for computer use which is beyond the cooperating teacher's control (Pelgrum & Plomp, 1991; Sheingold, 1991).

Finally, beyond the availability of hardware and software, the amount of support offered by training and on-site resource assistance, and the amount of planning time, the role of the principal appears to be especially important in setting the expectation for employment of instructional computer use in the school. Several studies have reported that teachers view the school principal as the main initiator in stimulation of computer use within a given school (DuPagne & Krendl, 1992; Knupfer, 1989; Sheingold, 1991).

Taken together, the adequacy of provision of these various factors forms an institutional context within a school which can strongly influence the employment of instructional computer use by the classroom teacher. The effect of the greater institutional context upon concerns of student teachers toward instructional computer use awaits investigation in the literature.

Summary

There is widespread concern that recent graduates of teacher preparation institutions are not adequately prepared for classroom computer use. These concerns have led to recent calls for placement of student teachers with cooperating teachers who employ instructional computer use on a regular basis in the classroom. While Handler's study of feelings of preparedness (1993) gave some credence to the idea that student teaching can be a significant factor in moving beginning teachers toward adoption of instructional computer use, substantial documentation of such movement is yet to be reported in the literature.

In addition, several other possible mediating variables as identified in the literature have yet to be taken into account. Early studies have suggested that the following variables may play an important role: (a) cooperating teacher's attitude toward instructional computer use, (b) cooperating teacher's length of involvement with the innovation, (c) the prior computer experience of student teacher, (d) the student teacher's perceived degree of instructional autonomy, and (e) a variety of factors arising from the broader ecological context of the setting.

Hypotheses

Research Hypotheses

The problem for investigation in Phase 1 of the study was an examination of changes in future teachers' concerns towards instructional computer use during student teaching placement. Utilizing the seven Stages of Concern hypothesized by the Concerns-Based Adoption Model, Phase 1 of the study investigated changes in concerns toward instructional computing use during the student teaching experience and the relationship of such change to seven factors: (a) the computer competence of student teachers prior to entering student teaching, (b) the extent of employment of instructional computer use by the cooperating teacher, (c) the extent of employment of instructional computer use by students, (d) cooperating teacher attitudes toward instructional computer use, (e) length of employment of instructional computer use by cooperating teacher, (f) the degree of autonomy experienced by the student teacher, and (g) the level of support evidenced by the broader institutional context.

The first hypothesis concerned the existence of change within the student teaching setting.

Hypothesis 1. Change occurs in the concerns of student teachers toward instructional computer use between the beginning and end of the student teaching experience.

Eight additional hypotheses were proposed concerning relationships between the hypothesized changes in the concerns of student teachers toward instructional computer use and the eight independent variables of the study.

Hypothesis 2. Changes in the concerns of student teachers toward instructional computer use differ as a function of the prior computer competence of student teachers.

Hypothesis 3. Changes in the concerns of student teachers toward instructional computer use differ as a function of the extent of instructional computer use employed by cooperating teachers.

Hypothesis 4. Changes in the concerns of student teachers toward instructional computer use differ as a function of the extent of instructional computer use employed by students of the cooperating teacher.

Hypothesis 5. Changes in the concerns of student teachers toward instructional computer use differ as a function of the cooperating teacher's perceived educational impact of instructional computer use.

Hypothesis 6. Changes in the concerns of student teachers toward instructional computer use differ as a function of the cooperating teacher's length of utilization of instructional computer use.

Hypothesis 7. Changes in the concerns of student teachers toward instructional computer use differ as a function of the student teacher's perceived degree of instructional autonomy.

Hypothesis 8. Changes in the concerns of student teachers toward instructional computer use differ as a function of the level of support provided by the institutional context.

Null Hypotheses

Null Hypothesis 1. No change occurs in the concerns of student teachers toward instructional computer use between the beginning and end of the student teaching experience.

Null Hypothesis 2. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the prior computer competence of student teachers.

Null Hypothesis 3. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the extent of instructional computer use employed by cooperating teachers.

Null Hypothesis 4. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the extent of instructional computer use employed by students of the cooperating teacher.

Null Hypothesis 5. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the cooperating teacher's perceived educational impact of instructional computer use.

Null Hypothesis 6. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the cooperating teacher's length of utilization of instructional computer use.

Null Hypothesis 7. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the student teacher's perceived degree of instructional autonomy.

Null Hypothesis 8. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the level of support provided by the institutional context.

Limitations

The following limitations of the study are acknowledged:

1. The study as conceived and conducted was exploratory in nature as opposed to experimental. The research was limited to an examination of several variables in naturally occurring student teaching placements. As such, results are intended primarily to serve the function of providing insight into possibilities for further reflection, questioning, and research.

2. The study was conducted using student teachers enrolled in one state-supported teacher preparation university in the Midwest. While findings of the study can inform discussion of issues in a broader arena, specific generalizations from the data should be limited by characteristics of that group.

Definition of Terms

For purposes of clarity, the study utilized specific definitions of the following terms:

1. Instructional computer use--(a) The use of a computer by students as a means of attaining instructional objectives or (b) use of a computer by teachers in the presence of students as a means of attaining instructional objectives. This definition effectively excluded activities such as employment of teacher

utility programs for purposes such as record-keeping, or grading, and also employment of programs with primarily recreational intent.

2. Computer competencies--The ability to successfully employ the computer for specified purposes in a classroom.

3. Concern--"The composite representation of the feelings, preoccupation, thought, and consideration given to a particular issue or task" (Hall, et al., 1977, p. 5).

4. Instructional autonomy--The amount of freedom a teacher has in making decisions regarding what is to be taught in a classroom and how it is to be taught.

Summary

The problem to be considered in this study was whether a relationship existed between changes in the concerns of student teachers toward instructional computer use and several factors involved in student teaching settings. In particular, the study was concerned with movement across the Stages of Concern as outlined by the Concerns-Based Adoption Model (Hall et al., 1977).

Several variables associated primarily with cooperating teachers were identified for investigation: (a) amount of instructional computer use employed by the cooperating teacher, (b) length of employment of instructional computer use, (c) perceived educational impact of computers, and (d) the amount of instructional computer use employed by pupils in the classroom. Another cluster of variables associated primarily with student teachers were identified for investigation: (a) the entering Stage of Concern toward instructional computer use, (b) the prior computer capabilities of student teachers, and (c) the student

teacher's perceived degree of instructional autonomy. Finally, the degree of facilitation provided by institutional context was examined.

A three-phase research design was employed for the investigation. The design consisted of a quantitative investigation of changes in the concerns of student teachers toward the educational innovation of instructional computer use (as measured by the SoCQ) and possible relationships with a variety of factors present in the student teaching experience.

Phase 2 of the research project employed an interview with a focus group comprised of 8 student teacher participants. The focus group was used as a means of investigating perceptions of student teachers regarding expectations and actual occurrence in the student teaching experience and reaction to the conclusions drawn from an analysis of the Phase 1 quantitative data.

The final phase of the research project employed an interview with a second focus group comprised of 8 cooperating teachers. Similar to the Phase 2 focus group, this focus group was used as a means of investigating the perceptions of cooperating teachers regarding expectations and actualities in the student teaching experience and reaction to the conclusions drawn from an analysis of the Phase 1 quantitative data. In addition, the focus group also explored reactions to the Phase 2 qualitative data drawn from the student teacher focus group. Exit interviews with participant reviewers who had reviewed qualitative reports were conducted to establish areas of common interpretation and areas in need of further amplification.

CHAPTER II

REVIEW OF LITERATURE

This chapter begins with an historical perspective on computers and teaching. An overview of the arrival of computers in the classroom and the historic response of teacher preparation institutions is presented to provide a context for understanding current calls for reform.

A review of the literature base for student teaching is then presented. Emphasis is placed on the ways in which student teachers are thought to be impacted by the student teaching experience. To that end, several aspects of student teaching will be studied, including a review of the literature on the role of cooperating teachers, the role of student teachers, and the impact of the broader institutional setting.

Instructional computer use is then considered in terms of educational innovation. Various theories from the literature on individual and organizational change will be summarized, with special attention being given to the Concerns-Based Adoption Model as theorized by Hall et al. (1977).

Finally, a synthesis of current knowledge from studies of student teaching, computer technology, and innovation adoption will be presented. This synthesis will form a rationale for the eight hypotheses which form the basis of the proposed study.

Historical Context of Computers in Education

"Teaching is practical work carried out in a socially constructed, complex and institutionalized world of schooling, and as such must be examined contextually as well as historically situated to understand why teachers do what they do" (Sanders & McCutcheon, 1986 as cited in Ross & Jenne, 1993, p. 2).

While mainframe computers were first introduced to school settings in the early 1970s (Wilson, 1984), it was the development of the first IBM microcomputer in 1978 which brought the computer to the classroom. In the subsequent decade, American education witnessed two simultaneous developments: (a) the release of an accelerating number of reports critical of public education in general and student achievement in particular, and b) the rapid expansion of computers in American schools.

In 1984, then Secretary of Education Terrel Bell announced a 4-year initiative to bring the U.S. educational system into the technological age with the microcomputer leading the way.

> Without doubt the potential is enormous as the computer can respond rapidly and cheaply to almost the full range of the learning process, from drill and practice to complex problem-solving simulations. The goal is the mass delivery of instruction which will address both the shortage of mathematics and science teachers as well as the low-level of student achievement. (Bell, 1984, cited in Hanson, 1985, p. 76)

As public media increasingly associated computers with competence, bottom-up pressure began to merge with top-down initiatives to embrace the role of computer technology in the classroom. What followed in the nation's schools was a rapid acquisition of educational technology, unparalleled in the history of American education (Cuban, 1986). Between 1981 and 1987, the percentage of American schools with one or more computers for instruction grew from 18% to 95% (OTA, 1988).

This unprecedented rate of acquisition drew the attention of many research efforts toward counting the quantity of machines, minutes, and courses during the early and mid 1980s (Becker, 1984; OTA, 1988). While recommendations for credentialing of future teachers were initiated during this

time, the provision of inservice programs lagged considerably behind the provision of computers themselves. By 1987, only one third of all K-12 teachers reported having had as much as 10 hours of computer training (OTA, 1988).

Research data would indicate that the second phase of technology acquisition which began in the late 1980s did attempt to provide a minimal amount of inservice training to classroom teachers. By 1991, 88% of teachers had taken a computer course (Lent, 1991). However, 60% of those teachers reported feeling that the typical inservice received was unsatisfactory. Explanations for this dissatisfaction have been sought in the typical content of such inservice sessions. While not totally lacking, applications in the classroom were found to often receive only secondary attention, at least in part due to the large amount of time consumed in most training sessions on learning how to use the computer itself and selected software (Glenn & Carrier, 1989). Without additional extensive follow-up support, it became apparent that efforts to train teachers did not significantly alter patterns of traditional instruction (Balajthy, 1988; Schug, 1988; Stieglitz & Costa, 1988).

As the 1990s began, the number of computers in U.S. schools had risen to exceed 2,400,000 (Becker, 1991). Sheingold (1991) reported a study of 608 teachers nationwide who had been nominated for exemplary use of computers in their teaching. The study of teachers in Grades 4-12 focused upon teachers, their teaching practices, and the teaching environments in which they worked.

Ninety percent of the teachers in the study reported having used computers for more than 4 years. The development of variety in teaching practices was connected with more experience in using computers in the classroom. On average, the teachers in the study listed between 14 and 15

different uses for computers in their classrooms. However, teachers who had used computers less than two years utilized an average 10.8 different applications in the classroom, while those who reported using computers for more than nine years averaged 17.1 applications.

Trends in specific types of teaching approaches appeared to be related to teacher experience as well. The percent of teachers whose students were creating their own products increased steadily until 5 to 6 years of utilization, then leveled off at near 65%. Students exploring programs on their own also rose until the fifth or sixth year, where it leveled off at 35%.

In an inverse relationship, teacher responses indicated that utilization of computers for enrichment, remediation, and drill/games followed a pattern of decline with increasing teacher experience. By the ninth year of computer use, the number of teachers using the computer for enrichment had decreased to less than 35%; teachers using the computer for remediation decreased from 50% to less than 35%; and a similar pattern was found with drill/game use which decreased from 40% to 19%.

Responses to questions concerning the teachers' schools indicated that a strong network of institutional support had been developed. Hardware was abundant. The schools averaged more than twice the number of computers found in a random sample of schools nationwide (59 per school in contrast with 26). While 90% were to some degree self-taught, 80% had attended conferences and workshops on their own time, and 60% had taken inservice offered by the district. Seventy-seven percent had access to on-site personnel for computer support and advice.

In summary, Sheingold's (1991) was the first study to look at exemplary computer-using teachers and their institutional surroundings. Several important descriptions emerged from the study:

1. Teaching practices which utilized the computer changed across time depending upon the length of the teacher's experience with the innovation.

2. The incorporation of instructional computer use into a well-organized teaching practice took several years--fully 5 to 6 years for this group of teachers.

3. These teachers' schools provided high levels of institutional support by means of extensive technology, on-site resource personnel, and inservice opportunities (Sheingold, 1991, p. vii).

Preservice Computer Training

The response of most colleges and universities to the arrival of the computer in the classroom was to act by establishing a set of computer literacy statements or program guidelines (Criswell, 1989). Historically, individual institutions sought to meet these computer related goals by (a) requiring a computer-specific course, (b) modifying audiovisual courses to include a computer component, or (c) some combination of the two approaches.

In spite of such early efforts, however, the computer education component of preservice teacher education has received repeated criticism. Ingram (1991) reported that in only five of the eight colleges was a computer course required within the elementary education program. Most recently, the Office of Technology Assessment has found facilities and faculties of preservice teacher programs to be wanting.

> OTA work in progress suggests that teacher education students are exposed to very few educators who use technology as a teaching tool in their preservice program and see very little

> technology use in their student teaching placements. Teacher education students are taught about technology, often in a required course, but less often taught with technology. Many education faculty do not have the skills needed to teach with technology, and thereby help their students integrate common technology applications into their teaching. (OTA, 1993, p. 4)

The most recent calls for reform in preservice computer education have centered around three principle dimensions of preservice preparation: (a) the content of computer specific courses for education majors (Criswell, 1989; Niess, 1990), (b) the modeling of instructional computer use in methods courses (Oke, 1992), and (c) the placement of student teachers with cooperating teachers who employ a high degree of instructional computer use (Bruder, 1989; Ingram, 1991; Oke, 1992; Willis, 1993).

Recommendations for computer-specific course work have been voiced for some time. However, recent recommendations have included a call that not only should computer-specific courses be required of education majors, but that the courses should be encountered early in the training sequence (Criswell, 1989; Niess, 1990). In light of such proposals, one response has been the restructuring of the traditional educational media course to focus much more upon computers and related technologies (Oke, 1992). However, only slightly more than half of the nation's colleges of education require that their students take such a course in informational technology (OTA, 1995).

Computer-Integrated Methods Courses

Others have agreed with the necessity of an introductory computer course, but caution that the limitation of computer curriculum to a stand-alone course only contributes to the broader problem of technical knowledge without pedagogical application (Berger & Carlson, 1988; Callister & Burbules, 1990).

Several professional organizations have taken the position that the integration of instructional computer use into courses throughout teacher education programs is fundamental to adequate preservice computer training (American Association for Colleges of Teacher Education, 1987; Association for Educational Communications and Technology, 1989) .

It is argued that education students need to see their professors repeatedly modeling the use of the computer and related technologies (Handler, 1993; Oke, 1992). Glenn and Carrier (1989) argue that if methods professors do not use the computer, the chances are significantly reduced that preservice teachers will use the computer in their future classrooms. Bitter and Yohe (1989) have singled out the integration of technology into teacher preparation as the single most pervasive issue in colleges of education today relative to technology.

Research literature investigating the effect of computer-integrated methods courses, while limited, is supportive of the practice. In one of the few studies in this area, Reed (1990) found that students exposed to computer activities in a content methods course evidenced substantial shifts in attitude and knowledge. Using a pre- and posttest design, 23 secondary English majors were asked to complete three activities at the beginning and end of an 11-week computer-intensive English methods course: (a) a listing of no more than 10 uses of computers in the English classroom and then rank them based on importance, (b) completion of a self-evaluation questionnaire on computer anxiety, and (c) completion of a Stages of Concern Questionnaire (Hall et al., 1977).

Comparison of pretest and posttest results indicated that (a) students were able to identify considerably more uses of computers, (b) the uses deemed important appeared to shift away from drill and toward composing uses of computers, (c) anxiety toward computers decreased significantly (t (22) = 3.363, $p < .002$), and (d) substantial changes in the Stages of Concern were noted. Of particular importance to the Stages of Concern data, Reed noted a strong interaction with the prior computer experience of students.

> Those students having no prior experience experienced the most changes; they decreased their Awareness- and Personal-related concerns while increasing their consequence-, Collaboration- and Refocusing-related concerns. Those having only word processing background increased their Collaboration- and Refocusing-related concerns. And, those with both word processing and programming language background reduced their Informational-, Personal-, and Management-related concerns. (Reed, 1990, 23)

In his discussion and summary, Reed acknowledged the limitations of measuring student concerns within the campus setting and pointed to the need for studies of student teachers and first-year teachers. Nonetheless, Reed's study remains one of the few studies undertaken thus far which documents a link between changes in preservice teachers and their engagement in an environment characterized by a high degree of instructional computer use.

In spite of such research findings, computer-integrated methods courses are still uncommon for the most part in teacher preparation programs (OTA, 1993). Most education majors enter the student teaching experience having seen little demonstration of instructional computer use (Sheingold, 1991).

Given this situation, several writers (Criswell, 1989; Oke, 1992) and some teacher preparation organizations, such as The Holmes Group (1993), have called for the placement of undergraduates in student teaching environments which employ a high degree of instructional computer use.

Student Teaching

> We rarely recognize the extent in which our conscious estimates of what is worthwhile and what is not are due to standards of which we are not conscious at all. But in general it may be said that the things which we take for granted without inquiry or reflection are just the things which determine our conscious thinking and decide our conclusions. (Dewey, 1916, p. 18)

Of all the components of preservice education, student teaching has held a unique role in its perceived ability to influence future teachers (Appleberry, 1976; Haring & Nelson, 1980). However, the knowledge base concerning field experience has historically been considered weak and contradictory; hence, a great deal of debate continues about the role that student teaching plays in teacher development.

The cooperating teacher, the student teacher, and the university supervisor form a triad of interaction during the student teaching placement. There is general consensus that cooperating teachers have greater influence on student teachers than do university supervisors or university instructors (Watts, 1987).

The speed of displacement of university mentors has been documented in a study by Richardson-Koehler (1988). In as little as 2 weeks time, student teachers in the study began discounting the influence of their university instructors, attributing their teaching practices to the primary influence of their cooperating teacher.

A number of investigations have indicated that the attitudes of student teachers tend to move during teaching practice in the direction of those held by their cooperating teachers (Cohen, 1969; Johnson, 1968; Yee, 1969). The exact nature of this shift has been debated. Many student teachers believe that cooperating teachers disapprove of ideas and methods advocated by the

teacher education program (Derrick, 1971; Shipman, 1967). Wittrock (1962) suggested that student teachers are capable of "impression management" for the benefit of persons holding power over them, while remaining wedded to the ideas and teaching practices advocated by their college institutions.

In addition to the question of overall attitude, several studies have indicated that student employment of the skills and dispositions which have been introduced in foundations and methods courses is highly dependent upon the specific setting wherein student teachers are placed (Grant, 1981; Hodges, 1982). Several authors have reported finding that the teaching of most student teachers closely reflects the methods used by their cooperating teachers rather than those suggested in the teacher education program (Yee, 1969; Wragg, 1970). Here again, the means by which cooperating teacher influence is exerted upon student teachers has been greatly debated.

The historical view of student teaching as an apprenticeship has placed an emphasis upon the reproduction of a set of valued teaching behaviors (Stones, 1984). Until recently this apprenticeship model has been the primary vehicle used to explain the influence of cooperating teachers within the student teaching setting. Using social-learning theory the influence of cooperating teachers can be explained by focusing on the concept of modeling (Bandura & Walters, 1963). In this view of classroom interaction, the cooperating teacher's utilization of particular instructional strategies serves as a model for the student teacher, providing a working representation of an instructional strategy which is valued. Repeated modeling of a given set of instructional strategy would provide vicarious reinforcement for use, thereby positively inclining the student teacher to use a like set of instructional strategies in the classroom.

Apprenticeship models have viewed student teaching as a time for the final demonstration of previously learned instructional skills. However, such models have come under increasing attack by critical theorists concerned with both the concept of reflective teaching (Zeichner & Tabachnick, 1985) and the broader role which student teaching plays in the overall socialization of teachers (Jordell, 1987; Ross, 1988).

Socialization theorists in particular have argued that the effect of the cooperating teacher on the use of instructional strategies of student teachers can better be explained by an understanding of the role of classroom ecology in the student teaching experience. Doyle and Ponder (1975) have defined the ecological system of the classroom as the "network of interconnected processes and events which impinges upon behavior in the teaching environment" (p. 183). According to ecological theory, the cooperating teacher's consistent utilization of a specific teaching practice in the classroom causes that practice to become a functional part of the classroom's ecological system. Pupils become accustomed to a teacher's use of a particular teaching practice and develop appropriate responses to its use.

Therefore, when a student teacher enters the classroom and attempts to employ that particular teaching practice, the attempt fits the system which is already in place. This ecological congruence in turn reinforces the student teacher's employment of the teaching practice, thereby increasing the likelihood that the practice will be utilized again.

In contrast, when a student teacher attempts to use a target skill in a classroom where there is no history of such use by the cooperating teacher, the attempt is not congruent with the ecological system and is therefore not

reinforced. A large degree of ecological incongruence may result in negative consequences which serve to directly inhibit use of the target skill. Thus, repeated attempts yielding aversive consequences may lead to a decline in the use of the skill by the student teacher.

Socialization research concerning the process by which teachers come to hold particular theories of action (i.e., sets of ideas a teacher might use in dealing with a given situation) has yielded mixed and conflicting results. According to Lortie's theory of "latent culture" (1975), socialization has already occurred prior to college entrance due to the estimated 10,000 hours students have already spent in the role of students observing their classroom teachers. According to this view, the progressive views of teacher education students expressed while still in college are seen as a front accommodating the values of those in positions of authority. The student teaching experience then acts as a stimulus for activating the latent culture which has been developed prior to teacher education programs.

The idea that socialization of teachers is completed before college training is a minority view however. According to reversal theory (Fuller & Brown, 1975), the progressive thinking generated by preservice training undergoes reversal beginning with student teaching and continuing into later teaching. While Hoy and Rees (1977) argued that the change develops over time in response to bureaucratic norms present in the school setting, Yee (1969) and Edgar and Warren (1969) stated their views that the shift occurs early, largely through exposure to traditional cooperative teachers.

The conception of socialization that has emerged most recently has emphasized a dialectical model focusing on the influence of institutional

cultures, while also highlighting the active role individuals play in selection and construction of a professional identity (Ross, 1988). Many theorists agree with the findings of Jordell (1987) that, while background experiences are important in the shaping of initial conceptions of teaching, practice-generated theories of action have the greatest impact on how teachers make day-to-day curricular decisions.

Recent research describes the cultural and institutional forces which work to socialize teachers (work as isolation, ends-means split in curriculum discussion). However, it also describes teachers as actively involved in shaping schools through individual and collective efforts (Jordell, 1987; Ross, 1988; Zeichner & Gore, 1990; Zeichner & Tabachnick, 1985). Pollard's (1982) conceptual model of classroom coping strategies suggests that socializing forces are mediated at both a macrolevel (cultural and institutional factors) and at a microlevel (role of pupils, ecology of the classroom).

In relation to microlevel forces at work in student teaching, Copeland (1978) reported a study which attempted to separate the effects of modeling by classroom teachers from the effects of ecological congruence. Copeland's study involved 32 first-year graduate students during their enrollment in a program for fifth-year elementary teaching credentialing at the University of California at Santa Barbara and was based upon a 2 x 2 factorial design. Cooperating teacher modeling of the target skill and a history of utilization of the target skill in the classroom ecology were controlled as independent variables, with exhibition of the target skill considered as the dependent variable.

All student teachers in the study were exposed to a microteaching experience on the instructional practice of asking probing questions during

classroom. They were then randomly assigned into a student teaching classroom where (a) the cooperating teacher modeled the target skill, or (b) the cooperating teacher had a history of utilization of the skill, but did not model its use for the student teacher. The use of the target skill by student teachers was then assessed. Exhibition of the target skill was determined by analyzing four 15-minute audiotape recordings of what each subject determined to be typical discussion groups.

Skill-utilization scores, as determined by trained raters, were analyzed by way of a 2 x 2 analysis of variance. Results indicated that, while neither modeling of the target skill nor the interaction of modeling and ecology had a significant effect, placement in a classroom ecology with a history of use of the targeted skill had a significant effect ($\underline{MS} = 6.73$, $\underline{F} = 4.7$, $\underline{p} < .05$) (Copeland, 1978, p. 98).

In a qualitative study of curricular decision-making of student teachers, Ross and Jenne (1993) examined the interplay between micro- and macrolevel forces in the student teaching experience and concluded that cooperating teachers play a significant role in filtering the effects of institutional forces upon student teacher decision making and that, in part due to the filtering and transfer of institutional forces, opportunities for significant student teacher curriculum decision making appear to be severely limited. The issue of instructional autonomy is apparent in the stories of two student teachers reported by Ross and Jenne (1993). Both persons described their experiences situated in student teaching in secondary social studies in the state of New York during the fall prior to Regents exams.

> Gloria was having problems with her cooperating teacher from the beginning and made it known that she did not want him in the classroom when she was teaching. Initially it was because of her personal dislike of him but increasingly it stemmed more from the fact that she was deviating from his format and feared that he would stop her from doing what she wanted to do in the classroom. According to Gloria it was almost as if an agreement was struck up to keep him out of the classroom. "It was like a bargain was struck up, if you let me go and hang around in the faculty room and do my stuff then ... it was like negotiations, I did all his work for him." This gave Gloria the freedom and opportunity to try out new things in the classroom. She quickly learned that if she gave his weekly quizzes and that her students did well on them then he would leave her alone. She also quickly learned that if she hit the students hard on Thursdays by intensely covering the material contained in the quizzes that she would have the rest of the week to do as she wanted. Gloria felt that doing this was not only necessary for her survival but also for the survival of the students. "The first week was like hell and on top of it I didn't believe in what I was doing. They hated it and I hated it too." Gloria looked primarily to her conscience and the needs of the students to direct her decision making.
>
> Bob's situation was different. His cooperating teacher continued to visit on a regular basis and Bob cleared his ideas before trying them out. Bob felt that in order to get a job he needed to focus primarily on what the cooperating teacher wanted. His cooperating teacher didn't tell him directly not to try new things but found other more subtle ways to make his wishes known. Bob labored under the restraints of leveled aspirations from the beginning. Although he occasionally pushed the boundaries a little he never deviated far from the program. "I knew what I could do so I didn't make up a hypothetical, I was too busy for that. I originally thought about student teaching as a time when you could really try new things, I kind of scaled down." As this statement suggests Bob was well aware that he was doing things and making curricular decisions contrary to the way he really felt. At one point he talks about the guilt he felt for letting the students down. In this regard Bob expressed admiration for Gloria and her ability to manipulate the situation to the benefit of herself and her students. Likewise, Gloria was aware of Bob's dilemma and felt that he and others were becoming bitter about their student teaching experience. (Ross & Jenne, 1993, pp. 10-11)

According to Ross (in press) cooperating teachers reinforce the distinction between curriculum and instruction as a distinction between means

and end that permeates the language of schooling. If one accepts this distinction, then student teachers are given some latitude about how to teach, but very little latitude about what to teach. Student teachers in a study by Ross and Jenne (1993) had difficulty separating the two in actual practice, and appeared to be well aware that confines of what to teach had a definite impact on how they could teach.

Bullough (1992) contended that the cooperating teachers plays a major role in shaping novice teacher thinking about teaching and about which curriculum decisions are theirs to make. Recent work by Su (1992) would tend to confirm the importance of cooperating teachers in the student teaching experience. Part of the federal research project, The Study of the Education of Educators, Su's study examined the role of three influences in beginning teacher socialization: (a) prior experiences from being a student, family member, and friend; (b) university socialization (e.g., course work, field experiences, faculty, and peer group); and (c) socialization within practice teaching (student teaching, cooperating teachers, other teachers in practice school). Su (1992) reached the conclusion that the most important source of socialization is the student teaching experience and cooperating teachers. In addition, Su reported that most student teachers were counseled to go along with the cooperating teacher and do basically what other teachers in a school do. In support of the influence of bureaucratic norms (Hoy & Rees, 1977), Su reported that student teachers felt that learning from methods courses was important and meaningful, but the ideas were not supported in context of the student teaching schools.

In summary, the research literature on student teaching has been viewed as weak and inconsistent. There is general consensus that the cooperating teacher has a significant effect upon the impact of the experience. Student teacher attitudes and teaching practices move toward those of the cooperating teacher. While social-learning theory has emphasized the role of modeling by the cooperating teacher to explain the influence of cooperating teachers, increased attention has been given recently to the role of ecological congruence and to the role which cooperating teachers play in filtering the effect of both the micro- and macrolevel institutional forces upon student teachers' instructional decision making.

Innovation Adoption

Nisbet has defined educational innovation as "the process of planned change in curriculum content, method and organization" (1988, p. 1499). The first formal reference to the term "planned change" appeared in connection with federal efforts of the 1950s to reform science curriculum (Lippitt, Watson, & Westley, 1958). In its original context, the term was specifically coined to differentiate purposeful change efforts from what the theorized tendency of educational institution to experience change by way of "unplanned, adaptive drift" (Hoyle, 1969).

According to Webster's Seventh New Collegiate Dictionary, the word innovation refers to the introduction of "a new method or device" (1972, p. 436), as indicated by its origin in the Latin root--nova. While the computer can be considered as meeting the definition as the introduction of a "new thing" in society, the computer's potential for new methods has received primary consideration in educational settings.

Havelock (1969) has identified three models which are frequently used to guide the adoption of educational innovation. They are: (a) a research-development-dissemination model emphasizing top-down distribution of knowledge, (b) a social-interaction model with emphasis upon two-way person to person interaction, and (c) a problem-solving model in which practitioners identify problems in current practice and, subsequently, enlist the consultation of experts to remedy the perceived problem.

In a similar vein, three strategies for the implementation of educational innovation have been identified by Bennis, Benne, and Chin (1969): (a) an empirical-rational strategy relying upon the presentation of rational evidence and arguments, (b) a power-coercive strategy emphasizing persuasion by authority or by control of resources, and (c) what has been termed a normative reeducative strategy with an emphasis upon changing attitudes and values of those responsible for implementing the proposed change.

Substantial correspondence can be seen between Havelock's change model and the strategies outlined by Bennis et al. (1969) The research-development change model and the empirical, rational change strategy both rely primarily upon the use of rational evidence to provide the mechanism for change. Similarly, both the social interaction change model of Havelock (1969) and the normative-reeducative strategy find a base in the socialization process within organizations. Although the problem-solving model of Havelock and the power-coercive strategy proposed by Bennis et al. appear to be quite different, both utilize a power base to induce change--the problem-solving model emphasizing the bottom-up power of practitioners, while the power-coercive strategy emphasizes the top-down power of administrative hierarchy.

Recent leadership practices have incorporated an eclectic approach to educational innovation which recognizes both organizational and individual influences on adoption of innovations. According to Nisbet (1988), educational organizations typically arrive at an agreed-upon policy through a mix of consensus and/or power-coercive strategies followed by the issuance of a set of guidelines for general direction. Detailed implementation however, is left to practitioners in specific settings--a recognition of the need to adjust the innovation implementation to localized circumstances.

The Concerns-Based Adoption Model

Due to the loose coupling of school districts and a tradition embracing considerable autonomy of classroom teachers, the role of individual teachers appears to be especially important in the adoption of specific instructional practices. The Concerns-Based Adoption Model (CBAM) (Hall et al., 1973) provides a theoretical stance for addressing the process of innovation adoption from an individual perspective.

CBAM as a theory of innovation adoption was formulated by Hall, Loucks and their colleagues at the Texas Research and Development Center, and is based upon Frances Fuller's work (1969) which examined the changing concerns of preservice teachers as they moved through teacher preparation at the University of Texas. As described by Hall and Loucks, CBAM expanded the original concerns identified by Fuller to seven stages that describe "certain perceptions, feeling, motivations, frustrations, and satisfactions about innovations and the change process" (Hall & Loucks, 1978, p. 53).

Ultimately grounded in Maslow's hierarchy of needs, CBAM is based on the following assumptions: (a) that change is a process that takes time, (b) that

change is achieved in sequential stages, (c) that individuals are the primary concern of change efforts, and (d) that the stages of change involve both perceptions and feelings of individuals concerning the innovation as well as their skill in its use (McCarthy, 1982).

The sequential stages theorized by the Concerns-Based Adoption Model provide a unique means of tracking innovation adoption by individuals. The concept of concerns about an innovation is based upon a view of the selective nature of perception involving task-demands.

> The composite representation of the feelings, preoccupation, thought, and consideration given to a particular issue or task is called concern. Depending on our personal make-up, knowledge, and experiences, each person perceives and mentally contends with a given issue differently; thus there are different kinds of concerns ... To be concerned means to be in a mentally aroused state about something. The intensity of the arousal will depend on the person's past experiences and associations with the subject of the arousal, as well as how close to the person and how immediate the issue is perceived as beings. (Hall et al., 1977, p. 5)

Concerns theory hypothesizes that innovation users pass through seven sequential stages. These stages can be broadly grouped as beginning with self and radiating outward. In the earliest stages of adoption, actions are guided primarily by concerns about acquiring enough information to determine self-impact of the innovation. As these self-concerns begin to be resolved, concerns shift toward the task of implementation of the innovation. With increasing control of the innovation, concerns ultimately move toward optimization of the innovation by contacts with others.

Accordingly, the seven stages (0-6) can roughly be grouped into three broad foci. Stage 0 (awareness) and Stages 1 (informational) and 2 (Personal) focus primarily around interest in gaining information concerning personal

involvement with the innovation. At Stage 0 the individual is not aware, nor concerned with involvement in the innovation. At Stage 1, the individual has gathered a general awareness of the innovation and is interested in learning more about the general characteristics of the innovation. In Stage 2 (Personal), the individual is uncertain about the demands of the innovation, his/her inadequacy to meet those demands, and his/her role with the innovation, including rewards, potential conflicts, and status implications of the innovation.

Stages 3 and 4 can generally be considered as stages where concerns about the innovation turn from general characteristics to a concern for specific knowledge concerning implementation and consequences of the innovation. In Stage 3 (Management), specific information is desired concerning specific planning for utilization of the innovation in a specific setting. At this stage, attention becomes focused on the tasks of using the innovation with the given resources. Here, issues of efficiency, organizing, managing, scheduling, and time demands are paramount. In Stage 4 (Consequences), concerns shift toward the impact of the innovation upon students. Concerns tend to focus around issues such as relevance for students, evaluation of student outcomes, and changes needed for increased student performance.

Stages 5 (Collaboration) and 6 (Refocusing) can be viewed as a shift toward optimization of the innovation. In Stage 5, the individual is concerned with networking with other users of the innovation for possible discussion, coordination, and cooperation. As the desire for outside consultation and coordination subsides, Stage 6 (Refocusing) emerges. Individual concerns begin to focus upon questioning and exploration of the broader benefits of the innovation. At this stage, the individual begins to consider the possibility of

major changes to the innovation, including possibly thoughts about entirely different alternatives.

Arousal and resolution of concerns appear to be developmental. In general earlier concerns must first be resolved (lowered in intensity) before later concerns emerge (increase in intensity). However, the process of arousal and resolution of concerns is thought to be highly personal with a variety of factors (e.g., knowledge and skill requirements, competing life demands, personal history and capabilities) impacting the arousal and resolution of concerns of individuals. "In general, however, it appears that a person's concerns about an innovation develop toward the later stages (i.e., toward impact concerns) with time, successful experience, and the acquisition of new knowledge and skill (Hall et al., 1977, p. 6).

The SoCQ is generally accepted in the inservice design literature as an aid in tailoring inservice to individual adopter needs. The model has been used in designing and evaluating educational computing inservice efforts. Bartel (1985) and Wedman and Strathe (1984) used the Stages of Concern framework to design faculty development programs. Wedman and Heller (1984) used the SoCQ to describe teachers' concerns before beginning an inservice effort.

Research by Leary (1983) has shown that an inservice program geared to teachers' assessed States of Concern (SoCQ) has a predictable influence on their Stages of Concern about an innovation, their Level of Use of that innovation, and the way the innovation is adapted for use by the adopting teachers. In addition, Reed (1990) reported using the SoCQ to assess the effects of a computer-intensive methods course for secondary English majors.

The utilization of the Stages of Concern Questionnaire with preservice teachers is consistent with CBAM theory that "all teachers, both preservice and practicing, go through a developmental sequence in adopting any innovation" (Vogel & Aiken, 1985, p. 768).

There is some evidence that changes in concerns reflected on the SoCQ precede changes in behavior evidenced in Levels of Use of an innovation (Leary, 1983). At both the early and later stages of an innovation adoption, the Concerns of the adopters and their Levels of Use (LoU) are related. In the middle ranges, LoU cannot be predicted from the SoCQ. In a CBAM workshop, Hall and Loucks have been quoted as stating that "Only in a well-planned and supported change effort will Stage of Concern 4 and above concerns become more intense. Otherwise, either Stages of Concern 3 concerns remain high, or all stages gradually decrease with no apparent peak, thus indicating relatively little concern" (Hall & Loucks as cited in Vogel & Aiken, 1985, p. 768).

Summary

The role of individuals in the adoption of educational innovation has often been viewed in the past as a resistance to be overcome through coercion or rational arguments. While recent practice has been to exert coercive-rational strategies for the production of unified guidelines, the normative-reeducative nature of innovation adoption has been recognized by the discretion allowed for individual implementation. This is especially true in educational settings. While the presence of the computer may or may not have arrived at the request of the individual teacher, the adoption of instructional computer use as a methodological innovation has typically been open to a great deal of individual teacher discretion in most settings. The SoCQ represents provides a means of

measuring movement of an individual teacher toward employment of the methodological innovation of instructional computer use.

Rationale for Research

The contention that placement with a computer-using teacher can yield positive benefits remains largely untested in research literature to date. In one of the few studies available on the subject, Handler (1993) asked 133 elementary teachers nearing the end of their first year of teaching to respond on a Likert scale from 1-7 (1 being none, 7 being great) to the following question: "As an educator I feel I was prepared in my preservice program to use the computer as an instructional tool to the following extent" (Handler, 1993, p. 149). Subsequently, questions were asked concerning the impact upon this sense of preparedness created by participation in various elements of preservice training: the introductory computer course, the degree to which computer use was observed or used in methods classes, and the degree to which computer use was observed or used in preclinical observations and the student teaching field experience.

The findings of this study, if true, hold several implications for computer education at the preservice level. Analysis of data noted that less than 20% of the group indicated feeling prepared as identified by a response equal to or greater than 5 (Much). This finding is especially important in light of the subsequent finding of a significant difference in the mean of the frequency with which teachers who felt prepared and teachers who felt unprepared were using computers in the classroom ($t = 2.2$, $p = 0.042$) (Handler, 1993, p. 151).

In comparing those who felt prepared with those who did not feel prepared, several factors emerged which appear to contribute to the feeling of

preparedness: (a) the separate course on the introduction to computers in education, (b) the degree to which computers were used during methods courses, and (c) the observation as well as the use of computers during student teaching field experience (Handler, 1993, p.149).

It is known that the teaching of most student teachers closely reflects the methods used by their cooperating teachers (Wragg, 1970; Yee, 1969). Therefore, there is reason to believe that the amount of time that cooperating teachers are actually engaged with instructional computer use might impact the teaching of student teachers. However, studies to date have not provided any direct evidence of such an effect.

In addition, earlier research on computing education has identified several other competing and sometimes overlapping variables present in the teaching environment. Some of the identified variables have the potential to mediate the effects of a high degree of employment of instructional computer use by cooperating teachers upon student teacher concerns toward instructional computer use. These hypothesized mediators can be clustered broadly into three categories: (a) those aspects which concern primarily the cooperating teacher, (b) those aspects dealing primarily with the student teacher, and (c) those aspects dealing primarily with the institutional context within which the student teaching experience occurs.

Cooperating Teacher Influence

Research indicating that student teacher attitudes shift toward those of cooperating teachers would indicate that positive attitudes toward employment of instructional computer use is likely to have an impact upon the willingness of student teachers to employ instructional computer use in their own teaching.

However, attitudes toward computers in the classroom have not proven to be strong indicators of actual teaching behavior in previous research. In a review of a statewide teacher training program's impact on computer usage in participant's classroom schools, Stieglitz and Costa (1988) found that positive attitudes toward the use of the computer did not always lead to a high level of classroom use. The assumption that positive attitudes translate to high usage and the inverse assumption that low usage indicates neutral or negative attitude may be totally unfounded. The possible effect of this disjuncture of cooperating teacher attitudes and actions upon student teachers has not previously been explored.

The historical view of student teaching as apprenticeship would indicate that the amount of actual use of instructional computer use by cooperating teachers themselves should have an impact upon the willingness of student teachers to employ instructional computer use in their own teaching. Likewise, the amount of actual use of instructional computer use by students under the control of cooperating teachers would be expected to have an impact upon the willingness of student teachers to employ instructional computer use in their own teaching.

However, a recent study of exemplary computer-using teachers by Sheingold (1991) raises questions which extend beyond the sheer number of minutes of employment. Documenting trends in the teaching practices of 600 teachers nominated from across the nation for their efforts in integrating the computer into their instructional program, Sheingold reached the conclusion that "It takes time for these teachers to master computer-based practices and approaches--fully five to six years of teaching with computers" (Sheingold &

Hadley, 1990, p. viii). As teachers gain experience employing instructional computer use, there appears to be an evolution in not only the amount of computer use, but also in the evolving patterns of instructional use in classroom settings. The number of years of cooperating teacher involvement with instructional computer use, as one means of measuring this variable, has not been addressed in the literature as a possible mediating variable on concerns of student teachers.

Student Teachers

A second cluster of variables which may influence the employment of instructional computing use by student teachers are closely associated with the student teacher him/herself. The literature provides reason to believe that the prior background experience which the student teacher brings to the student teaching experience has the potential to significantly mediate the effect of cooperating teacher employment of instructional computer use. In measuring the effect of computer integration in methods classes, Reed (1990) found very different shifts in concerns toward classroom computer use, depending upon the levels of prior computer use which students brought to the methods class. It seems plausible that prior experience with computers, as evidenced by entering computer competencies, would play a similar role in the impact of the student teaching experience. While, the presence or absence of such a relationship has been alluded to in the literature, no attempt at direct verification has been attempted in student teaching settings.

The Concerns-Based Adoption model would posit that each person entering into the student teaching experience would be somewhere along the seven Stages of Concern with regard to employment of instructional computer

use. The research of Reed (1990) indicated that the effect upon preservice teachers of exposure to a high degree of instructional computer use in a methods course can vary depending upon the student's entering Stage of Concern. The possibility that the entering Stage of Concern plays a similar role in mediating student teaching experiences cannot be ruled out.

Finally, recent research has raised new questions about the interaction between student teacher and cooperating teacher. Traditional belief has held that student teachers pass through several stages of increasing control by the student teacher. According to the Mentoring Model (Stahlhut, 1992) a typical student teaching experience of 7 to 9 weeks cycles through 4 stages. In Weeks 1 and 2, cooperating teachers are in the height of control, directing and telling student teachers specifically what procedures should be duplicated. Weeks 3 and 4 focus on a variety of effecting teacher practices, with the teacher's role alternating between modeling of those practices and then coaching as the student teacher tries out the instructional practice. The third phase releases more control to the student teacher as the cooperating teacher begins encouraging the student teacher to modify instructional practices for a better match with the student teacher's personal style of teaching. In the final phase, most classroom responsibilities are delegated to student teacher control, and a large degree of autonomy is extended to allow student teachers to work on their own to refine their instructional practices (Stahlhut, 1992).

Given the recency of instructional computer use in many classroom, a large number of student teachers will be placed with cooperating teachers who are not currently employing a high degree of instructional computer use. Therefore the effect of various degrees of instructional autonomy for student

teachers, as researched by Ross and Jenne (1993) and Stahlhut (1992), may be a very important consideration.

Institutional Context

Looking beyond the immediate classroom setting, research by Copeland (1977) and Tabachnick and Zeichner (1984) indicated that factors outside the immediate control of the cooperating teacher exert influence upon classroom employment of instructional computer use. For computer usage, several aspects of school policies and procedures are likely to function in concert to provide a broader institutional context which facilitates or inhibits the employment of instructional computer use. Basic availability of hardware and software represents one factor which is often a barrier for teachers. In a recent survey by the International Association for the Evaluation of Education Achievement, 53% of elementary teachers cited insufficient numbers of computers as a significant problem, and 33% of secondary teachers cited the lack of appropriate software as a problem (Pelgrum & Plomp, 1991).

Aside from the procurement of hardware and software, the extent of training is an obvious aspect of the school environment which can affect employment of instructional computer use. Given that isolated computer training efforts seldom result in altered instructional patterns (Glenn & Carrier, 1989) the availability of repeated or extended training opportunities can act to either facilitate or inhibit the employment of instructional computer use.

Long-term support encompasses more than training sessions, however. Teachers attempting technology innovation often have specific questions which need to be answered on the run. Less experienced users of classroom computing encounter greater difficulty and consequently need support early on

with technology questions and support with pedagogy and curriculum questions later on (Sheingold, 1991). Therefore, the availability of on-site support personnel may be a critical variable facilitating or inhibiting instructional computer use in a school.

Finally, beyond the availability of hardware, the amount of support offered by training, and the amount of on-site resource assistance, the role of the principal appears to be especially important in setting the expectation for employment of instructional computer use in a school. Several studies have reported the view of teachers that the school principal is seen as the main initiator to stimulate computer use within a given school (DuPagne & Krendel, 1992; Knupfer, 1989; Sheingold, 1991).

Taken together, the adequacy of provision of these various factors forms an institutional context within a school which can influence strongly the employment of instructional computing use by the classroom teacher. The effect of the greater institutional context upon concerns of student teachers toward instructional computer use awaits investigation in the literature.

Summary

There is a widespread concern that recent graduates of teacher preparation institutions are not adequately prepared for classroom computer use. Criswell (1989) reported a growing sense of failure in preservice education programs to prepare first-year teachers who feel confident about using computers in their classrooms. In a similar vein, Ingram (1991) has concluded that the use of computers in elementary teacher education programs is inadequate for training teachers for the 21st Century.

These concerns, have led to recent calls for placement of student teachers with cooperating teachers who employ a high degree of instructional computer use. Only two studies (i.e., Reed, 1990, Handler, 1993) can be found in the computer education literature which concern the effects on preservice teachers of placement in a high computer use environment.

Of those studies, only Handler's encompasses student teaching placement, and its conclusions rest upon the recalled impressions of first-year teachers rather than student teachers themselves. While Handler's study of feelings of preparedness (1993) has given some credence to the idea that student teaching can be a significant factor in moving beginning teachers toward adoption of instructional computer use, substantial documentation of such movement is yet to be reported in research literature.

Several variables within the student teaching setting have been identified which hold the potential of mediating the effects of student teacher placements in high computer use classrooms. Earlier studies have suggested several such factors that can be broadly clustered around (a) the cooperating teacher, (b) the student teacher, and (c) the ecology of the broader institutional setting.

Restatement of Hypotheses

Based on the review of literature, several hypotheses were formulated at the outset of the study.

Hypothesis 1. Change occurs in the concerns of student teachers toward instructional computer use between the beginning and end of the student teaching experience.

Hypothesis 2. Changes in the concerns of student teachers toward instructional computer use differ as a function of the prior computer competence of student teachers.

Hypothesis 3. Changes in the concerns of student teachers toward instructional computer use differ as a function of the extent of instructional computer use employed by cooperating teachers.

Hypothesis 4. Changes in the concerns of student teachers toward instructional computer use differ as a function of the extent of instructional computer use employed by students of the cooperating teacher.

Hypothesis 5. Changes in the concerns of student teachers toward instructional computer use differ as a function of the cooperating teacher's perceived educational impact of instructional computer use.

Hypothesis 6. Changes in the concerns of student teachers toward instructional computer use differ as a function of the cooperating teacher's length of utilization of instructional computer use.

Hypothesis 7. Changes in the concerns of student teachers toward instructional computer use differ as a function of the student teacher's perceived degree of instructional autonomy.

Hypothesis 8. Changes in the concerns of student teachers toward instructional computer use differ as a function of the level of support provided by the institutional context.

CHAPTER III

METHODOLOGY AND PROCEDURES

This study was designed to investigate--via hypotheses--factors which result in a change in concerns toward instructional computer use during student teaching. It was hypothesized that change scores would be positively related to high levels of the following variables: (a) the student teacher's entering computer competencies, (b) frequency of instructional computer use by the cooperating teacher, (c) frequency of instructional computer use by students in the cooperating teacher's classroom, (d) cooperating teacher's perceived educational impact of instructional computer use, (e) the number of years of instructional computer use by the cooperating teacher, (f) the student teacher's perceived degree of autonomy in the student teaching setting, and (g) the degree of facilitation afforded by the institutional context of the student teaching experience.

This chapter contains a description of the methodology and procedures used to perform the study. This research was cast in the form of an exploratory study and encompassed three distinct phases: (a) a pre- and postplacement collection of data, (b) a round of focus group interviews of student teacher participants, and (c) a final focus group interview with cooperating teachers. Accordingly, this chapter incorporates a section for each phase of research. Within each section several topics will be discussed: selection of subjects, instrumentation, data collection, and data analysis. A final section will present null hypotheses as a foundation for following chapters on data analysis.

Phase 1

Phase 1 of the study involved a pre- and postplacement collection of data concerning the existence of various factors within the student teaching setting and their relationship to changes in the concerns of student teachers toward instructional computing use as expressed in pre- and postplacement administration of the Stages of Concern Questionnaire. As such, the subjects of this study were comprised of two distinctive groups: (a) student teachers and (b) cooperating teachers. More specifically, the study involved all pairings of cooperating and student teachers which met the following criteria: (a) student teachers involved in student teaching for the first time during spring semester of 1995, (b) student teaching placement site was within the given state, (c) student teachers had consented to participation in the study, (d) the school districts of the cooperating teachers had consented to participation in the study, and (e) cooperating teachers had consented to participation in the study.

Subjects

All student teachers at the given university are required to participate in weekly seminars conducted by professional student teaching coordinators who are employed by the university. Solicitation of student teacher subjects was undertaken in the first meeting of the required seminar for spring semester, 1995. A 15 minute videotaped presentation was given to each seminar in which the purpose of the study was described, along with an explanation of what would be expected of those students agreeing to participate (see Appendix D).

During the second week of student teaching, the cooperating teachers of the student teacher participants were contacted via mail. The purpose of the

study was described along with an explanation of what would be expected of those students agreeing to participate, and a request for participation.

Materials and Instruments

The materials and instruments used in Phase 1 of the study included (a) an instrument for cooperating teachers developed by the researcher for the measurement of the extent of teacher and student instructional computer use, the length of utilization of instructional computer use, and the influence of institutional context (see Appendix A); (b) an instrument for cooperating teachers developed by the International Association for the Evaluation of Educational Achievement for the measurement of perceived educational impact (see Appendices A and F); (c) an instrument for student teachers developed by the researcher for the measurement of computer competence, (see Appendix A); (d) an instrument for student teachers developed by the researcher for the measurement of instructional autonomy as perceived by student teachers (see Appendix A); and (e) the Stages of Concern Questionnaire (SoCQ) developed by Hall et al. (1977) to be administered to student teachers (see Appendix A).

Extent of Instructional Computer Use by Cooperating Teacher

"Student teachers should have an opportunity to intern with a teacher who can model the use of microcomputers in classrooms" (Criswell, 1989, p. 40). The teaching practices of student teachers have been shown to closely approximate the teaching practices of their cooperating teachers. Therefore, the extent of employment of instructional computer use in a classroom was a primary consideration of this investigation. Instructional computer use in classrooms occurs when a teacher uses a computer for instruction, (e.g., a group or whole class presentation). However, instructional computer use also

occurs when students themselves take an active role in utilizing the computer to reach instructional objectives.

Instructional computer use was defined to include (a) use of a computer by student as a means of meeting instructional objectives or (b) use of a computer by teachers in the presence of students as a means of meeting instructional objectives. The extent of instructional computer use by cooperating teachers was operationalized to mean the average number of minutes per week that a computer was used by the classroom teacher as a means of attaining instructional objectives. Teachers were asked for a self-report of such use with the following question: "On average, how many minutes per week would you say that you, the teacher, are engaged with instructional computer use?"

Questions concerning the reliability of self-reported data often arise. A pilot study conducted by the researcher in spring, 1994 explored various uses of the SoCQ and self-reporting data. Teachers in the pilot study were asked to indicate the amount of instructional computer use employed in their classroom by marking one of the following: (1) no use, (2) little use, (3) moderate use, or (4) substantial use. Independent of the teacher's self-report, an outside professional in the teacher's building (e.g., media specialist) was asked to complete the same information concerning the teacher's amount of instructional computer use. The relationship between teacher self-report and outsider report was positive and supported the veracity of teacher self-reporting. The correlation coefficient between the two was .938, significant at the .01 level.

Extent of Instructional Computer Use by Students

The extent of instructional computer use by students in the classroom was operationalized to mean the average number of minutes per week that a computer was used by students as a means of attaining instructional objectives. Teachers were asked to report such use by answering the following question: "On average, how many minutes per week would you say that the typical student in your class is engaged with instructional computer use?"

Length of Utilization of Instructional Computer Use

In her study of exemplary computer-using teachers, Sheingold reached the conclusion that "It takes time for these teachers to master computer-based practices and approaches--fully five to six years of teaching with computers" (Sheingold & Hadley, 1990, p. viii). As teachers gain experience employing instructional computer use, there appears to be an evolution in not only the amount of computer use, but also in the evolving patterns of instructional use in classroom settings. This finding raises issues which extend beyond the amount of instructional computer use. It is conceivable that the history of employment of instructional computer use by the cooperating teacher is as important as the actual amount of time that instructional computer use is employed in the classroom. Teachers were asked to answer the question "How long have you employed instructional computer use in your classroom, not counting this year?" Response was indicated by checking one of the following: (a) none, (b) 1 yr, (c) 2 yrs, (d) 3 yrs, (e) 4 yrs, (f) 5 yrs, or (g) 6 yrs or more.

Perceived Educational Impact

Considerable support exists for the assertion that the professional attitudes of cooperating teachers have an influence upon student teachers in

the student teaching experience (Turney, 1985). The attitudes of teachers toward employment of instructional computer use were measured by administration of a modified Perceived Educational Impact Scale, originally designed and utilized by the International Association for the Evaluation of Educational Achievement (Pelgrum & Plomp, 1991). The Perceived Educational Impact Scale consists of nine statements regarding the educational benefits to be expected of computers in classroom settings for which teachers are asked to check agreement or disagreement. The scale was constructed after pilot testing in England, the Federal Republic of Germany, Greece, and the Netherlands. Principle component analysis (PCA) confirmed the existence of this attitudinal dimension. Subsequent reliability analyses of U.S. teachers showed alpha reliabilities of .87.

The scale was modified for use in the current research effort. Rather than asking teachers to either agree or disagree, a Likert scale was imposed to further delineate the intensity of either response. Teachers were asked to check strongly disagree, mildly disagree, mildly agree, or strongly agree for each of the nine statements concerning perceived impact of computers in educational settings. After modification, the scale yielded a perceived educational impact score of 0-27.

Influence of Institutional Context

In order for cooperating teachers or student teachers to be able to employ instructional computer use, a certain amount of computer hardware and software must be available. This seemingly elementary statement raises the question however of broader institutional support systems and their effect upon student teachers. Sheingold (1991) found that teachers employing a high

degree of instructional computer use were most often to be found in schools which provided high levels of institutional support by means of extensive technology, on-site resource persons, and inservice opportunities (Sheingold, 1991, p. vii). Beyond the availability of hardware and software, the amount of support offered by training and on-site resource assistance, the role of the principal appears to be especially important in setting the expectation for employment of instructional computer use in the school (DuPagne & Krendl, 1992; Knupfer, 1989; Sheingold, 1991). A student teacher could be placed with a cooperating teacher who holds very favorable attitudes toward instructional computer use, but has very little institutional support for their use, or a student teacher could be placed with a cooperating teacher who holds very unfavorable attitudes toward instructional computer use, but is surrounded by very high institutional support. The effect of these possibilities on student teacher concerns toward instructional computer use may be very different.

The influence of institutional context was determined by asking teachers to utilize a 4-point Likert scale (strongly discourage, mildly discourage, mildly encourage, strongly encourage) to indicate the effect of the following factors upon instructional use of the computer by themselves and their students: (a) the amount of available hardware, (b) the amount of available software, (c) the amount of planning time, (d) the availability of on-site resource people, (e) the amount of administrative support offered, and (f) the amount of inservice training offered. The index yielded a score ranging from 1-24 with a minimal score of 6.

Prior Computer Experience

In a study of secondary English majors enrolled in a computer-intensive English methods course, Reed (1990) reported substantial changes in the

Stages of Concern Questionnaire. However, Reed noted a strong interaction with the prior computer experience of students.

> Those students having no prior experience experienced the most changes; they decreased their Awareness- and Personal-related concerns while increasing their consequence-, Collaboration- and Refocusing-related concerns. Those having only word processing background increased their Collaboration- and Refocusing-related concerns. And, those with both word processing and programming language background reduced their Informational-, Personal-, and Management-related concerns. (Reed, 1990, p. 23)

The linkage between prior experience and movement on the SoCQ is an important contribution to the literature. However, operationalization of prior experience within Reed's study should be considered as gross. "During the pretest session, the research participants provided their prior experience with computers by checking one or more of the following (a) none, (b) running content-area software, (c) word processing, (d) learning programming languages such as BASIC, Pascal, or Logo, and (e) other (please explain)" (Reed, 1990, p. 6). Indicating prior computer experience by checking off in front of word processing could indicate anything from required use of word processing in an educational class sometime in the distant past to continuing use of a word processor for publishing of club newsletters.

Given the purposes of the current investigation, prior computer experience was measured by means of the degree to which students identified themselves as being competent to perform several computer tasks . Student teachers were presented with the following list of computer tasks: (a) utilizing drill and practice software, (b) using a word processor, (c) using a database, (d) using a spreadsheet , (e) creating a stack by using Hypercard or similar program, (f) using electronic mail, (g) using the Internet for long-distance

communication, (h) using the Internet to access distant information, and (i) using a computer language such as BASIC or Logo. Student teachers were then asked to indicate their ability to perform each of these computing tasks according to the following scale: 0 = not competent, 1 = somewhat competent, and 2 = very competent. The results yielded an index of computer competence with a potential range of 0 to 27.

Perceived Level of Instructional Autonomy

Bullough (1992) contended that the cooperating teachers plays a major role in shaping novice teacher thinking about teaching and about which curriculum decisions are theirs to make. Opportunities for significant student teacher curriculum decision making appear to be severely limited (Ross & Jenne, 1993). Cooperating teachers reinforce the distinction between curriculum and instruction as a distinction between means and end that permeates the language of schooling (Ross, 1988a) According to Ross, if one accepts this distinction, then student teachers are given some latitude about how to teach, but very little latitude about what to teach. The degree of instructional autonomy has a direct bearing on the employment of instructional computer use by student teachers and was therefore included as a variable in the study.

The following definition of instructional autonomy was provided on the instrumentation for the study: "Instructional autonomy refers to the amount of freedom a teacher has in making decisions regarding what is to be taught in a classroom and how it is to be taught." Following presentation of this definition, the level of autonomy experienced by student teachers in the student teaching setting was determined by asking students to utilize a 4-point Likert scale (low,

medium low, medium high, and high) to respond to the following question: As a student teacher, how would you categorize the level of autonomy extended to you by your cooperating teacher?"

Stages of Concern Questionnaire

Student teacher concern toward instructional computer use was established by administration of the Stages of Concern Questionnaire (SoCQ) (Hall et al., 1977). The SoCQ consists of 35 items which are designed to measure the level of intensity of each of the seven Stages of Concern theorized by the Concerns-Based Adoption Model. Respondents indicated the degree (intensity) to which each statement is true by circling a number from 1 to 7 on an intensity scale. The raw score for each of the seven scales was obtained by adding the sum of the responses to the five items representing that scale in the questionnaire.

Interpretation is possible for either individual data or group data. It is recommended that group data analysis be conducted by either of two reporting devices: (a) reporting the means for each stage or (b) reporting the frequency of highest individual scores on each stage.

Reliability

Alpha coefficients of internal reliability, using data from a stratified sample of 830 teachers and professors, range from .64 to .83. Test-retest correlations range from .65 to .86. Higher correlations were found at Stage 2 (Personal) and Stage 6 (Correlation). The lowest correlation was found at Stage 0 (Information).

Validity

An analysis of the data from 359 persons completing the 195-item questionnaire indicated that 83% of the items correlated more highly with the stage to which they had been assigned than with the total score on the instrument. Seventy-two percent correlated more highly with the stage to which they had been assigned than with any other stage. This evidence indicated that items on a particular scale tended to be responded to similarly, the inference being that the items in each scale measured a notion distinct from notions measured by other scales. A correlation matrix based on the same data showed a simplex pattern (Guttman, 1954 as cited in Hall et al., 1977) corresponding to a set of objects having degrees of similarity and dissimilarity with one another in such a way that they can be arranged on a line. The scales on the questionnaire indicated an order consistent with the hypothesized order of the Stages of Concern (Hall et al., 1977, p. 12). Additional evidence of the validity of the SoCQ was provided in a two year longitudinal study of adoption of a new curriculum approach in two elementary schools. Teachers exposed to a 5-week summer workshop had higher scores on Stages 3, 5, and 6 while those not in the workshop had higher scores on Stages 0, 1, and 2 (Hall et al., 1977, p. 18).

The Stages of Concern Questionnaire is based upon The Concerns-Based Adoption Model (CBAM) (Hall, Wallace, & Dossett, 1973). According to concerns theory, the Stages of Concern Questionnaire provides a means of assessing an individual's relative progress through adoption of an innovation by identification of the stage exhibiting the highest intensity at a given point in time (Hall & Loucks, 1978). The SoCQ has been utilized successfully to assess

the effects of computer-intensive methods courses for preservice English teachers (Reed, 1990) and to evaluate implementation of instructional computing activities as a result of a project by the Biological Science Curriculum Study (Ellis, 1989).

Both Reed (1990) and Ellis (1989) reported substantial change in pre- and posttest scores of participants. Ellis noted, however, that implementation-related concerns had not intensified as predicted. A follow-up study attempted to determine whether group profiles were actually depicting concerns about more than one utilization of educational computing.

Teachers at five elementary schools, one middle school, and one high school completed one of four versions of the SoCQ, each version focusing on a different application of educational computers. Initial examination of the group profiles for four different applications computer assisted instruction (CAI), computer managed instruction (CMI), interactive video (IV), and word processing (WP) indicated that different types of concerns were not evident for differing applications. However, examination of individual profiles for the peak concern indicated that concerns do vary, depending on which application is being considered (Ellis, 1989,10).

Ellis wrote that the results of the follow-up study seem to support the notion that educational computing may be an "innovation bundle" (i.e., a collection of several specific innovations each of which elicit potentially different concerns. Ellis cautioned against the use of such an analysis as a blueprint for inservice design however (Ellis, 1989, p. 11).

There is evidence that changes in concerns reflected on the SoCQ precede changes in behavior evidenced in Levels of Use of an innovation

(Leary, 1983). At both the early and later stages of an innovation adoption, the concerns of the adopters and their Levels of Use (LoU) appear to be related. However, in the middle ranges, LoU cannot be predicted from the SoC (Vogel & Aiken, 1985). In a CBAM workshop, Hall et al. have been quoted as stating that "Only in a well-planned and supported change effort will Stage of Concern 4 and above concerns become more intense. Otherwise, either Stage of Concern 3 concerns remain high, or all stages gradually decrease with no apparent peak, thus indicating relatively little concern" (Hall et al. as cited in Vogel & Aiken, 1985, p. 768).

Data Collection.

Student teachers from the participating university met in weekly seminars during the student teaching experience. During the initial student teaching seminar, a videotaped presentation introduced student teachers to the research project and provided a description of what would be required of participants (see Appendix D). Those student teachers agreeing to participate were then asked to spend 30 minutes of their time to respond to: (a) a self-reporting scale of computer competence based on prior computer experience and (b) a Stages of Concern Questionnaire (SoCQ) in regard to the innovation of instructional computer use. Participants were asked to utilize the last five digits of their university student number for coding of all instruments.

Written instructions were provided for all instruments. The written instructions and videotaped presentations were employed to ensure that student teachers received the same instructions regardless of the location of their teaching seminar. To prevent contamination of the instrument from outside

sources, seminar facilitators were instructed to deflect specific questions regarding items on the instruments. regarding specific content

During the following week, the cooperating teachers of the volunteers were asked via mail to complete a self-rating scale concerning: (a) the extent of employment of instructional computer use by the teacher, (b) the extent of employment of instructional computer use by the students in the cooperating teacher's class(es), (c) the length of employment of instructional computer use by the teacher, (d) a scale of perceived educational impact of computers, and (e) a scale indicating the effect of institutional factors upon instructional use of the computer by the teacher and the teacher's students.

Those cooperating teachers agreeing to participate were instructed to complete and return the self-rating scale. Cooperating teachers were asked to employ the last five digits of the university student number of their respective student teacher for record keeping purposes. This coding ensured the matching of paired data between specific cooperating teacher and specific student teacher.

The questionnaire was returned in a self-addressed stamped envelope provided by the researcher. A follow-up letter, duplicate instrument, and postage paid return addressed envelope were mailed approximately 4 weeks after the first request to nonresponding cooperating teachers (see Appendix G).

After student teaching, the Stages of Concern Questionnaire (SoCQ) was readministered to participating student teachers, along with a scale for indicating student teacher's perceived level of instructional autonomy.

The pre- and the posttest administrations of the SoCQ were recorded on separate machine-scorable forms. Student teachers were instructed to place

the last five digits of their student number on each sheet so that they could be matched. Pretest and posttest forms were coded to differentiate test administrations. In addition, a database was constructed to provide a means of cross-matching student teachers, identification numbers, cooperating teachers, and university student teaching coordinators.

Labeled folders were used to accumulate and organize the following material: (a) the signed consent form of the student teacher, (b) the signed consent form of the cooperating teacher (c) the Student Teacher Questionnaire Prior to Student Teaching (computer-using competencies), (d) the SoCQ completed at the beginning of student teaching, (e) the paired cooperating teacher questionnaire, (f) the Student Teacher Questionnaire After Student Teaching (perceived level of autonomy), and (g) the SoCQ completed at the end of student teaching.

Null Hypotheses and Data Analyses

Phase 1 of this study was designed to test several null hypotheses. These null hypotheses concerned the relationship between various factors present in the student teaching experience and changes in student teacher concerns toward instructional computing use in the classroom.

Null Hypotheses

Null Hypothesis 1. No change occurs in the concerns of student teachers toward instructional computer use between the beginning and end of the student teaching experience.

Null Hypothesis 2. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the prior computer competence of student teachers.

Null Hypothesis 3. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the extent of instructional computer use employed by cooperating teachers.

Null Hypothesis 4. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the extent of instructional computer use employed by students of the cooperating teacher.

Null Hypothesis 5. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the cooperating teacher's perceived educational impact of instructional computer use.

Null Hypothesis 6. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the cooperating teacher's length of utilization of instructional computer use.

Null Hypothesis 7. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the student teacher's perceived degree of instructional autonomy.

Null Hypothesis 8. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the level of support provided by the institutional context.

The Statistical Package for the Social Sciences (SPSSX/VAX) was used for quantitative data analysis. Data were computer scored and uploaded to the university's DEC Alpha computer for analysis.

The first step in data analysis was to describe data distributions. Descriptive statistics and data representations including measures of central tendency, measures of variability, frequency counts, and histograms were used

to arrive at descriptions of the independent and dependent variable data distributions.

In the second step of analysis, the relationships of variables with each other were examined with correlations. Scatterplots were examined as a check on the linearity of relationships. As part of this analysis, a check was made of the assumptions underlying use of a regression equation: (a) the normal distribution of residuals along the regression line, (b) linearity between Ys and predicted Ys, and (c) homoscedasticity--the assumption that the variance of residuals is homogeneous at all points along the regression line.

Third, and finally, a multiple regression analysis was conducted. Multiple regression allowed the determination of the relative contribution of each independent variable in its ability to explain variance in the dependent variable.

Phase 2 Methodology

Population

The population for Phase 2 of the study consisted all student teachers placed within the state by the university for spring semester, 1995.

Sample Selection

Student teachers are placed into 1 of 10 student teaching centers operated in the state of Iowa by the university. Student teachers at the university experience two 8-week placements in a given semester. While the cooperating teacher typically changes for the second placement, the student teaching seminar remains as a constant throughout the semester. Given the purposes of Phase 2 as an exploration of participant insight and reaction, there was no reason to believe that student teachers in one center would be remarkably different from teachers in another student teaching center.

Therefore, a convenience sample was utilized in choosing the student teaching center located most closely to the university campus.

During the second student teaching seminar of the second 8-week placement, a brief presentation by the researcher introduced student teachers to Phase 2 of the research project. An invitation for participation elicited 8 student teachers willing to attend a one-hour focus group interview. The group interview was then scheduled for a late afternoon 3 weeks later.

Materials and Instruments

The group interview was primarily focused upon student teacher expectations, the realization of those expectations during student teaching, and student teacher reactions to tentative conclusions drawn from Phase 1 data (see Appendix A). The opening question dealt with prior expectations for use of the computer in the student teaching experience. Follow-up probes dealt with the genesis of such expectations and their confirmation or disconfirmation in the student teaching experience.

A research log entry immediately following the conclusion of the focus group provided extemporaneous insight into the researcher's impression of group functioning. In addition, the research log served as a basis for establishing the rationale behind the actual line of questioning taken in the group interview situation.

Data Collection and Analysis

Audiotape recordings of the focus group were made. After the interview, the tapes were transcribed, reviewed, and analyzed. Using a modified coding system based on Lederman (1990), responses were coded for themes and

group consensus or disagreement. The coded responses were then used as a frame for qualitative analysis.

A qualitative report summarizing the information generated during the interview was prepared. The qualitative report included research questions, summaries of group responses to each of the questions (including both consensus items and areas of disagreement), the researcher's impressions of the group and group processes, and a discussion of unanticipated areas of group discussion. The qualitative report was then submitted to a participant of the focus group for a member check. An exit interview with the participant reviewer was then conducted to identify areas of agreed interpretation and areas in need of further amplification.

Phase 3 Methodology

Population

The population for Phase 3 of the study was all classroom teachers employed by the university as cooperating teachers.

Sample

The population was represented by a sample of 8 classroom teachers who had served as cooperating teachers within the current academic year. Based upon coordinator recommendations, a pair of cooperating teachers from each of four school districts within 30 miles of the university campus were invited to participate in a one-hour focus group on the university campus.

Materials and Instruments

The group interview was primarily focused upon cooperating teacher expectations, the realization of those expectations with student teachers, and cooperating teacher reactions to tentative conclusions drawn from Phase 1

quantitative data and Phase 2 qualitative data (see Appendix C). The opening question dealt with prior expectations for use of the computer in the student teaching experience. Follow-up probes dealt with the genesis of such expectations and their confirmation or disconfirmation in the student teaching experience.

As in Phase 2, a research log entry immediately following the conclusion of the focus group provided extemporaneous insight into the researcher's impression of group functioning. In addition, the research log served as a basis for establishing the rationale behind the actual line of questioning taken in the group interview situation.

Data Collection and Analysis

Audiotape recordings of the focus group were made. After the interview, the tapes were transcribed, reviewed and analyzed. Using a modified coding system based on Lederman (1990), responses were coded for themes and group consensus or disagreement. The coded responses were then used as a frame for qualitative analysis.

A qualitative report summarizing the information generated during the interview was prepared. The qualitative report included research questions, summaries of group responses to each of the questions (including both consensus items and areas of disagreement), the researcher's impressions of the group and group processes, and a discussion of unanticipated areas of group discussion. The qualitative report was then submitted to a participant of the focus group for a member check. An exit interview with the participant reviewer was then conducted to identify areas of agreed interpretation, and areas in need of further amplification.

Summary

Phase 1 of the study sought the participation of approximately 230 student teachers from a regional Midwestern university in spring semester, 1995 and their respective cooperating teachers. Phase 1 was undertaken in order to better determine the relationship between changes in student teacher concerns toward instructional computer use and several variables involved in the student teaching experience: (a) the computer competence of student teachers prior to entering student teaching, (b) the extent of employment of instructional computer use by the cooperating teacher, (c) the extent of employment of instructional computer use by students, (d) cooperating teacher attitudes toward instructional computer use, (e) length of employment of instructional computer use by cooperating teacher, (f) the degree of autonomy experienced by the student teacher, and (g) the level of support evidenced by the broader institutional context.

Quantitative information gained from the following instruments was analyzed: (a) a questionnaire concerning computer-using competencies; (b) a cooperating teacher questionnaire concerning extent of instructional computer use, length of employment of instructional computer use, perceived educational impact and influence of institutional context; (c) a student teacher Questionnaire concerning perceived level of autonomy; and (d) pre- and posttest administration of the Stages of Concern Questionnaire. Correlations and regression analyses were computed to examine relationships between independent variables and the dependent variable of change scores. A multiple regression analysis was conducted to determine the relative contribution of each independent variable in its ability to explain the variance of

the change score. In addition, various other data analysis techniques were employed to examine relationships among variables where appropriate.

Analysis of data obtained from the focus group interviews conducted in Phase 2 and Phase 3 of the study was analyzed using a modification of the coding system reported by Lederman (1990). Coded responses were then used as a frame for classifying responses.

A qualitative report of the focus group data was developed for focus groups in both Phase 2 and Phase 3. Each qualitative report was submitted to a focus group participant for a member check. Interviews were then held with the participant reviewers to establish areas of agreed interpretation and areas in need of further amplification.

CHAPTER IV

ANALYSES OF DATA

Recent calls have been made for the placement of student teachers with cooperating teachers who employ a high degree of instructional computer use (Bruder, 1989; Ingram, 1991; Oke, 1992; Willis, 1993). This recommendation rests upon the assumption that a relationship exists between such placements and the likelihood of future employment of this particular innovation by student teachers.

The problem to be considered in this study was twofold: (a) whether the concerns of student teachers toward instructional computer use change during student teaching and (b) whether a relationship exists between such change and several factors involving student teachers themselves, cooperating teachers, and the broader institutional context of the sites in which those student teaching experiences take place. In particular, the study was concerned with wavelike movement across seven Stages of Concern as outlined by the Concerns-Based Adoption Model (Hall et al., 1977).

A post hoc exploratory investigation of change during a naturally occurring 8-week student teaching experience was chosen for two decisive reasons. First, preservice computer education has only recently come under serious attention in research literature. As such, the literature provides an extremely shallow base for determining appropriate levels of variables which would have to be controlled in more experimental designs. Secondly, the investigator held a strong belief that student teaching by its very nature belongs essentially to the participants, and should not be encumbered by outside intervention. As such it was determined to invite participation from all education

majors at one regional Midwestern university enrolled in a first student teaching placement along with their respective cooperating teachers.

The study itself was organized into three distinct phases. Phase 1 involved the administration of the Stages of Concern Questionnaire developed by Hall et al. (1977) to student teachers before and after an 8-week student teaching placement. The pre placement instrument for cooperating teachers included a questionnaire concerning four pertinent areas of classroom computer use: (a) the extent of instructional computer use by the cooperating teacher and that teacher's students, (b) the length of utilization of instructional computer use by the cooperating teacher, (c) the degree of educational impact of instructional computer use as perceived by the cooperating teacher, and (d) the influence of institutional context. All items on the questionnaire were developed by the researcher with the exception of the measurement of perceived educational impact which was developed by the International Association for the Evaluation of Educational Achievement in conjunction with its international survey of computer use (Pelgrum & Plomp, 1991).

Phase 1 also involved development of a questionnaire for cooperating teachers concerning four pertinent areas of classroom computer use: (a) extent of instructional computer use, (b) history of employment of instructional computer use, (c) perceived educational impact of instructional computer use, and (d) the influence of institutional context. All items on the questionnaire were developed by the researcher with the exception of the measure of perceived educational impact which was developed by the International Association for the Evaluation of Educational Achievement in connection with its international survey of computer use (Pelgrum & Plomp, 1991).

Phase 2 of the study involved a focus group comprised of 8 student teachers. The group interview focused upon student teacher expectations for instructional computer use, the realization of those expectations in student teaching, university preparation, and perceived expectations from cooperating teachers, university faculty and the marketplace. A research log entry immediately following the conclusion of the focus group provided extemporaneous insight into the researcher's impression of group functioning.

Phase 3 of the study involved a focus group comprised of 8 cooperating teachers. Again, the group interview focused upon expectations for instructional computer use, realization of those expectations, university preparation and perceived expectations from university faculty. Again, a research log entry immediately following the conclusion of the focus group provided extemporaneous insight into the researcher's impression of group functioning.

Audiotapes from both Phase 2 and Phase 3 were transcribed and analyzed using a modified coding system based on Lederman (1990). A qualitative report summarizing the information generated during the interview was then prepared.

Phase 1

Descriptive Data

The first step in data analysis was to utilize descriptive statistics and data representations to arrive at descriptions of demographics, independent and dependent variable distributions. Information concerning several demographic variables was collected on the sample of student teachers and is presented in Table 1. Approximately 64% of the student teachers were placed in the

Table 1

Demographic Characteristics of Student Teachers

Variable	N	%
Student Teaching Level		
PreK-K	25	18.7
Primary	41	30.6
Intermediate	20	14.9
Middle School/Junior High	22	16.4
High School	22	16.4
Other	4	3.0
	134	100.0
Student Teaching Area		
All Content Areas (Self-contained)	64	47.8
Reading/Language Arts	15	11.2
Resource Support - Special Education, Chapter I, ESL	13	9.7
Music, Art, Physical Education	11	8.2
Science	9	6.7
Social Studies	8	6.0
Math	5	3.7
Other	9	6.7
	134	100.0

elementary grades, with 32% reported at middle or secondary levels. Areas of student teaching assignment ranged broadly with the most common occurrence cited as student teaching in all content areas (47.8%), followed by reading/language arts (11.2%), and some form of resource support role (9.7%).

Prior Computer Competency

Prior to student teaching, student teachers were asked to indicate their level of competence for each of the following tasks: (a) utilizing drill and practice software, (b) using a word processor, (c) using a database, (d) using a spreadsheet, (e) creating a stack by using Hypercard or similar program, (f) using electronic mail, (g) using the Internet for long distance communication, (h) using the Internet to access distant information, and (i) using a computer language such as BASIC or Logo. Students were asked to rate their ability as either 1 (not competent), 2 (somewhat competent) or 3 (very competent). Based on responses to each of the nine tasks, a computer competence index score was compiled for each individual, and for the group as a whole. With the exceptions of computer programming languages and Internet use, student teachers rated themselves as somewhat competent with most computer uses (see Table 2).

Degree of Perceived Instructional Autonomy

After student teaching, student teachers were asked to rate the amount of instructional autonomy they had experienced in the classroom. Instructional autonomy was defined as "the amount of freedom a teacher has in making decisions regarding what is to be taught in a classroom and how it is to be taught." Student teachers were asked to utilize a 4-pointLikert scale (low, medium low, medium high, or high) to respond to the question, "As a student teacher, how would you categorize the level of autonomy extended to you by your cooperating teacher? Overall, group participants rated their level of instructional autonomy as medium high to high (see Figure 1).

Table 2

Level of Computer Competence of Student Teachers (Self-Reported)

Computer-Related Task	M	SD	Median
Using a word processor	2.75	.62	2.00
Using electronic mail	2.34	.68	2.00
Using drill and practice software	2.25	.68	2.00
Using Hypercard or similar program to create a stack	1.93	.76	2.00
Using a database	1.86	.78	2.00
Using a spreadsheet	1.83	.69	2.00
Using the Internet for long distance communication	1.63	.76	1.00
Using the Internet to access distant information	1.53	.66	1.00
Using a computer language such as BASIC or LOGO	1.47	.65	1.00

Note. Minimum possible score = 1. Maximum possible score = 3. N = 152.

Extent of Instructional Computer Use by Cooperating Teachers

Cooperating teachers were asked to complete an 18-item questionnaire and return it to the investigator by pre stamped envelope. The questionnaire was divided into four sections: (a) extent of instructional computer use, (b) length of employment of instructional computer use, (c) perceived educational impact, and (d) influence of institutional context. Instructional computer use was defined as (a) use of a computer by students as a means of meeting

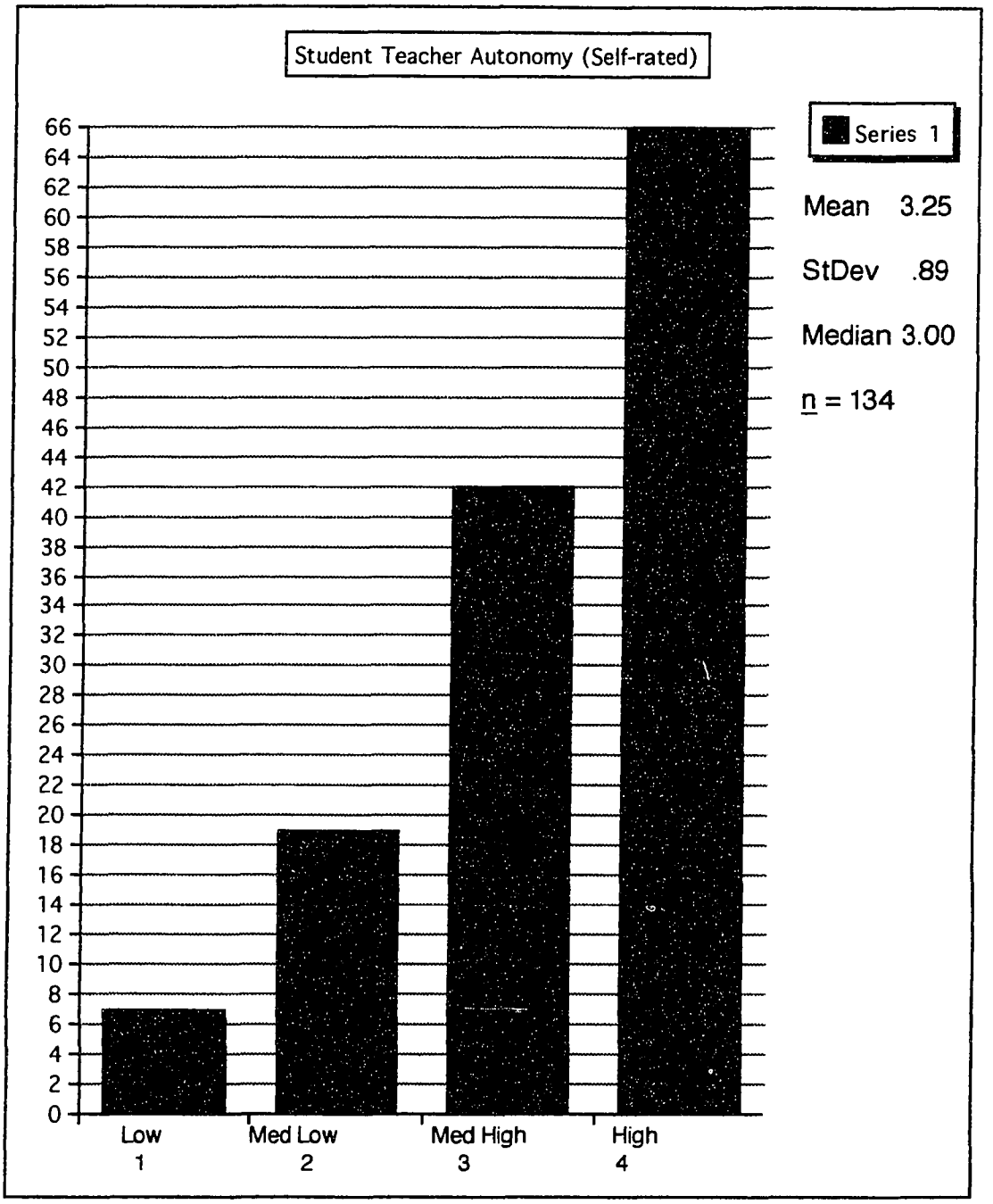

Figure 1. Student Teacher Autonomy.

instructional objectives or (b) use of a computer by teachers in the presence of students as a means of meeting instructional objectives. Cooperating teachers were asked to report the average number of minutes per week that they, the teacher, engaged with instructional computer use. With 134 cooperating teachers reporting, extreme variance was evident in the average number of minutes reported, ranging from zero minutes to over 900 minutes. The group median was 30 minutes. A large degree of variance was anticipated across individual sites due to hardware availability and individual teaching patterns (see Figure 2).

Extent of Instructional Computer Use by Pupils

Cooperating teachers were asked to indicate the average number of minutes that pupils in their classrooms were engaged with instructional computer use. The group median was 30 minutes. Again, extreme variance was evident in the average number of minutes reported. Similar to the cooperating teacher use, a large degree of variance was anticipated across individual sites due to hardware availability and the use of integrated learning system computer labs (see Figure 3).

Length of Employment of Instructional Computer Use

Cooperating teachers were asked to indicate the number of years, not counting the current year, they had employed instructional computer use in the classroom. With response choices ranging from never to six or more years, the median response was given at five years of use. Considerable variance was also apparent in response to this question (see Figure 4).

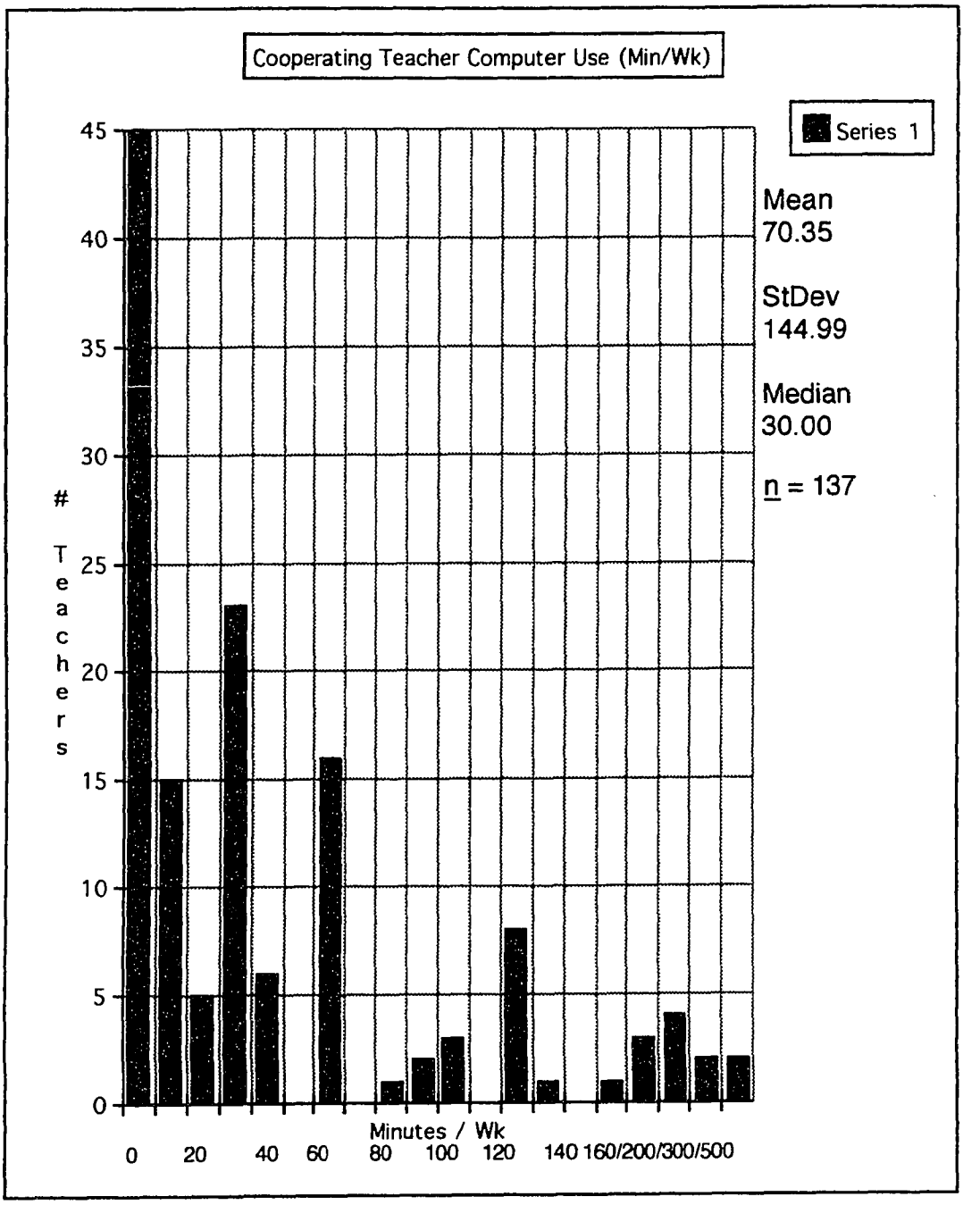

Figure 2. Cooperating Teachers: Average Minutes of Computer Use / Week.

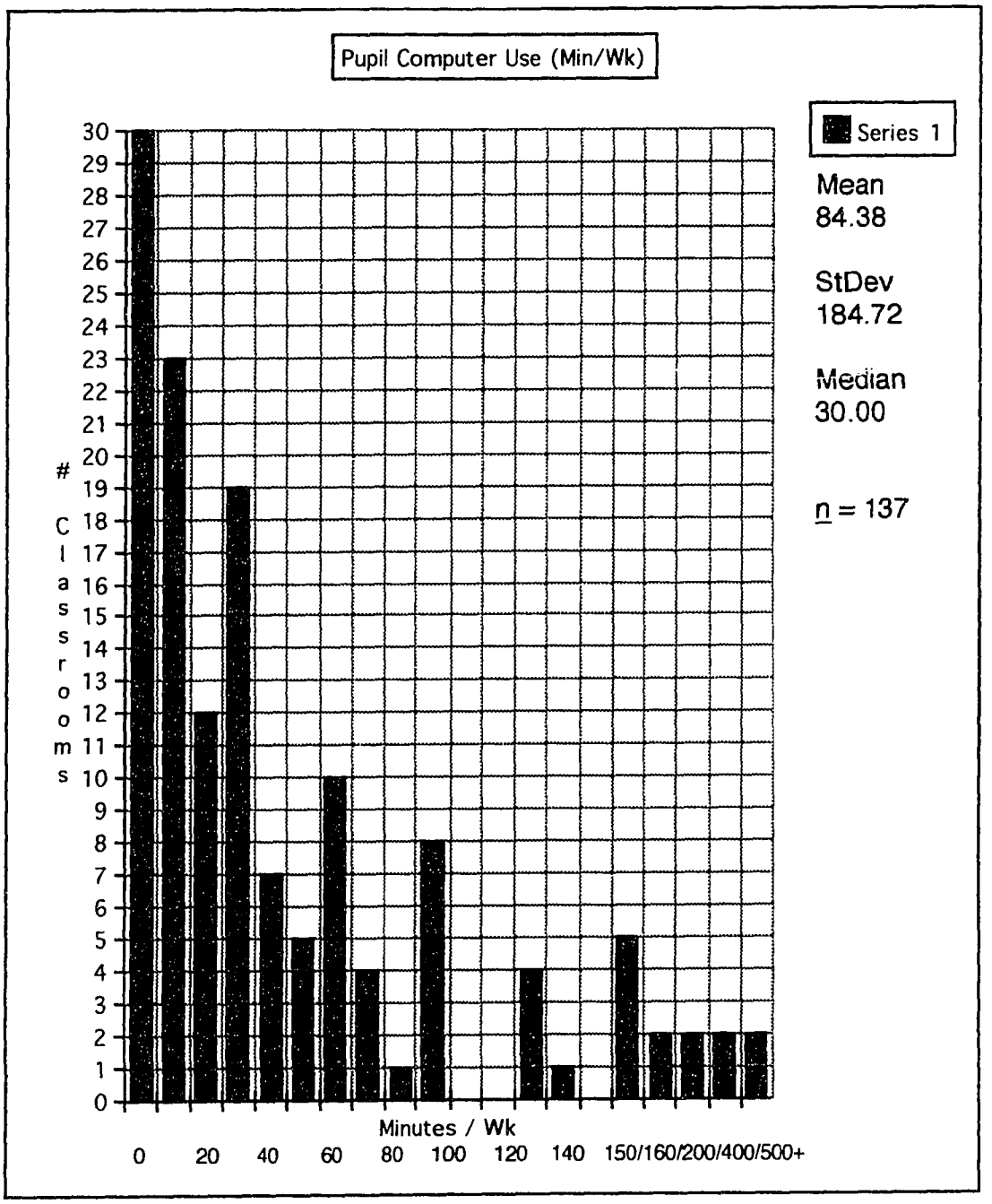

Figure 3. Pupils: Average Minutes of Computer Use / Week.

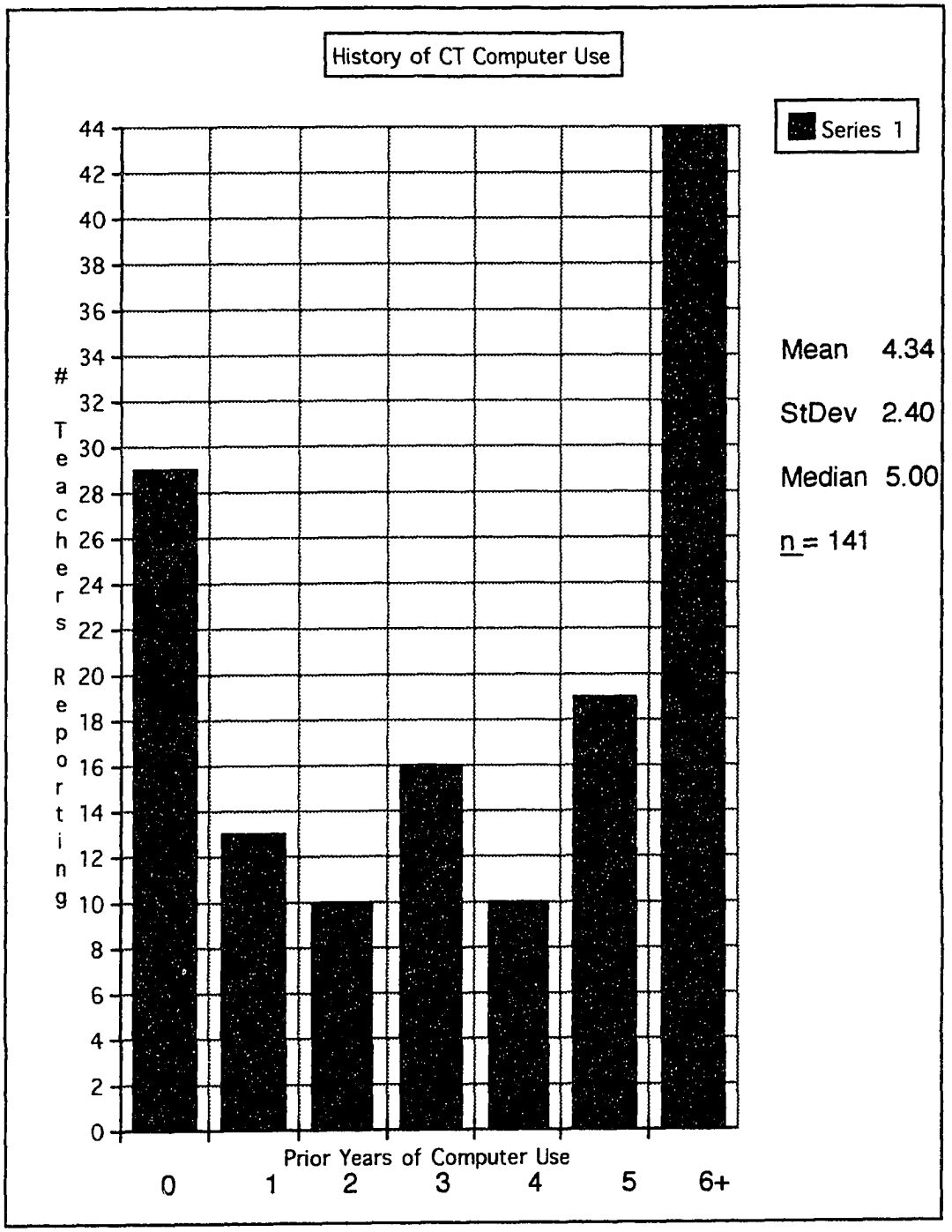

Figure 4. Cooperating Teachers: History of Computer Use.

Perceived Educational Impact

The third part of the questionnaire for cooperating teachers was comprised of a modified version of the "Perceived Educational Impact Scale" developed by the International Association for the Evaluation of Educational Achievement (Pelgrum & Plomp, 1991). The scale contains nine statements concerning the impact of computers in school settings. Participants were asked to rate their agreement or disagreement with each statement by choosing (1) strongly disagree, (2) mildly disagree, (3) mildly agree, or (4) strongly agree. With a potential range of 9 (strongly disagree) to 36 (strongly agree), the overall median index score was 28 ($M = 26.49$, $SD = 6.10$).

Influence of Institutional Context

In the fourth section of the questionnaire, participants were asked to indicate how the following factors influence instructional computer use in their building: (a) the amount of available hardware, (b) the amount of available software, (c) the amount of planning time, (d) the availability of on-site resource people, (e) the amount of inservice training offered, and (f) the amount of administrative support. Participants were asked to respond to each factor by choosing one of the following: (1) strongly discourages, (2) mildly discourages, (3) mildly encourages, or (4) strongly encourages. The median response to all factors was 3 (mildly encouraging) except the influence of the amount of planning time which received a median response of 2 (mildly discouraging). With the exception of planning time, cooperating teachers indicated that institutional context was for the most part mildly encouraging. The strongest encouragement factor appeared to be in the area of administrative support ($M = 3.13$) (see Table 3).

Table 3

Influence of Institutional Context on Instructional Computer Use

Factors	M	SD	Median
Amount of available hardware	2.83	1.18	3.00
Amount of available software	2.89	1.08	3.00
Amount of planning time	2.38	1.07	2.00
Availability of on-site resource people	2.56	0.99	3.00
Amount of inservice training offered	2.60	1.05	3.00
Amount of administrative support	3.13	0.92	3.00

Note. Minimum rating = 1. Maximum rating = 4.

Summary

Approximately two-thirds of the participants in this study were female; one third were male. Placement in self-contained classrooms at elementary grade levels characterized about half of the student teachers. The student teacher participants reported themselves to be somewhat competent with several computer uses relevant to classroom instruction and they reported feeling medium high to high instructional autonomy in their student teaching classrooms.

Cooperating teachers in the study mildly agree with statements concerning the positive impact of computers on students. The median for average number of minutes per week of instructional computer use by teachers

and their pupils was 30 minutes per week. Extreme variance was found however, ranging from zero minutes to over one thousand for teacher use, and for pupil use also. Cooperating teachers report that with the exception of planning time, most institutional factors are mildly encouraging of instructional computer use. On average these cooperating teachers had been utilizing instructional computer use for about five years.

Inferential Analysis and Hypothesis Testing

The study was designed as an exploratory examination of changes in the concerns of student teachers towards instructional computer use during student teaching. Aside from descriptive data, Phase 1 of the study was designed to gather quantitative data relating to movement of student teachers across the seven Stages of Concern hypothesized by the Concerns-Based Adoption Model. The first hypothesis predicted changes in concerns toward instructional computing use during the student teaching experience.

Hypothesis #1. Change occurs in the concerns of student teachers toward instructional computer use between the beginning and end of the student teaching experience.

Based on the literature, seven additional hypotheses were proposed concerning relationships between the hypothesized change and selected factors involving (a) student teachers, (b) cooperating teachers, and (c) the institutional context surrounding the student teaching placement.

Hypothesis #2. Changes in the concerns of student teachers toward instructional computer use will differ as a function of the prior computer competence of student teachers.

Hypothesis #3. Changes in the concerns of student teachers toward instructional computer use will differ as a function of the extent of instructional computer use employed by cooperating teachers.

Hypothesis #4. Changes in the concerns of student teachers toward instructional computer use will differ as a function of the extent of instructional computer use employed by students of the cooperating teacher.

Hypothesis #5. Changes in the concerns of student teachers toward instructional computer use will differ as a function of the cooperating teacher's perceived educational impact of instructional computer use.

Hypothesis #6. Changes in the concerns of student teachers toward instructional computer use will differ as a function of the cooperating teacher's length of utilization of instructional computer use.

Hypothesis #7. Changes in the concerns of student teachers toward instructional computer use will differ as a function of the student teacher's perceived degree of instructional autonomy.

Hypothesis #8. Changes in the concerns of student teachers toward instructional computer use will differ as a function of the level of support provided by the institutional context.

Hypothesis Testing

Null Hypothesis #1. There will be no change in the concerns of student teachers toward instructional computer use between the beginning and end of the student teaching experience.

Changes in concerns toward the instructional computer use was established by administration of the Stages of Concern Questionnaire (SoCQ) (Hall et al., 1977) before and after student teaching. The SoCQ consists of 35

items which are designed to measure the level of intensity of each of the seven Stages of Concern theorized by the Concerns-Based Adoption Model. Respondents indicated the degree (intensity) to which each statement was true by circling a number from 0 to 7 on an intensity scale. The raw score for each of the seven scales was obtained by adding the sum of the responses to the five items representing that scale in the questionnaire.

Means on pre and post administration of each stage were examined for change by means of a series of t tests for paired samples between the pretest and posttest (see Table 4). Significant change in the overall group means was found for information concerns: t (125) = 3.53, p value < .01. Significant change in the overall group means was also found for personal concerns of the student teachers t (127) = 3.23, p value < .01. Given the exploratory nature of the study, it should also be noted that there was change in the refocusing concerns of student teachers at a .10 significance level: t (123) = -1.67, p value < .099. No significant change was found in the awareness, management, consequence, and collaboration concerns of the student teachers.

The Concerns-Based Adoption Model which underlies use of the SoCQ theorizes that movement toward employment of an innovation occurs as an individual's personal, management, and consequence concerns regarding use of an innovation concerns are aroused and successively resolved. A stage by stage plotting of pre and post concerns (see Figure 5) indicated that the concerns of entering student teachers were in a generally heightened state of arousal across nearly all stages. Concerns were especially high in the early stages of awareness, information, and person concerns.

Table 4

Pretest and Posttest Means onStages of Concern Questionnaire

Stage of Concern	M	SD	SE	t	df	p
Awareness						
Pretest	19.55	5.52	.50			
Posttest	20.45	6.65	.60			
(Difference)	-0.90	6.34	.57	-1.59	124	.120
Information						
Pretest	27.04	5.89	.53			
Posttest	25.35	6.40	.57			
(Difference)	1.68	5.35	.48	3.53	124	.001**
Personal						
Pretest	26.95	7.15	.64			
Posttest	24.89	8.31	.74			
(Difference)	2.06	7.20	.64	3.23	126	.002**
Management						
Pretest	21.45	5.98	.53			
Posttest	20.97	6.56	.58			
(Difference)	.48	6.56	.58	.83	126	.411
Consequence						
Pretest	26.69	5.57	.59			
Posttest	25.75	7.44	.66			
(Difference)	.94	6.81	.61	1.56	125	.122
Collaboration						
Pretest	23.18	6.91	.62			
Posttest	22.31	7.85	.71			
(Difference)	.87	7.32	.66	1.33	123	.187
Refocusing						
Pretest	17.91`	6.48	.58			
Posttest	18.99	6.86	.62			
(Difference)	-1.08	7.19	.65	-1.67	122	.098^

Note. ** $p < .01$.

^ $p < .10$.

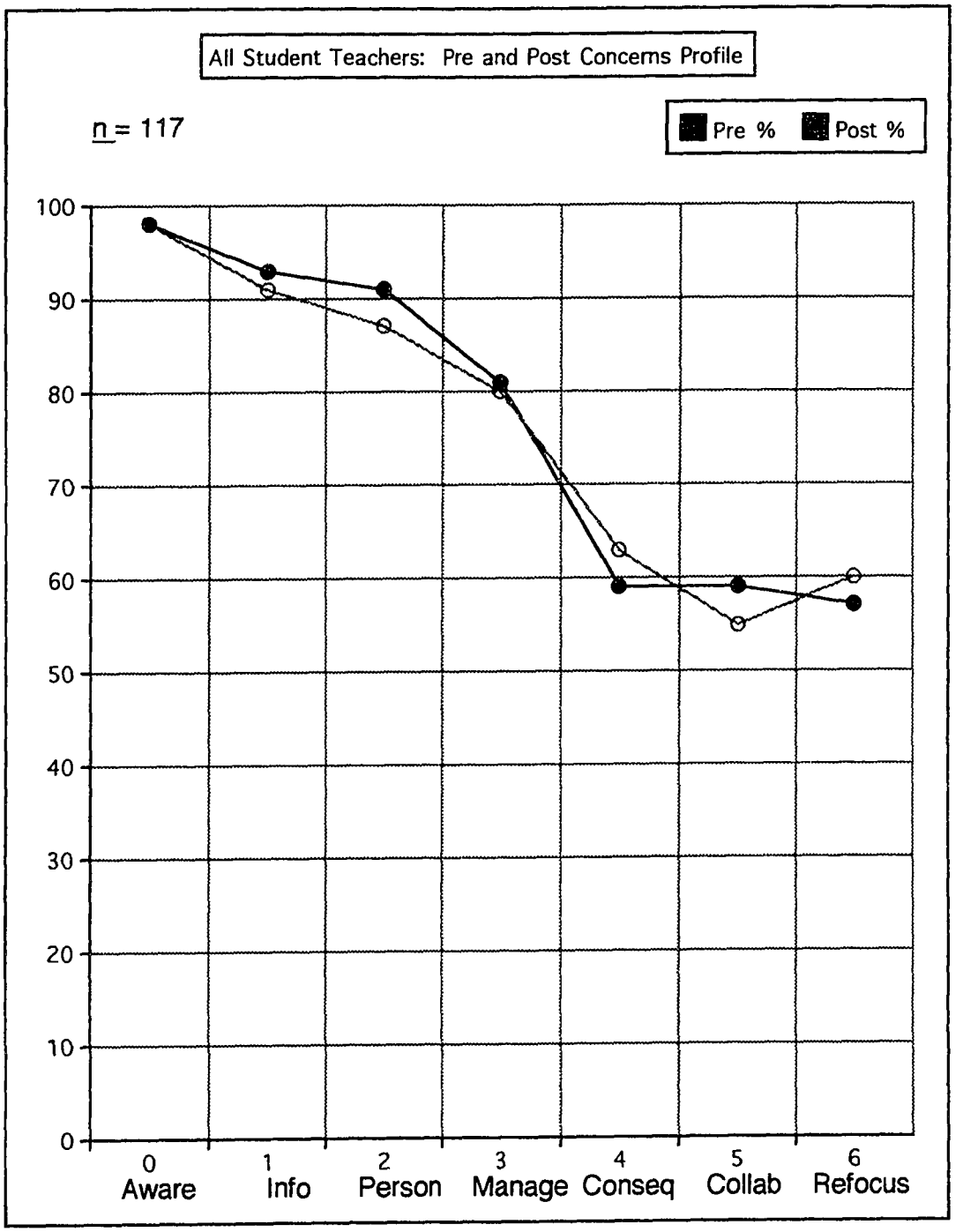

Figure 5. All Student Teachers: Pre and Post Concerns Profile.

Procedures for gestalt interpretation of SoCQ data profiles, as outlined by the SoCQ Manual (Hall et al., 1977), were applied to the group pre and post placement plots. The pre placement plot was found to fit the profile of a typical nonuser. "Nonusers' concerns are normally highest on stages 0, 1, and 2. and lowest on Stages 4, 5, and 6 . . . in general, either Stage 0, 1, or 2 is the highest score" (Hall et al., 1977, 35-36).

The student teachers in this study appear to be intensely aware of instructional computers use and are very concerned about obtaining more information, both on the innovation itself (Stage 1) and on their person position and well-being in relation to instructional computer use (Stage 2). Prior to student teaching, the student teachers as a group have relatively lower concerns regarding management of the innovation (Stage 3) , and consequences of use (Stages 4 and 5). The Stage 6 score suggests that student teachers do not have other ideas which are held as strong potential competitors with instructional computer use. Overall, the profile reflects extremely interested, very concerned nonusers who are very interested in gathering specific information on instructional computer use and its personal ramifications for themselves as teachers.

Statistically significant changes between pre and post administrations were found in the information and personal Stages of Concern (see Table 4). However, the post student teaching profile indicates that changes in these two areas were not practically significant. The profile of concerns after student teaching continues to peak in the areas of information and personal concerns (see Figure 5).

After student teaching for 8-weeks, student teachers as a whole continue to be intensely aware of instructional computers use and continue to be concerned about obtaining more information on instructional computer use itself (Stage 1) and on personal ramifications associated with its use in the classroom (Stage 2). Given no resolution of these primary concerns, student teachers report lessening concern with classroom management of instructional computer use (Stage 3), and consequences of use (Stages 4 and 5). Given the moderately elevated refocusing concern (Stage 6) student teachers may be starting to critically think about the appropriateness of instructional computer use under a variety of classroom circumstances. The post placement profile is not substantially different from the pre placement profile. Once again, it suggests a group of very concerned individuals who continue to be predisposed toward engaging with instructional computer use, but have yet to actually begin use. As a group, the student teachers continued to be most concerned with gathering enough information to allow them to resolve specific concerns with instructional computer use itself, and to resolve concerns with the ramifications of such use on personal/professional standing.

Null Hypothesis #1. There will be no change in the concerns of student teachers toward instructional computer use between the beginning and end of the student teaching experience. Given the statistical finding of change at the .01 level of significance for both information and personal Stages of Concern, the null hypothesis was rejected. Change did occur during the student teaching experience of these student teachers. However, given the overall interpretation of the pre and post student teaching concerns profiles, the practical significance of such change is questionable.

Correlation. In the second step of analysis, the relationships of variables with each other were examined with correlations. Seven independent variables had been identified as potential mediators of changes in concerns of student teachers toward instructional computer use: (a) the computer competence of student teachers prior to entering student teaching, (b) the extent of employment of instructional computer use by the cooperating teacher, (c) the extent of employment of instructional computer use by students, (d) cooperating teacher attitudes toward instructional computer use, (e) length of employment of instructional computer use by cooperating teacher, (f) the degree of autonomy experienced by the student teacher, and (g) the level of support evidenced by the broader institutional context. Scatterplots of these seven variables were examined. As part of this analysis, a check was made of assumptions of normality, linearity, and homoscedasticity.

Correlations among all variables are presented in Tables 5, 6, and 7. With the independent variables themselves, the strongest relationships exist between various factors associated with cooperating teachers (see Table 7). Extent of cooperating teacher use was positively related to the perceived impact of computers ($r = .24$, $p < .01$) and pupil use ($r = .34$, $p < .01$). Perceived impact was positively related to history of use ($r = .39$, $p < .01$). It appeared that extent of cooperating teacher use, pupil use, and history of use, each held a position in a cluster of variables associated with cooperating teachers' perceived impact of computer use.

Institutional context was also positively related to perceived impact ($r = .29$, $p < .01$) and history of use ($r = .31$, $p < .01$). This was not unexpected. The

Table 5

Correlations Among Independent Variables and Pre Stages of Concern

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. Competency Index	1.00	-.01	-.10	.05	-.03	-.01	-.23	-.25	-.08	-.09	-.10	.18*	.29**	.13
2. Coop Teacher Use		1.00	.24**	-.07	.32**	.12	.04	-.01	.01	.00	.02	.06	-.02	.03
3. Coop Impact Index			1.00	.05	.02	.39**	.29**	.13	.05	.01	.01	.11	-.08	.03
4. ST Autonomy				1.00	-.05	.03	.05	-.03	.22**	.25**	.14	.23**	.21	.06
5. Pupil Use					1.00	.14	.14	-.07	.03	.08	.07	.08	.09	-.04
6. Coop History						1.00	.31**	-.05	-.04	-.05	-.04	.11	-.04	.07
7. Institutional Context							1.00	.08	-.02	-.06	.09	.04	-.14	-.03
8. Pre Awareness (0)								1.00	.16	.14	.34**	-.08	-.18*	-.04
9. Pre Information (1)									1.00	.75**	.47**	.62**	.60**	.31**
10. Pre Personal (2)										1.00	.44**	.62**	.62**	.36**
11. Pre Management (3)											1.00	.41**	.34**	.36**
12. Pre Consequence (4)												1.00	.71**	.55**
13. Pre Collaboration (5)													1.00	.55**
14. Pre Refocusing (6)														1.00

Note. ** $p < .01$. * $p < .05$.

Table 6

Correlations Among Independent Variables and Post Stages of Concern

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. Competency Index	1.00	-.01	-.10	.05	-.03	-.01	-.23	-.24**	-.02	.09	-.04	.17	.33**	.18
2. Coop Teacher Use		1.00	.24**	-.07	.32**	.12	.04	-.05	.01	-.01	.08	.03	.07	.01
3. Coop Impact Index			1.00	.05	.02	.39**	.29**	.05	.04	.06	.02	.14	.05	.03
4. ST Autonomy				1.00	-.05	.03	.05	-.15	.14	.08	.02	.16	.09	.07
5. Pupil Use					1.00	.14	.14	-.04	.04	.07	.03	.01	.00	.07
6. Coop History						1.00	.31**	.15	-.03	-.01	.08	.05	.02	.03
7. Institutional Context							1.00	.24**	-.13	-.09	-.04	-.17	-.26**	-.19*
8. Post Awareness (0)								1.00	-.06	-.07	.23**	-.22**	-.44**	-.27**
9. Post Information (1)									1.00	.79**	.47**	.64**	.59**	.54**
10. Post Personal (2)										1.00	.60**	.72**	.60**	.55**
11. Post Management (3)											1.00	.53**	.32**	.50**
12. Post Consequence (4)												1.00	.72**	.71**
13. Post Collaboration (5)													1.00	.69**
14. Post Refocusing (6)														1.00

Note. ** $p < .01$. * $p < .05$.

Table 7

Correlations Among Pre and Post Stages of Concern

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. Pre Stage 0	1.00	.16*	.16*	.35*	-.08	-.17*	-.04	.47**	.05	.01	.14	-.09	.24**	.02
2. Pre Stage 1		1.00	.75**	.47**	.61**	.59**	.31**	-.02	.62**	.54**	.41**	.40**	.29**	.39**
3. Pre Stage 2			1.00	.44**	.62**	.62**	.36**	-.00	.57**	.57**	.43**	.43**	.35**	.43**
4. Pre Stage 3				1.00	.41**	.33**	.36**	.24**	.26**	.25**	.50**	.13	.00	.24**
5. Pre Stage 4					1.00	.71**	.55**	.00	.42**	.50**	.41**	.53**	.41**	.43**
6. Pre Stage 5						1.00	.55**	-.12	.51**	.52**	.37**	.47**	.51**	.46**
7. Pre Stage 6							1.00	.09	.18*	.26**	.36**	.26**	.27**	.42**
8. Post Stage 0								1.00	-.06	.79**	.47**	.64**	.59**	.54**
9. Post Stage 1									1.00	.79**	.47**	.64**	.58**	.54**
10. Post Stage 2										1.00	.59**	.762**	.59**	.56**
11. Post Stage 3											1.00	.54**	.32**	.51**
12. Post Stage 4												1.00	.72**	.72**
13. Post Stage 5													1.00	.69**
14. Post Stage 6														1.00

Note. ** $p < .01$. * $p < .05$.

provision of hardware, software, and personnel support provides a base from which history of use and perceived impact can develop.

A significant relationship was found between student teacher competency and consequence and collaboration concerns on the pre administration of the SoCQ ($r = .29$, $p < .01$). Increased competency may allow student teachers to move beyond information toward consequence concerns.

Student teacher autonomy was positively related to information concerns ($r = .22$, $p < .01$), personal concerns ($r = .25$, $p < .01$), and consequence concerns ($r = .23$, $p < .01$) on the pre administration of the SoCQ. Since autonomy was not assessed until after the student teaching experience, this finding was not expected. Several correlations between independent variables and post placement Stages of Concern were also evident (see Table 6). A negative relationship was found between student teacher computer competency and post awareness concerns ($r = -.25$, $p < .01$). A positive relationship was evident between computer competency and post collaboration concerns ($r = -.33$, $p < .01$). This supports the theory underlying stages of concern that increased background acts to lower intensity of concerns for general information about an innovation and allows the individual to increase concerns at later stages.

There was a positive correlation between institutional context and post awareness concerns ($r = -.33$, $p < .01$). A negative correlation existed between institutional context and post collaboration concerns. Both of these correlations are in keeping with stages of concern theory. Increased hardware, software and support personnel may act to broaden student teacher understanding of the

complexities involved with instructional computer use. Intensifying awareness concerns would likely decrease attention to concerns at later stages.

Multiple Regression Analysis

To determine the relationship between the independent variables and changes in concerns, a multiple regression analysis was conducted. The seven stages of concern with beta weights, p values, and Multiple Rs are presented in Table 8. The multiple correlations (R) were highly significant with $p < .001$ which in large part can be attributed to the treatment of preplacement SoCQ scores as independent variables. However, with the exception of student teacher competency, the partial correlations as shown by the beta weights were not significant.

A stepwise multiple regression was computed. In stepwise regression, the independent variable which contributes the most to explaining the variance in the dependent variable is entered into the regression equation first. The independent variable which can best explain the remaining variance is entered on the next step, and the process continues until entry of additional variables provides no further significant explanation of variance in the dependent variable.

At Stage 5 (collaboration concerns), the Stage 5 score on the pre student teaching SoCQ had a correlation of .47 with the post student teaching score. The second variable to enter was student teacher competency. The Multiple R increased from .47 to .52. The regression analysis indicated that in the presence of pre placement scores, no other independent variables were found to contribute significantly to awareness concerns (Stage 0), information

concerns (Stage 1), personal concerns (Stage 2), management concerns (Stage 3), consequence concerns (Stage 4), or refocusing concerns (Stage 6).

Table 8

Multiple Regression Statistics

DEPENDENT VARIABLE	R	p	INDEPENDENT VARIABLE	Beta	p
(0) Awareness Concerns	.48	.001	ST Competency Index	-.19	.06 ^
			CT Minutes of Use	.10	.31
(1) Information Concerns	.64	.001	ST Competency Index	-.01	.87
			CT Minutes of Use	.03	.70
(2) Personal Concerns	.56	.001	ST Competency Index	.03	.66
			CT Minutes of Use	.07	.39
(3) Management Concerns	.46	.001	ST Competency Index	-.03	.74
			CT Minutes of Use	.01	.88
(4) Consequence Concerns	.50	.001	ST Competency Index	.08	.36
			CT Minutes of Use	-.07	.42
(5) Collaboration Concerns	.47	.001	ST Competency Index	.23	.01**
			CT Minutes of Use	.07	-.77
(6) Refocusing Concerns	.40	.001	ST Competency Index	.12	.17
			CT Minutes of Use	-.11	.24

Note. ** denotes significance at .01 level. ^ denotes significance at .10 level.

Post Hoc Partitioning. Multiple regression analysis indicated that only prior computer competence could be used to predict posttest concerns toward collaboration. Lack of explanatory power from the independent variables was

not expected. A post hoc partitioning of subjects was conducted to determine if significant change had been masked by student teacher competency levels or by cooperating teacher instructional computer use (see Figures 6). Response

		Student Teacher: Level of Computer Competence	
		Low	High
Cooperating Teacher: Level of Computer Use	Low	Cell 1,1 Low ST Competency Low CT Computer Use	Cell 1,2 High ST Competency Low CT Computer Use
	High	Cell 2,1 Low ST Competency High CT Computer Use	Cell 2,2 High ST Competency High CT Computer Use

Figure 6. Four Quadrant Partitioning Matrix: Student Teacher Computer Competence by Cooperating Teacher Computer Use.

on these two factors were broken into high and low categories. A separate SoCQ plot was constructed for each cell in the 2 X 2 matrix. In addition, paired t-tests were computed for the pre and post SoCQ stage scores within each cell.

SoCQ plots of student teacher change, and t-tests of significance within the four partitioned cells differed substantially from one another .

Low competence, low computer use. SoCQ profiles are achieved by converting the raw scores for each Stage of Concern to percentile scores for each stage. The profile for low computer competence student teachers matched with low computer-using teachers (Cell 1,1) indicates relatively little change (see Figure 7). The peak remains strongly fixed on general awareness about the instructional computer use. In addition, the profile displays a tendency toward lessening of collaboration concerns, although this was not statistically significant. This general profile is in keeping with SoCQ theory which posits that in the absence of substantial exposure to an innovation, concerns remain fairly fixed with a tendency to decline over time as general interest in an innovation wanes. Interest in instructional computer use appears to be stagnate.

Low competence, high computer use. The profile for similar student teachers (low computer competence) placed with high computer-using teachers (Cell 2,1) indicates an even stronger pattern of lessening concerns in most areas (see Figure 8). It appears that student teaching with a high computer-using teacher has allowed these teachers to resolve some of their information and personal concerns. Setting aside the strong concern for general information about instructional computer use, concerns about classroom management are now strongest in intensity. Substantial decrease in concern toward consequence and collaboration also appear.

High competence, low computer use. The profile of high competence student teachers placed with low computer-using cooperating teachers

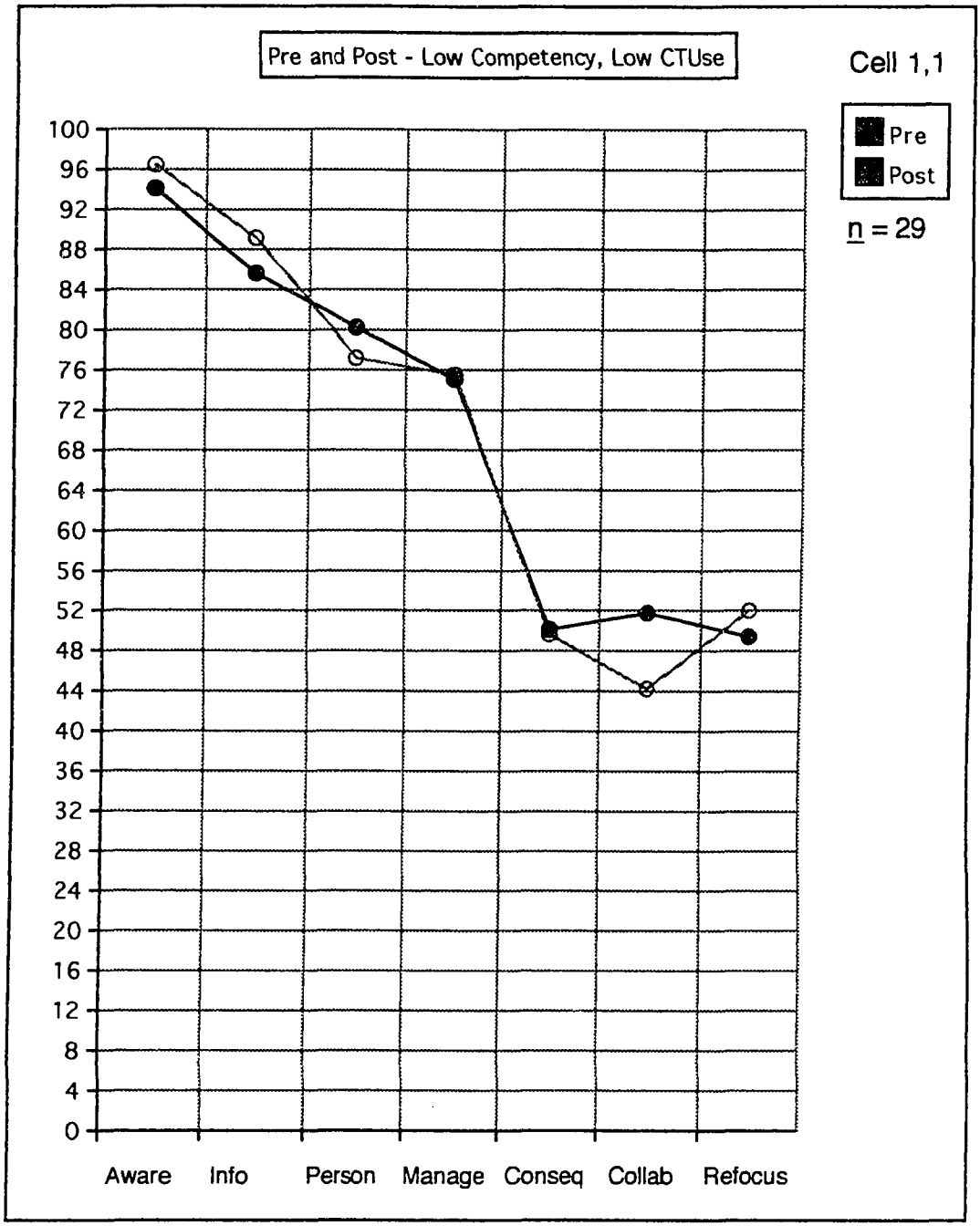

Figure 7. SoCQ Profile: Cell 1,1.

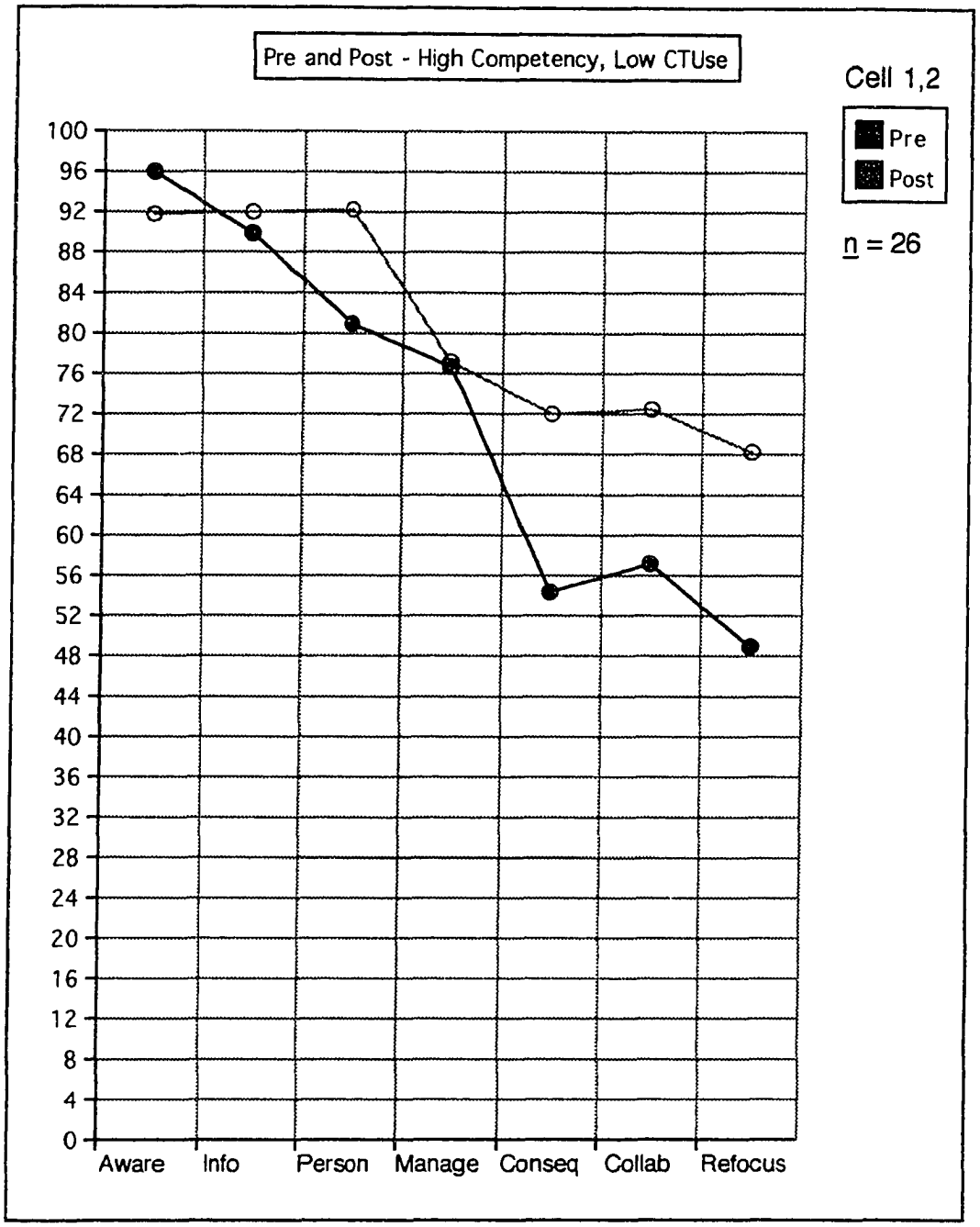

Figure 8. SoCQ Profile: Cell 1,2.

(Cell 1,2) is characterized by a substantial increase in personal concerns, which rose to join awareness and information in a multiple peak (see Figure 9). These student teachers appear to have retained strong concern with acquiring additional information about instructional computer use and, in the absence of computer use by cooperating teachers, concerns about personal ramifications of computer use have risen substantially. In addition these student teachers have increased concerns with the consequences and appropriateness of instructional computer use.

High competence, high computer use. Of all participants, the profile for high competence student teachers placed with high computer-using cooperating teachers (Cell 2,2) was the only one to indicate a substantial increase of intensity with management concerns (see Figure 10). Experiencing student teaching with a high computer-using teacher was associated with a decline in concerns for collaboration to improve utilization of instructional computer use, as well as a substantial increase in critical thinking of appropriate utilization of computers in the classroom. Student teachers in this quadrant appear to be moving toward the profile of a novice user, while maintaining very intense concerns about gathering further information about the innovation, and about its impact on their personal/professional lives.

Low competency quadrants. Looking at the 2 X2 matrix formed by competency and cooperating teacher use variables, it is possible to find some common patterns between cells. Low competency student teacher profiles, in general, do not indicate substantial intensifying of any concerns during the student teaching experience. Any substantial change is likely to be a lessening

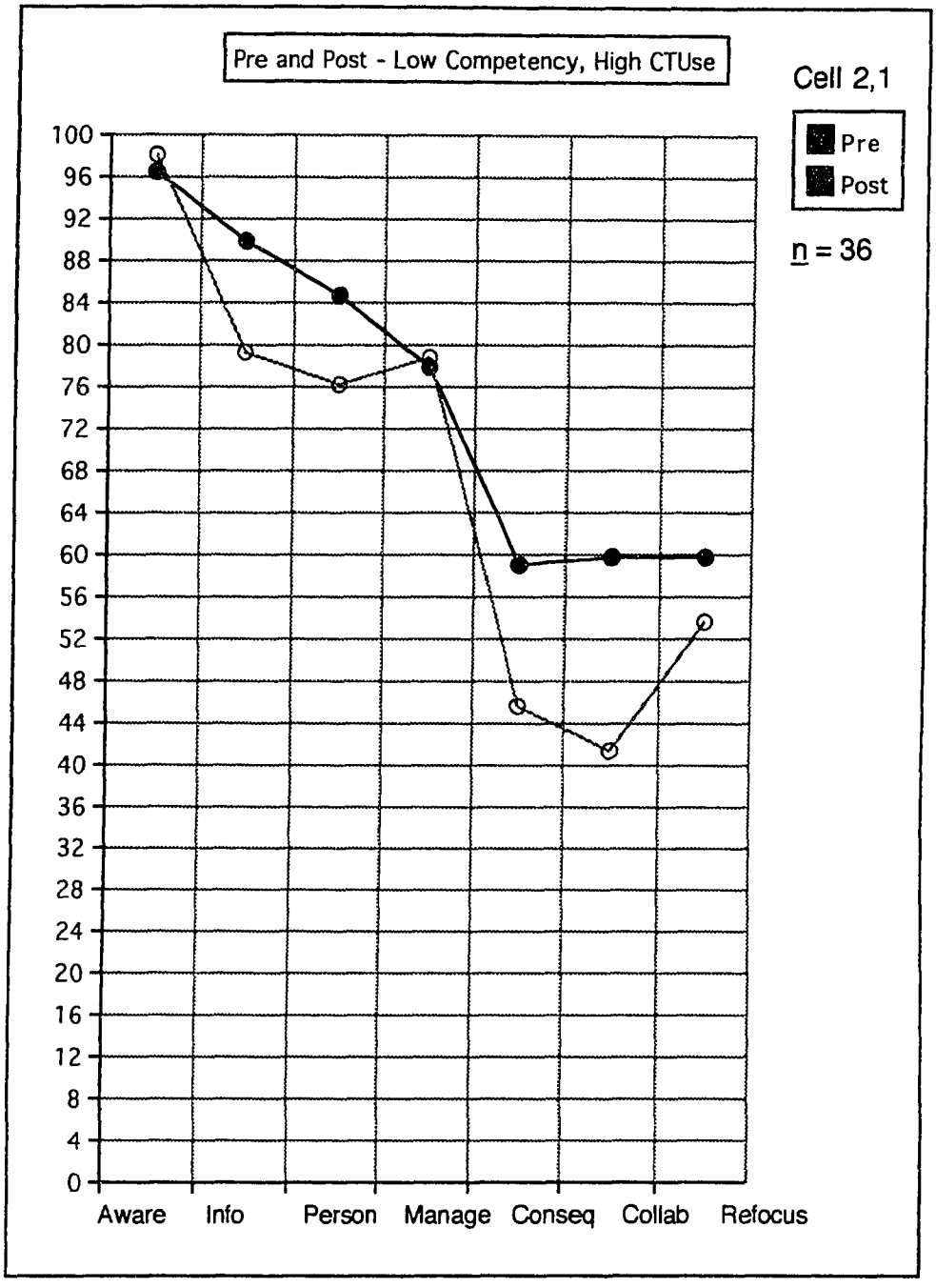

Figure 9. SoCQ Profile: Cell 2,1.

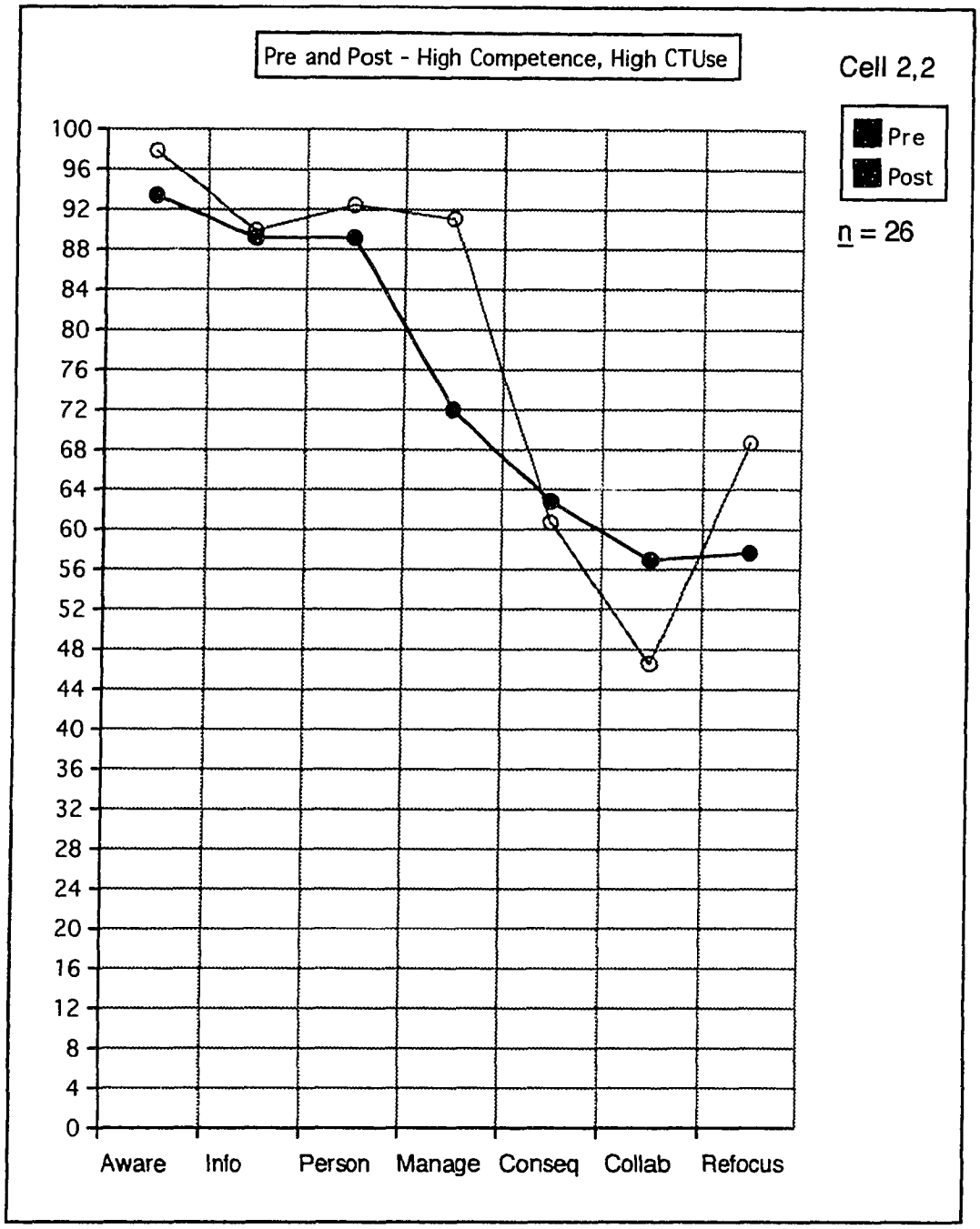

Figure 10. SoCQ Profile: Cell 2,2.

of concern, especially with a high computer-using cooperating teacher (see Figures 7 and 8).

High competency quadrants. By contrast, change for high competency student teachers appears to be typified by substantial increases in concerns. The profiles indicate very few areas of concern which have diminished. Movement across the Stages of Concern in these cells occurrs more by increasing concerns than by resolution of earlier concerns. Intensifying is most likely to be found in the areas of personal, management and refocusing concerns (see Figures 9 and 10).

Low and high computer use quadrants. The profiles for cooperating teacher computer use are not as quickly classified as those for student teacher competency. Change in specific concerns vary according to student teacher competency levels. However, one distinctive pattern does emerge. Student teachers placed with low computer-use cooperating teachers tend to be relatively low on refocusing concerns and tend to maintain those levels during student teaching. By contrast, student teachers placed with high computer-use cooperating teachers indicate strongly intensified concerns with refocusing. Both of the cells 2,1 (see Figure 8) and 2,2 (see Figure 10) reveal multiple peaks with a high Stage 3, and second high Stage 6 patterns. "A common high/second high combination is a person highest on Stage 3 and second highest on Stage 6. Individuals with this combination are concerned about management of the innovation (high Stage 3) and have some ideas about how to change their use (second high Stage 6). Individuals who are low on Stage 6 and high on Stage 3 do not have ideas about what to do and are apt to be stuck with their time and efficiency problems" (Hall et al., 1977, p. 33). It would

appear that in the presence of high computer-using cooperating teachers, student teachers gain ideas about possible ways to deal with the management concerns. This does not appear to be nearly as likely to happen in low computer-use placements (see Figure 7 and Figure 9).

Summary. In general, low competency student teachers experience a lessening of intensity of most concerns during student teaching placements, regardless of cooperating teacher computer use. By contrast, high competency student teachers tend to increase the intensity of most concerns during student teaching. After placement with high computer-use cooperating teachers, student teacher profiles reflect concern with management issues and the acquisition of ideas for possible solution of those concerns. Student teachers placed with low computer-use cooperating teachers peak in Stages of Concern earlier than management, i.e. informational concerns and personal concerns are still most intense.

Discussion of Regression and Partitioned Profiles.

Multiple regression analysis indicated that change in only one of the seven Stages of Concern (concerns toward collaboration) could be predicted by any of the independent variables. Even then, prior computer competence managed to add only slightly to explanation of the variance.

Given previous findings supporting the role of prior computer competence in concerns changes (Reed, 1990) and the effects of observation and use during student teaching (Handler, 1993), lack of explanatory power from the independent variables was not expected. A post hoc partitioning of data resulted in construction of a 2 x 2 matrix based on the independent variables which appeared in the regression procedure with the highest beta

weights: (a) student teacher competency levels and (b) cooperating teacher instructional computer use. SoCQ profiles were then constructed for each cell. The four cell profiles revealed that change patterns differed greatly depending on the relative level of the two independent variables: (a) level of student teacher computer competence and (b) amount of instructional computer use by the cooperating teacher.

Null Hypothesis #2. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the computer competence of student teachers. Given the profiles of the partitioned cells, null hypothesis #2 was rejected. Reed (1990) found that significant changes in concerns toward educational computer use occurred during an 11-week computer-integrated methods course. Reed identified prior experience as a strong mediator of concerns changes in preservice teachers. This study supports and extends Reed's research. Changes in the concerns of student teachers toward instructional computer use do differ as a function of the computer competence of student teachers.

Null Hypothesis #3. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the extent of instructional computer use employed by cooperating teachers. Given the profiles of the partitioned cells, null hypothesis #3 was rejected. Changes in the concerns of student teachers toward instructional computer use do differ as a function of the extent of instructional computer use employed by cooperating teachers. This finding supports the earlier findings of Bullough (1992) and Su (1992) that the cooperating teacher plays a major role in shaping the student teacher's thinking about teaching. Differences in the profiles of high and low

competence student teachers placed with low computer-using teachers however, indicate that changes in student teachers do not rest solely on cooperating teacher practices. The profiles support the dialectical model of teacher socialization proposed by several researchers (Jordell, 1987; Ross, 1988b; Zeichner & Gore, 1990; Zeichner & Liston, 1987) and highlight the active role individuals play in constructing their own views of teaching.

Null Hypothesis #4. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the extent of instructional computer use employed by students. Pupil computer use does appear to have a strong relationship with cooperating teacher computer use (r = .32, $p < .01$). However, correlation coefficients between instructional computer use by pupils and concerns scores after placement were not significant. Given the lack of significance, null hypothesis # 4 was retained. In this study, instructional computer use by cooperating teachers was associated much more with student teacher change than classroom pupil use.

Null Hypothesis #5. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the cooperating teacher's perceived educational impact of instructional computer use. There was a positive relationship between the cooperating teachers' perceived impact of computers and cooperating teacher use (r = .24, p <.01), history of cooperating teacher use (r = .39, p <.01), and the institutional context index (r = .29, p <.01). In spite of its strong correlation with other cooperating teacher variables, however, correlation coefficients between the impact index itself and concerns scores after placement were not significant. Given the lack of significance, null hypothesis # 5 was retained.

Null Hypothesis #6. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the cooperating teacher's length of utilization of instructional computer use. Years of instructional computer use by the cooperating teacher is related to cooperating teachers' perceived impact of computers ($r = .39$, $p < .01$) and the institutional context index ($r = .31$, $p < .01$). However, correlation coefficients between instructional computer use by pupils and concerns scores after placement were not significant. Given the lack of significance, null hypothesis # 6 was retained. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the cooperating teacher's length of utilization of instructional computer use. This finding was mildly surprising. Earlier research by Sheingold (1991) had found the incorporation of instructional computer use into a well-organized teaching practice took fully 5 to 6 years. It might be expected that a cooperating teacher's history of use would be related to changes in at least some of the Stages of Concern. Such relationships were not detected by this study.

Null Hypothesis #7. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the level of instructional autonomy extended to the student teacher. Autonomy was not related to any of the other independent variables. Correlation coefficients between instructional autonomy and concerns scores after placement were not significant. Given the lack of significance, null hypothesis # 7 was retained.

Null Hypothesis #8. Changes in the concerns of student teachers toward instructional computer use do not differ as a function of the level of support provided by the institutional context. There was a positive relationship between

institutional context and cooperating teacher impact index ($r = .29$, $p < .01$) and the history of instructional computer use by cooperating teachers ($r = .31$, $p < .01$). A negative relationship was evident between institutional context and student teacher competency ($r = -.23$, $p < .01$).

Correlation coefficients between institutional context and postconcerns scores were significant at several stages. A strong negative relationship was evident between institutional context and collaboration and refocusing concerns after student teaching ($r = -.26$, $p < .01$, $r = -.19$, $p < .01$). In addition, a positive relationship between institutional context and postawareness concerns was evident ($r = .24$, $p < .01$).

It was anticipated that institutional context would bear some relationship to changes in concerns scores. Instructional computer use rests upon a base of hardware, software, and overall personnel support. The absence of such support may well lead to questions concerning the role of instructional computer use. By contrast, the more an institution takes on a role of active support for computer technology, individuals within those settings are likely to become increasingly aware and increasingly interested in utilization of instructional computer use.

In spite of the strong relationships between institutional context and postawareness, postcollaboration, and postrefocusing concerns, institutional context did not pass the entrance test in the multiple regression procedure. In this study, changes in the concerns of student teachers toward instructional computer use did not differ as a function of the level of support provided by the institutional context.

Phase 2

Qualitative Report of Student Teacher Focus Group

The group was quick to establish a sense of rapport, with all of the participants previously acquainted through attending the same student teaching seminar. The elementary grades were heavily represented by the volunteer participants, with 2 of the 7 speaking from placement at the junior high/middle school level. The lone male volunteer canceled just prior to the group interview, citing unexpected family commitments which necessitated his departure from campus.

As we moved into discussions about the difference between expectations and realizations, we began to get a flow back and forth. Participants seemed eager to share their experiences and began responding back and forth with each other, rather than relying on the interviewer to maintain the flow of conversation. My role in the group shifted across time, paralleling the ebb and flow of the conversation. As would be expected, initial explanations of protocol positioned me as a director and distant prompter of questions. However, my role progressively moved toward one of probing, validating, and summarizing as the heart of the interview unfolded. As the interview drew to a close and preliminary research findings were discussed, I was aware that the distance between the participants and myself had increased once again.

In general, the questioning protocol was maintained with relatively minor adjustments in sequencing. Two significant side issues did emerge however, as student participants extended probes into lengthier discussion: (a) on-campus computer preparation and (b) the role of expectations from market forces and student teaching supervisors in shaping student teacher concerns.

Expectations of Hardware

The first area of discussion revolved around student teacher expectations. "Going into student teaching, what, if any expectations did you have about the use of the computer in the classroom?" The discussion first turned to availability of hardware. A substantial variability was reported across specific sites. Several participants reported the availability of computers in their placement site was actually as good or better than they had anticipated.

Laurie I wasn't expecting anything actually when I went into the classroom, because from what I could remember when I was in school, was quite surprised to find at West a Mac Lab and there was also an IBM business lab there, plus computers in every classroom and I think we had basically whenever we wanted in there we could go in because there so many teachers I think that were there that were scared of the lab that it wasn't highly used. Teachers were still learning, so the teachers didn't want to take their students in there.

Wendy The thing I really noticed is that walking into the school that I was in or the district, was that the whole school was computerized. The principal had a great computer in his office, the secretary had her computer. Everything that came around--memos were computerized. The whole theme of the school was computers, where the placement I'm at now, they still type everything out, and that's, you know they still have the older computers and that's still OK to them because they're not a computerized school.

Many other participants besides Laurie and Wendy reported their expectations had been met or superseded in terms of computers being available. However, the opposite reaction was also reported in locations where participants found access limited by computer lab scheduling or single-computer classrooms which in turn raised concern about classroom management.

Celia — With the computers in the classroom where I was at, I expected that there would be more computers. I think computers are going to be important to the future, so you expected a lot more computers to be at the school system, and more computer time, students on the computer gaining the experience. You could definitely tell in the classroom I was in, the students that had computers in their home, they had the skills, they could go back and sit on the computer and work. And you could tell the students that did not have that experience. And somewhere that has to balance out. So I was expecting something more to be available to the students.

Cooperating Teacher Computer Literacy

The group was almost evenly split on the question of whether their cooperating teacher possessed more knowledge concerning computer than they did. Again, wide variance was noted across specific school settings.

At times this was attributed to the recent arrival of new computers; at other times, it appeared to be attributed to ineffective or ill-planned inservice efforts. On the whole, student teachers appeared to be empathetic to the idea that the faculty in their placement schools were just learning to use computers themselves.

Lynn — I had a in-service in February, and it was all on technology. And it was fascinating for me because it was familiar to me, but I noticed how the teachers, there were teachers who knew about it and were very familiar with the computer. But then there were the majority of the teachers who just didn't really know enough. They knew the old Apples, but they didn't know anything new with Macintosh, which a lot of the schools, especially elementary, are going to have. And they just were scared I think to use, a little frustrated, and didn't feel that they really had the time to sit down and learn, just the basics about a computer, let alone a whole entire program that you can go out and buy. I mean, it was the basics of getting around in the computer that some of them were afraid of too.

Joan — In our inservice, I found the exact opposite. Those teachers knew a lot. And those first- and second-grade teachers are using all sorts of different programs. And we've got all the teachers using the Aver key and different things to get it up on the TV screens,

and I mean they're just going great guns. And they just don't have enough stuff for everybody to get this done. And so that was really neat just to see how excited they were with all this kind of thing, so I found the exact opposite in that group that I was with.

Interviewer Would Joan's experience here be an exception, or would other people join?

Celia I would say so because being in, I'm in Lynn's same shoes. Our school was not that way. You had some teachers that really knew it and knew what they were doing and got along with the computer fine. There were other teachers that, you could tell, that they were scared of it. And I don't know how your inservice went, but when I sat in, and I'm nervous around computers as it is, I would not have felt relieved after that inservice because the instructor that came for our inservice thought that the computer ability of everyone was much higher than it was. And then she was put in a situation where she didn't know how to adjust to accommodate for such a wide range of people that were in our group. So a lot of people who didn't know were supposed to work on the computer by themselves and then it didn't help them.

Interviewer Sounds like a disaster.

Celia Yeah, it just didn't work, you know, and so, it was unfortunate.

In spite of such discouraging remarks from respondents, several group members felt that their cooperating teacher did have a good handle on computer use within a classroom setting. Several student teachers reported that it appeared their cooperating teacher had taught specific computer programs to students earlier in the school year.

Celia One of the things that we were doing when I was at this school system was a National Geographic...

Interviewer Kids Net?

Celia Kids Net, that's it. And so the computers, or the students had the opportunity to work on computers and locate information on a United States map that was on there, a graph that was on the computer. And it was all supervised by a teacher. They were fortunate in the fact that while they were doing most of that work, I was doing my full teaching, so I was in there and they could pull the students out. I think it would be more difficult not having

someone in the classroom that someone could supervise and make sure the students were doing what they were supposed to be doing. But they did for awhile there, work on the computer...

Joan — I was very impressed with my teacher and her willingness to try new things. She had developed a database with the other fifth-grade teacher in order to get the kids to put the titles of their books and the rating scales that they gave it. So she was very, she had a lot more than I did. And she had done Kids Net with them - the weather. She had just finished up a great big unit with that on a computer. Tried the America On Line stuff. So that was inspirational to me. Just to see that she is an older teacher and that she is willing to try new ideas.

Wendy — My teacher did a lot with the computers and then when I got there she was really excited, showed me a lot too. Which was neat, because they got of their, I don't know how you call it, but they get the programs just for a little while just to see if they like them or not.

Interviewer — From Area 7? [Local Education Agency]

Wendy — I think that's where it could have been. So we'd go through it and then the kids would all stand around or they would have their own computers and then they had that main computer where she would go through it and then they would just watch on their computer. So we went through a lot of the programs with them.

Laurie — As I was completing student teaching, my teacher had just started building , I can't think of what they are called right off the top of my tongue yet, where the screen flips, you...

Unidentified — HyperCard.

Laurie — She was using a, building a HyperCard program. I taught a research unit, and it was the very beginning, their first experience with research. Several students missed a lot of my days. She was making a HyperCard program that students could go to later, and instead of students having to come to her, you know, "What did I miss? What do I need to make up?" they could go right to the computer, pull it up, and learn themselves. I didn't get the advantage of having that, but I think it is something that would work well.

In spite of stories such as these, in general student teachers reported substantially more emphasis upon independent pupil use than upon cooperating teacher use in most settings.

Barb I believe mine, before I got there, she must have taught them how to use the Writing Center for ClarisWorks. While I was there, that was all they used. That was all they knew how to use. And I know they've used Kids Net and stuff. But during the 8-weeks that I was there, there wasn't any kind of teaching whatsoever that she did with it. They used Writing Center, and Writing Center only.

Holly One thing that I noticed was that my teacher developed a lot of things on the computer- tests and stuff. And when I was teaching, the students witnessed her doing that or when they had study hall. However, when it came to actually interacting with the students together, it rarely happened, unless they had free time and you came over to check and see what they were doing, or they were typing a paper and you just glanced over your shoulder to double check and make sure they were on task.

Expectations and Realizations

"Did you use the computer for instruction more or less than you had anticipated?" Although pains had been taken to exclude teacher productivity from the definition of instructional computer, discussion repeatedly drifted toward personal production for teachers.

Interviewer I'm wondering did you find yourself using the computer for instruction, more, less, or about the same as your cooperating teacher?

Kim You mean like, actually showing the students or with the students with you or for preparing materials?

Interviewer I guess I'm more interested in the first one probably, in terms of actually using it for instruction.

Kim OK. Then about the same, because she didn't.

All of the group members reported using the computer heavily for preparation of classroom materials, with special emphasis on "typing." For instructional purposes however, most reported employing the computer less than they had anticipated.

Barb I used it a lot from a personal use, but I wasn't, I was, it's like the opportunity was there. I could have taken it, but I was almost afraid of it. With one computer and 21 students, how do I do this? And this is just too much right now for an 8-week experience. And so I guess I almost shied away from it. But, I used it for my personal use, but I never used for the opportunity to teach with the students.

Is the lack of a plan for classroom management a significant inhibitor of instructional computer use for student teachers as Barb has alluded to? The answer comes through more in silence than in direct answers. Very particular uses are mentioned in the few cases where student teachers did report using computers as part of classroom instruction.

Celia Now I used it with the students. I had them do a research project, and they would use, is it Groliers?, and a couple other programs that were offered through the media center, so we had them looking up information and using that more. As far as me modeling it, that's a different story. But I had them on the computer as much as possible.

Interviewer Laurie.

Laurie I was just going to say, not so much programs through the computer did I use, but just to get them in there familiar with the basic ClarisWorks, it was required that they type their final research paper for me, and it was five pages long. So we had four straight days in the computer lab. And I know some of them did dive into those other programs when I wasn't paying attention. But that was how I utilized it while teaching. Along with for my own personal use. All my overheads, all my lesson plans, everything I typed up on those computers in the classroom during my prep period and before and after school.

Lisa O. My [resource room] teacher did a lot with the computers and then when I got there she was really excited, showed me a lot too. Which was neat, because they got their, I don't know how you call it, but they get the programs just for a little while just to see if they like them or not...so we'd go through it and then the kids would all stand around or they would have their own computers and then they had that main computer where she would go through it and then they would just watch on their computer. So we went through a lot of the programs with them.

Interviewer Was that in the lab situation?

Lisa O. In the lab. Yeah, in the lab they did that. And then we had a couple of her own that were in the classroom too that she would teach. You know, we had smaller groups of kids too, so we could really individualize and teach and then they could do that.

Almost all student teachers talked about using the computer as a productivity tool for lesson planning. Few student teachers reported utilizing computers for instructional purposes. Those student teachers who did report instructional use, describe using the computer as an individual student tool for typing of papers, as an individual tool for gathering research information, or in a specialized small group setting.

The definition of effective teaching in American schools is still heavily associated with directed group instruction. None of the student teachers in this group appear to reject this notion. At the same time, none of the student teachers appear to be prepared to utilize the computer in these terms either. This disjuncture is troubling for those who speak of the computer as a means of transforming American education. In the absence of a vision for effective use of computers with group instruction, the need for computers in classrooms comes into question. "With one computer and 21 students, how do I do this?" Typing and learning centers do not appear to be enough of an answer for these student teachers.

Cooperating Teacher and University Expectations

Joan. I used, I wanted to use it more, and I got information from the Media Specialist. We had ideas to do KidPix and different things and use some laser discs. But the time element was the problem. I had a lot of good ideas, but at the time, I was into my unit that I couldn't utilize all those things. But I did learn a lot about it, and so that was one thing that I really valued. I have my own computer at home, so I used that to type up all the units and that kind of thing. So I did use the computer more than I thought I would. But as far as in the classroom, I didn't get the chance that I wanted to with the kids.

Interviewer Does that ring a bell in terms of lots of pressing demands all at the same time?

Unidentified Uh huh. Uh huh.

Explanations for the gap between anticipated and actual computer use were initially attributed to the press of other concerns within a finite 8-week placement for the student teaching. However, those comments were subsequently linked with the lack of explicit expectations for technology use in student teaching evaluations.

Bridgette I knew where I could get those programs from, but then I also, I thought if I have 21 students and I have one computer in my room. How am I supposed to do this? This is more than just,I'm supposed to teach the concept with the computer, teach the technology with the computer, and also the management part of it. And I was a little bit afraid of it. I thought it's easy just,'m only here 8-weeks. That's a bad thing to say, but.

Interviewer No. No, everything is pressing.

Bridgette I mean when everything boils down, you've got everything to do during that time.

Barb I would say, and I'll be realistic and I'll just lay it out too on the table, that it's not required. I mean I've got to worry about all of my other concerns--how well I'm teaching, my management, getting my own units developed, and that kind of thing, and getting all that

covered that I am being evaluated on. So I'm concerned with this the most.

Joan. So then that's not the push. That's not the first thing "Oh, I'd better make sure I do something with computers this 8-weeks."

Interviewer Some things are laid out like that though?

Joan Yeah.

Laurie I actually took my evaluation, well just for our 2-week evaluation, I mean this is something I just did. But I did this same in my last placement. My final evaluation, went through the checklist. Made sure I had done everything on that evaluation sheet.

Unidentified 'Cause that's what was most important.

Laurie 'Cause that's what they were marking me on.

This direct discussion of the role of expectations by university student teaching personnel arose without prompting from the interviewer and presented a major departure from the anticipated questioning protocol. The force of such discussion positions it as a major insight from participants as to what is driving student teaching behavior during the student teaching placement.

University Computer Preparation

Another substantial topic of discussion centered upon the computer education component of the university's teacher education program. This discussion began with an examination of the role which Educational Media played in their university preparation. Several different concerns were voiced: that it attempted to do too much in too short a time, that it should be placed as a follow-up course to a general education computer course, that students transferring in Educational Media credit were at a disadvantage in student teaching, that the 4- week summer option was overwhelming. In spite of such

criticisms, strong group consensus held that Educational Media represented the sole source of any significant preparation in their teacher preparation program.

Interviewer You were saying, you had come out of math in particular gotten some background in math. Do other people have other experience in other methods courses other than Ed Media? How much of your preparation in college rests on Ed Media? How much besides that is there?

Unidentified With computers?

Interviewer Uh-huh. I've heard math here. Is there any other methods course that would slant towards that at all?

Celia Unh-Unh, Unh-unh. Computer use. Did we in Mickfort's in science?

Unidentified I was in Guttenberg's.

Celia Oh that's right. Uh, with Mickfort we did a project with, I can't think of what they're called now--the computers that are out in the lobby--

Interviewer The e-mail computers?

Celia Yeah, the e-mail computers. We did an e-mail project with the University of Wisconsin, so we were back and forth with e-mail, but other than that .

Interviewer Not really in terms of using that to teach science?

Celia No, but not in terms of teaching science. It was just a form of communicating back and forth.

Unidentified I think it would be beneficial if they integrated the computer into the methods and even further back in the education program. Just, I mean, not just a one class, OK here's how you use the computer in this, but maybe if they just, as you're going through learning all this, point out and have times when you show what the computer can do for you in your classroom.

Celia Besides that you need to have instructors that are willing to help students. I am a math minor as Barb is and the instructor that I had for my math tech class was not good. And I did not benefit from being in that class a whole semester and being on the computers.

And so I think you need an instructor that understands and is willing to take the time and work with the students and then is continually build on it from there so you become familiar with the computer and feel comfortable with it.

Barb I felt very comfortable with math and I know where my resources are to find to teach math, but if I'm going to teach K though six elementary, now what do I do with social studies, or what do I do with spelling? Or how do I integrate everything else? Is the only place I'm going to use a computer in math because that's where I'm comfortable at? Maybe the other methods courses should also provide something for my science and my social studies. I didn't have that for any of my other classes.

A strong consensus emerged concerning the need for a multilayer approach to providing undergraduate computer instruction--something along the lines of laying a base with a required general education course for all college students, intensive work within educational media, and integration within existing methods courses, or follow-up work in a computer course targeted at computer applications in specific fields. Reacting to the possibility of a Follow-up computer course, the group felt that the addition of further course work could be justified by its benefits in light of external market expectations and society as a whole.

Awareness of Market Expectations

Discussion of the benefit of additional computer education led directly into an unanticipated source of concern for student teachers--the market forces involved in hiring of new teachers.

Lynn I can see its benefits. I can see also the complaining of the students on so much more added work. But you've also got to look at. I mean once you're in the student teaching phase, you start to realize how beneficial some of that stuff is. So I think there can be some benefit to that if you, if it's played out right.

Joan. And if that is what employers are looking for then I feel like that is only beneficial to anybody who, I mean technology, technology, technology is what they said to us at the, you know, and that's all they want to know about.

Interviewer Who's the they that you're referencing?

Joan. Well, the administrators from the school districts and whatever who came and they said technology is something that you need, and so, that can only be beneficial.

Barb Well, I just had two interviews last week. And at both of them they said, "What do you know about technology and how can you implement technology in your classroom?" And the best, really the best I went through was I dropped words like Geometry sketchpad because we've used it in one of my math classes before and just trying to drop some of the new names of technology that are coming out. But as for right now setting up a unit and teaching using it, I think I would be scared. But teachers, or administrators are asking for that kind of stuff and they want that in their schools. And we're not quite prepared for it, for a lot of it.

Laurie Like Barb just said, I had an interview, and that was their biggest concern. The have in the whole middle schools, they have six computers and they are outdated computers and they said, "Well, we've had no reasons to update our lab because we don't have any teachers who can run the computers, so if the teachers can't run the computers, how can we expect the students to run the computers?" And they said, " What classes have you had? How have you used it? What are your ideas? because we need to get you in here to teach everyone else."

So I have a feeling, that I am going to be doing a lot of work (laughter).

Unidentified Come on guys, I'm not a technology specialist!

It must be remembered that the focus group interview was being conducted in early spring of the participants' senior year. Thus, the acquisition of a job was an immediate priority for all participants. Nonetheless, the nature and extent of the pressure being reported for technological competence appears to have been in sharp contrast to the lack of specific expectations being offered within the student teaching setting.

Response to Preliminary Findings

As we moved to the end of the focus group interview, I explained the preliminary nature of findings from the first round of Phase 1 data analysis. From those results, I was able to highlight two factors which appeared would be of the most interest in follow-up analyses: (a) the number of minutes of cooperating teacher use reported and (b) the index of computer competency which had been taken from the pre-placement student teacher instrument. The introduction of the quantitative data appeared to change the tone and nature of the discussion. Students had little to say about the preliminary findings, although nonverbals indicated no general surprise to the findings.

Summary

What emerges from this interview is a picture of student teachers, modestly equipped with technical computer knowledge, highly concerned with the role of the computer in the classroom, but driven primarily by the actions and perceived expectations of those in positions of power. This appears to hold true regardless of student teacher level of computer competence and the amount of cooperating teacher computer use. Given the multitude of concerns bombarding student teachers in an 8-week placement, students teachers look to those in closest proximal power for cues as to what is truly valued. Student teachers look to their cooperating teachers for modeling of teaching behaviors, but also for direction in establishing a priority of competing concerns. In some cases, cooperating teachers provided strong models of computer use; in some cases, they didn't. However, even in those cases where classroom teachers modeled instructional computer use, it appears rare that expectations for student teacher computer use went beyond the mentioning of possibilities.

Student teachers also look to their university course work for adequate preparation for employing computer technology in the classroom. For student teachers in this group, it appears that the degree to which such expectations have been met varies considerably. Utilization of educational technology rests upon twin pillars of technical knowledge and pedagogical knowledge. These student teachers appear to focus primarily upon technical computer knowledge.

Ensuring technical computer competence for student teachers would appear to be broader and more complex than is apparent at first glance. These student teachers speak of concerns in several different areas: (a) knowledge of specific computer platform environments; (b) knowledge of broad applications such as word processing, data base, spreadsheet, multi-media, and electronic communication programs; and (c) knowledge of highly specific software programs tailored to individual content areas. Student teachers appear to recognize that, like competence in a second language, much of this technical knowledge is mastered only by engaging with computers across timeframes which exceed typical university semesters.

If technical knowledge were all that were required to utilize computers in classrooms, the wide variance in entering technical knowledge might be accommodated through some form of competency testing. However, in teacher preparation programs, technical knowledge almost always comes bundled with pedagogical knowledge. Pedagogical knowledge in itself is a multifaceted domain: (a) declaratory knowledge concerning the different genre of educational software such as tutorials, simulations, and interactive multimedia; (b) criteria for evaluation and selection of specific software; (c) conditional knowledge concerning when and under what conditions to utilize computers in

a classroom; (d) the possibilities afforded by computer labs versus one computer classrooms; and (e) deep knowledge concerning specific software within particular curriculum areas and grade levels.

Student teachers are aware that their own computer preparation could be strengthened. However, the current level of technical computer competence, albeit far from mastery, does not appear to be the primary explanation for the gap between intended computer use and actual computer use during student teaching. Student teachers do not have a vision of effective instructional computer use in group settings; therefore, with few exceptions they utilize the computer as a personal production tool or utilize it almost exclusively in individual settings.

In this respect, these student teachers were not unlike the cooperating teachers they were placed with. Student teaching is an expectation driven experience, inherently concerned with orchestration of multiple agendas, for multiple audiences. For the most part, these student teachers were not expected to utilize instructional computer use during student teaching; therefore, they did not.

These findings would highlight the role of pedagogic knowledge in computer preparation and the indirect role which the university supervisor plays in the inner workings of the student teaching triad. The absence of attention to teaching in a one-computer classroom yields student teachers with limited procedural and conditional knowledge concerning instructional computer use. The absence of computer utilization from student teaching evaluation criteria sends a strong message to student teachers (and indirectly to cooperating teachers) that instructional computer use is not on the "critical" list of

competencies. The absence of such expectations appears to have left the inclusion of computer use up to the individual cooperating teacher.

Interestingly enough, widely different student teaching experiences appear to have yielded amazingly similar outcomes. Some participants reported that student teaching presents the first episode of continuous computer access they have experienced. However, given only minimal availability of computers; given only minimal computer utilization by cooperating teachers; and given only minimal prior competence, the participants in this group reported being pulled toward increased instructional computer use during student teaching.

Participants reported experiencing the specific setting as either temporarily frustrating for its limitations, or experiencing the specific setting as building expectations further due to witnessing firsthand realization of computer capabilities. From these comments, it would appear that this group of student teachers has developed a positive bias in favor of instructional computer use. This positive bias may actually be taking on the function of a self-perpetuating filter for constructing positive interpretations of computer-related classroom experiences.

Regardless of their placement, these student teachers appear to have maintained positive expectations about the role computers would play in their future classrooms, while maintaining substantial concerns about both technical and pedagogic knowledge concerning the reality of computer use in classrooms. Positive biases, the expectations of the marketplace, and societal expectations in general combine to maintain high levels of concern for the employment of instructional computer use in classrooms.

Member Check of Phase 2 Qualitative Report

A copy of the qualitative report on the student teacher focus group was submitted to a member of the focus group for review. Written directions for the review highlighted two specific components: (a) a determination of the extent to which the report paralleled interpretations of the group discussion by the reviewer and (b) identification of those areas in which the reviewer perceived a need for further amplification. The reviewer and the researcher met for an interview at which time both components were addressed.

The reviewer reported substantial agreement with the content of the qualitative report. Agreement with findings in four specific areas was mentioned: (a) that not enough computer preparation had been provided, (b) that time crunch was a major factor in student teaching settings, (c) that student teachers were very much concerned with what needed to get accomplished (although not all kept checklists), and (d) that pressure for computer competence was very evident in job interview situations.

In addition, the reviewer found four areas where she felt amplification would be appropriate. The reviewer felt that the overwhelming use of the computer by cooperating teachers for personal productivity should be highlighted more intensely. She felt that the absence of instructional computer use lay grounds for questioning comments by some student teachers that their schools appeared to be computerized.

The reviewer also felt that the computer itself presented a new content area rather than as a tool for delivering other content. She felt that the group was split on this point, and this issue should be brought out further in the report.

Last, the reviewer stated her strong support for the need for a general education requirement for all university students, followed by a second level computer course within the teacher education program.

Phase 3

Qualitative Report of Cooperating Teacher Focus Group

As with the student teacher focus group, a convenience sample was utilized for the cooperating teacher focus group. Two university student teaching coordinators close to the university campus were asked for help in selecting coordinating teachers to be invited to the campus. Coordinators were told that a mixed group of teachers was desired. The need for cooperating teachers representing the full range of computer usage, from much to little, was addressed directly, along with a request for a variety of grade levels and teaching areas within the constraints of an 8-member group.

Pairs of participants convened from two rural and two urban districts within 30 miles of the university campus. Kindergarten, primary, middle school, and high school levels were represented. Self-contained classrooms with all content areas were common, with middle school and secondary members speaking to areas of industrial technology, social studies, and science.

Including the full range of computer-using teachers presented a bit of difficulty in efforts to ensure true disclosure of participant ideas and feelings. Prior to convening the focus group, I had spoken by phone with each member concerning meeting location and time. Three participants expressed hesitation to participate, giving some variation on the feeling that their current level of computer use could be described as minimal at best. Such statements were without exception tied with feelings of guilt--"I just don't do as much with the

computer as I should." My response to such statements was to reassure the participants that I was not attempting to convene a meeting of computer addicts, but rather a group of real cooperating teachers. With such statements and reassurance that they would be coming with a partner from the same district, all 3 teachers agreed to participate in the group discussion.

I continued to be concerned with validating individuals, regardless of level of computer use, even as we came together for the first time.

> Research Journal - April 25, 1995 7:15 pm
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> The discussion seemed more difficult to navigate this time. I was concerned from the outset about the ability to get a true reading on actual computer use. I had to reiterate in the group that this wasn't about feeling guilty because we didn't do enough.
>
> A much less homogeneous group of people than the student teachers, I thought. From the outset it was apparent that everyone there had their own agenda. Some took on the role of displaying knowledge with name dropping of programs or equipment. Some took on a more passive role. I guess they seemed like more self-orienting persons, and moved to define the discussion in their own terms rather quickly. That surprised me a bit, but they were willing to come back on line when I redirected the conversation.
>
> Diversity in the amount of equipment and support quickly became apparent. Again I was anxious to preserve a sense of validity for those people coming from the have-not districts versus the haves ....

Interviewer I really want to avoid the issue of what you should be doing. I really do. I do not want anyone being placed in a position here about what I should be doing, what I am doing. I need to know what is happening, not people feeling guilty about what they should be doing. And actually talking about the support you're getting, I think goes to some of those issues. You're obviously saying you're going home on your own time and using some district-supported equipment. The main thing I got out of this, and I'm going to summarize and then move on--was that time seems to be the most pressing thing for cooperating teachers. In terms of computers, actual technology, it seems maybe there's some variance across school districts or sites, whatever you're talking, but not too bad support, and I heard great administrative support. Is that a summary that we could live with?

Tom Moral support. The attitude is there.

Barbara And the money. In our district, lots and lots of money is being put into technology (laughter) and getting it throughout the school district.

Tom Well, you need to qualify that. We passed the instructional support levy. We're in the third or fourth year of it now and that has really made the difference. It just wouldn't be happening without that. You know that's where it's coming from.

Barbara We have a visiting team here because we're going through NCA right now. But they are just marveling at the fact that we have computers in our classroom and those kinds of things. You know, they just don't have that, and these are big school districts that are represented here, so in that respect I feel that we are better off than others. Connie.

Connie I would just like to put a little disclaimer on that (laughter) for Hadley School District.

Interviewer We don't have consensus on this point. (laughter)

Connie Our school district has a lack of money, and we too have the instructional support levy, which passed it with I think it was 75% or 66%, very big. But I'm not sure what's being done with that money right at this point. But the money is not there. The moral support is there from the administration and they would love to see things improve. Hopefully they will. But the money is a problem in our district.

Mary Well, I hope it [computer use] can increase for me ... because I'm kind of starting at the very bottom. And I don't have a computer at home and I don't have somebody who is computer literate either. But I think the equipment has to be there. If we don't have this in our school--I mean I just hope we have a school in the next five years. You know, we're kind of sitting at--we just never know and so the equipment has to be there. I mean we go to technology meetings and we see these CD Roms, and, well, I think we do have one in the high school, don't we?

Connie I don't think so.

Mary We don't even have one in the high school. So it's like you can't take these things back.

Interviewer Betty and Doris, coming from your situation, it sounds like yes, you have some money dedicated to it, but it's always looking for more.

Betty Right now we've getting ready to do a support levy again in the fall. And we were told today at the Technology Department meeting that this will be a big push because we have a lot of needs. Today we were talking about the phone system because--we have the fiber optics at the high school, but we need to get all of our buildings networked and we've got some problems there. So we had a lot of people in today discussing the problems that we've got.

And then we were making our proposals for next year, and everybody has a big wish list. And I had mine in primary type because we had a BIG wish list.

It appeared initially that group cohesion might be difficult to elicit, given the lack of any prior contact, the wide range in levels of technology access across districts, the broad spectrum of teaching levels and areas, and the sense of guilt which some members brought to the meeting. A serendipitous event served to provide common ground, in a most unplanned manner. Again, from my journal entry following the focus group:

> The prank fire drill fifteen minutes into the group was something else. In some ways I think it may have been actually fortunate, however. The group seemed to loosen up and joke a bit during its reentrance back up five flights of stairs. We began to laugh more in the group almost as soon as we got back to it. A sort of loosening up in a hands-on demonstration of how much we don't control in education.

The opening event over, we began to settle into a wide-ranging discussion of computer use, student teaching, and the role of cooperating teachers. Response to directed questions in the group rarely resulted in categorical answers, but typically spun to related issues. The result was a sense of surfing across a construction of loosely interlocking themes. The discussion shifted back and forth between themes almost constantly, with four being identified as dominant: university computer preparation, cooperating

teacher expectations for student teachers, cooperating teacher computer uses, and university expectations.

Cooperating Teacher Uses and Expectations

Discussion commenced with comments regarding recent student teachers and their instructional computer use. This topic became quickly entwined with expectations for student teacher computer use, which brought in cooperating teacher use and the role of modeling in the student teaching setting. Throughout the discussion a concern with the relationship of student teacher knowledge to cooperating teacher knowledge is apparent.

Peggy I teach sixth grade science and this year one section of social studies. And I have a student teacher right now. And I like to get new ideas, and I'm hoping when student teachers come that they have new ideas and that they come into the classroom and say 'I'd like to do this. Can I try this?' We're doing a service learning project through student teaching and I said, OK, we need to have a lesson plan because I have one right now. He's working on a service learning project, and we decided that we'd have seventh and eighth graders come down and work with our sixth graders. And so one of the things we needed to do was come up with a format, something so that these seventh and eighth graders would know what to do when they came into the room. And so it was really nice to say, 'Well,' (You know we talked about what our format should be). 'why don't you go up to the computer lab and figure out what it is'. And he went up there and figured it out, readjusted it. He brought it back down. I said, 'OK, now we have to look at this. We have to have a place if we're going to bind this, so we can keep track, so every student has one. And it was just really nice to be able to send him up there to do it, and he did it. And.

Tom In my area, which is the student teachers coming out, I would expect to be squared away and proficient with the technical areas, not to be confused with technology as we view it. In other words, machining, drafting, those kinds of things. Come out of the university this year, their technical ability should be up to speed. I don't expect them to be world-class leaders coming out of a place like [the university]. If they spent 2 years at [the local technical

> institute], you know, we could expect them ready to walk in and make this computer-controlled machine hum. But they ought to at least be literate on it and they ought to be probably ahead of me, you know. I'm going to get it the hard way or I haven't yet.

As can be seen, the consensus which emerged from the group was that students should be at least as knowledgeable on computers as their cooperating teacher, and preferably even ahead of them. As one participant pointed out, there is an expectation by many cooperating teachers that students should be "more literate than I am because they're coming right out of the university."

The alignment of expectations with the reality of university teacher preparation is not always realistic nor consistent with teachers' own experiences grappling with technology. On one hand, cooperating teachers feel that the amount of time necessary for them to gain a working knowledge of computers is seriously underestimated by district administrators.

Tom: The thing that doesn't happen, is that a school district like ours doesn't seem to realize that it takes hundreds of hours to really get to speed on computers. And before you're really going to get good at it, you're going to buy your own. You know, we put Auto Cad in, and I went out and bought a computer and I spent hundreds of hours on it and I still spend lots of hours on it. And now we're putting in computer machining, and I'm going to have to spend hundreds of hours on it. Maybe there's just no real good way for a school district to compensate for that, you know, I don't know.

Tom's statement, which appeared to be supported by other cooperating teachers in the group, lies in contrast with cooperating teacher statements at other points in the discussion concerning the ability of student teachers to quickly learn about computers.

Barbara I have lots of programs and I thought first, you know you have to sit down and you have to train the kids [kindergartners] to use each program on your computer. But hey, they know more about the programs on the computer than I do. Because, they're willing. They just aren't afraid to go in there and try.

Peggy I think that's true what you're say when you talk about kindergartners the same thing applies to student teachers. Because when we were going to put my grades on the computer I said, "OK, you can teach me how to do this." Because he'd try things, and I don't know, maybe I'm from the old school. I don't want to try this because maybe I'm going to wreck something. And he'd be going along, you know, "Oh well, this didn't work. Let's try this" And we got the grades on the computer.

Kim And I think a lot of them are so familiar with video games. And they're so related that most of them that I've had have been very computer literate.

Information concerning what actually occurs in university preparation was of great interest to the cooperating teachers. It appeared that assumptions had been made which they were curious to check against reality.

Interviewer The second thing that came up [in the student teacher focus group] was--we talked about preparation and basic proficiencies in terms of using the computer for different tasks. They felt like they had moderate proficiencies, and it varied across the table; but in general, they felt like they had a modest degree of preparation in basic computer use. Nothing outstanding.

There concern was more when it comes in the program. That it tends to come in one particular class--the Educational Media class, and that tends to be early in the program for most students, and then it's 2 years before they hit student teaching. And in some methods programs around campus there are some methods courses that utilize computers to talk about how you deliver instruction in math, science, something like that. But actually in a lot of courses, that's not happening. That really wasn't surprising because the faculty here struggle just like you do in terms of their trying to come up to speed.

Doris And I'm kind of curious, something you mentioned about how they get it 2 years before they go out student teaching, but some

methods classes are starting to incorporate that. Do you see a change coming here at [the university] to give them more knowledge in that area closer to the time that they're going to go out to the student teaching field? Is there a push going that way around here at all, or are they content for their Ed Media class to take care of that all for them.

Interviewer Well, there's two answers to that question. I don't think it's a matter of the student teachers being content to let it take care for them. I think it's a matter of initiatives within the college to address it. Because it's not happening because the student teachers don't care about it in their methods classes. It's happening because the people teaching those classes did not get trained themselves to utilize instruction for technology.

Still, in spite of the limitations of university computer preparation, for the most part, these cooperating teachers report that their student teachers have met or exceeded their expectations.

Interviewer So he met all of the expectations you would have for him?

Peggy Yes. And then he helped one of the other teachers on my team when she was doing a class project, she needed another body in the computer lab to help her. And so he went up and helped you know with the printers and just helping the kids when one person isn't enough. And working on putting grades on the computer, which I'm trying to learn how to do that. So it's been beneficial for me.

Mary I'm Mary. I'm from Hadley. And I've taught first grade for 10 years at Hadley, and last year I was switched to third grade. They told me I would have a student teacher last year in third, and I said, 'No I don't think I'm ready for a student teacher in third grade.' but they sent one out. And he was wonderful. And he, I don't think had a computer at home, but he came to the computer lab here at [the university], and he would type some units for me. I don't think he did any student work on the computer, but I've had two student teachers this year, and both of them were able to take student projects home and type things up on the computer. They both had their own. One was a little more computer literate I think than the other one. But both of their works looked very, very nice. And they did a nice job of typing up the students' work. They offered. 'I can

do this' and 'Sure I can take them home', and that is a really nice plus when I don't have time, or can't do it that well.

There was not total consensus, however.

Barbara I teach kindergarten and a lot of the student teachers that I have coming in aren't familiar with like using the TV with your computer or doing your experience charts on the computer rather than you know on the chart tablet and things like that. They don't seem to have a lot of background or expertise on using the computer with kindergartners. We use ours basically as a center and a teaching tool, but the student teachers have to be taught or shown how to do this. Do you find that to be true too, Betty?

Betty My first two student teachers that I had were not literate at all, but very willing to learn. So I see that as a plus. But the one I have now is IBM literate and Mac literate. So we've been able to do a lot of things together.

Interestingly, the expectation that student teachers will exceed the computer knowledge of cooperating teachers creates a relative standard which very much depends upon the knowledge level of the individual cooperating teacher. Even within this relatively small group of 8 cooperating teachers, computer knowledge varied considerably. The industrial technology instructor obviously had specialized computer knowledge and expectations tied to his specific area. Other instructors however, spoke largely to the computer as a word processor--both for personal productivity and for "taking student projects home and typing things up."

Expectations and Role Reversal

As Naisbitt and Aburdene have pointed out (1990), emerging technology is likely to be utilized as a mere extension of existing technology, so this "typing mentality" should not be totally surprising. However, by indicating that student teachers should be ahead of them, the cooperating teachers do not appear to be speaking of extended knowledge of word processing applications. Rather

they appear to be speaking of other instructional uses which move beyond mere extensions of existing technology.

This looking to student teachers for computer expertise creates a substantial crack in the paradigm of student teaching as apprenticeship to a master teacher. This reversal of roles, also addressed in the student teaching group, was not easily grappled with by the cooperating teachers.

Interviewer Peggy, you mentioned that you actually learned some things from them. In terms of expectations, do you feel them. Do you yourself have any expectations that you would have for them to utilize computers?

Peggy I expect them to be more literate than I am. Because I feel like they should be one step ahead of me because they're coming right out of the university. And so that's one of the things that I said to him, cause I figured, he's coming right off from the top, but I'm expecting that he can teach me.

Barbara I would agree with that, they [student teachers] should have the technology and the skills to use it, maybe the skills to make the machine work. But integrating it into the curriculum is still another step. And that's what I was suggesting needed to be modeled. You know, how you would use it in the curriculum.

Peggy I think the expectation goes back to the cooperating teacher as well, because when I have this student teacher, I think I've got to get myself motivated. And so I got into, what do we have available with videodiscs? What can you show me in CD Roms? So that it motivated me also so I could be modeling as well. So it was like a two way street.

The 2-way street creates a window of opportunity for student teachers who are anxious to demonstrate competence. The ability to impart information that another does not possess is the portal of acceptance into a professional community and immediately realigns implicit power relationships in the student teaching experience. The expectation that the student teacher would be

capable of superseding the mentor is given a bit of credence traditionally. However, computer technology pushes that possibility to front and center stage.

Still, the standard is relative. It is not the computer knowledge of the student teacher alone. Much depends upon the level of computer knowledge that the cooperating teacher possesses. In situations where the cooperating teacher is one up, movement toward instructional computer use may be heightened by social learning and direct modeling. In situations where the lead role is taken by the student teacher, movement toward instructional computer use may be heightened by the gratification of being able to share information.

In some situations, student teachers can develop a 'rep' in the building even during their short 8-week tenure.

Peggy I have one right now. He's working on a service learning project, and we decided that we'd have seventh and eighth graders come down and work with our sixth graders. And so one of the things we needed to do was come up with a format - something so that these seventh and eighth graders would know what to do when they came into the room. And so it was really nice to say, 'Well . . .' You know we talked about what our format should be. 'why don't you go up to the computer lab and figure out what it is'. And he went up there and figured it out, readjusted it. He brought it back down. I said, 'OK, now we have to look at this. We have to have a place if we're going to bind this, so we can keep track, so every student has one. And it was just really nice to be able to send him up there to do it, and he did it.

Interviewer So he met all of the expectations you would have for him.

Peggy Yes. And then he helped one of the other teachers on my team when she was doing a class project, she needed another body in the computer lab to help her. And so he went up and helped you know with the printers and just helping the kids when one person isn't enough. And working on putting grades on the computer, which I'm trying to learn how to do that. So it's been beneficial for me.

Tom — Now when this student teacher came out, he accepted that. I'm kind of jealous of that. Cause I think we're working harder than we ever have, and I think computers are the reason. Steve just accepted that. It's part of the operating procedure because he's got a big old computer at home and he loves it, and he spends all that time on it. He came out and he helped everybody on our floor in computers.

The experience of being viewed as knowledgeable in an area of expertise can be a powerful one for student teachers. Experts tend to seek experience and knowledge which will consolidate and extend the power of such a title. Future employment of computer use might well be heightened by such an experience.

Disjuncture of Modeling and Expectations

When the group discussions turned to the topic of cooperating teacher expectations, it became apparent that cooperating teachers were uncomfortable with the idea of asking student teachers to demonstrate competence which they themselves were not modeling.

Barbara — I just wanted to ask a question. Do you feel that--when I say to my student teacher I expect you to develop a unit and it will have--If I were to include use of a computer in there, do you think more people would not only use that behavior, but develop that as part of their teaching behaviors?

Interviewer — I need to redirect that to the table, since I'm the one that's trying to moderate.

Betty — I think if I told my student teacher at the beginning, This is what I expect of you", it would be done. Because they are trying to meet my goals and expectations of them.

Doris — I would have to agree with that. I have to think, when they are in that situation, they will pretty much do what is asked of them. And I think it gets back to that modeling then. If we were asking them to do this, then we would have to give them some good modeling so they could see have we would expect it to be done. But then I think they would do it.

Barbara — But do you think that they would use this when they actually got in their own classroom. Do you think they would take it with them as a teaching tool?

Betty — If the tools are available, I'm sure they would use them. The ones that we are working with now, they are just so eager to do everything.

Barbara — But then don't you think that--

Interviewer — Barbara, can you answer your own question?

Barbara — Well, I was just going to say my response was going to be, don't you think that we owe it, if this is where education is going, that we owe it to the student teachers to be sure that we do insist that they do use this when they are student teaching with us.

Interviewer — It sounds like you do.

Barbara — No, I don't. [It appears Barbara is speaking to whether she currently insists on computer use, rather than the broader question of whether we should insist on this]. But I thought of other things that I wanted. If I wanted dramatic play center, I have to say, "You will have a dramatic play center." I've discovered that you can't leave it to chance. You have to specifically tell them, "in your unit it will include these kinds of things."

Tom — When you say that student teachers figure out what they're going to be evaluated on going in and answer those things. This is exactly what--these people coming out now are squared away, they're goal-oriented, they know where they're going, and they know what they have to do to get there. And if computer instruction is now part of their program, sure they'll meet it. But it's our responsibility to get our program squared away so it's part of it.

Barbara — So it puts the responsibility back on the cooperating teacher.

Tom — Well, I think so.

Interviewer — Kim, how would you relate to that? Just a little bit ago, you were talking about feeling like you should be doing more yourself. Now we're talking about not just you and teaching, now we're talking about you as a cooperating teacher should be doing more. Is that just overloading someone who is already overloaded--a cooperating teacher?

Kim — Well, I think the pressure is on. But I think that it's something that is expected of me. And if I'm going to be a cooperating teacher, then I need to make an attempt to really do that. And I've really made an attempt to do, especially this year. Otherwise, when somebody comes in and is going to look to me to model what they should be learning and doing in the classroom, I have to do that. Or I don't think I'm a very good cooperating teacher. So I do feel responsible.

Role conflict is apparent in this discussion by cooperating teachers. On one hand, they feel that student teachers should be ahead of them with computer technology due to their recent university experience. On the other hand they feel that they should not be asking student teachers to employ instructional computer technology which they themselves do not already exhibit.

University Expectations and Autonomy

Questioning their role as cooperating teachers elicited questions concerning the university expectations for student teachers and cooperating teachers alike.

Interviewer — It sounds like the people still sitting at the table are agreeing that the cooperating teacher is--if it would rest on the cooperating teacher's responsibility to make that part of what is expected? Or are you expecting guidance from the university in terms of that?

Betty — I think a little bit of both.

Interviewer — OK? Either from the university or the cooperating teachers themselves, it would be reasonable to set an expectation.

Betty — You've got to be self-motivated. But yet, if that's what's expected of us to ask the student teachers to do that, we need to be told that.

Interviewer — So you shouldn't be left in the dark, if that's going to be an expectation.

Barbara — And yet, I think that basically what you expect of your student teachers is left up to you. They bring you the student teacher and say "Take this precious thing and guard it." But you decide what it

> is they're going to teach and what experiences they're going to have when they're with you. Other than, I think they say they have to teach three days on their own, but the rest of the time, you formulate the student teaching.

This topic of discussion brings to light another area in which instructional computer use challenges traditional views of the student teaching experience. The apprenticeship model of student teaching has typically granted a great deal of autonomy to cooperating teachers in determining the nature and extent of the student teaching experience. Teacher preparation institutions which have taken on a more assertive role, have highlighted specific areas or experiences for the student teacher and cooperating teacher to address--e.g. small and large group instruction and effective lesson preparation. Giving explicit expectations that student teachers will employ instructional computer use moves beyond the scope of content standards and into the arena of delivery standards.

Given widespread disparities in school funding of technology and actual use of available technology, establishing such criteria begins to imply that teachers and districts who do not employ instructional computer use are not considered completely competent. Although such a notion is increasingly embraced by the American public, such a proposal for dividing the effective from the substandard is very unsettling within education. Any move by universities to restrict student teaching placements to sites based upon such delivery standards would immediately embroil them in controversy. A much less troublesome path is to focus attention on the need for better computer preparation within university course work.

Response to Findings from Phase 1 and Phase 2

As our time began to run down, I told the group that initial analysis of the quantitative data indicated that very little change was occurring during the

student teaching placements. I also provided them with the thinking of the student teacher groups as to why that might be happening and searched for agreement with the student teacher rationale.

Interviewer The main thing that came out when I talked with them was "There's just not enough time in an 8-week placement. The time pressure is so strong on us that one person literally said, "I literally went down and looked, here are the things we're going to be checked on in student teaching and those are the things that I made sure got done. And anything else that came up, and computers was one of those- I wanted to. I had plans. Matter of fact, I sat down with the media person and I talked about what I could do. And then by the time we got into the student teaching, and 8 weeks came, it just wasn't time." So it wasn't so much that there couldn't have been an effect, that given the particular way that the university sets up student teaching here--and there are some benefits, this is only a thin slice of that argument--but in the 8-week time, they're feeling a lot of time pressure, and it doesn't tend to be their top concern. Does that fly with what's happening with your student teachers? Are you surprised that not a great deal of change is happening towards their attitudes toward using computers during student teaching? By the way this is regardless of where they were placed, high or low cooperating teachers.

Betty I'm thinking time pressure is a great element for everybody whether you're student teaching or not student teaching. I can see that time just gets away from you. You're working so hard with those kids. There are so many things I would like to do with my class too. I don't have time to get at everything.

Interviewer That rings a bell. Tom, it seems to play into what you were saying: "It's just more difficult to student teach right now in student teaching just to come out and try to be an expert in everything."

Tom Oh yeah, because we put more and more on them. My situation is that the student teacher I had of course, he was in computer drafting and so his computer application was solid. But I can see what you're talking about.

Summary

The picture which emerges from the cooperating teacher focus group is one of busy professionals working hard to incorporate instructional computer

use into their own teaching practices. In some instances, teachers are working with a broad range of institutional support; in some instances they work with very meager resources. With the exception of the industrial technology specialist, these are teachers who for the most part have oriented themselves to the computer as primarily a text-processing tool. Other uses such as Living Books and CD Rom capabilities are mentioned, but appear to play only minor roles in classrooms.

Aware of the gap between their own university preparation and the computer capabilities they find themselves increasingly expected to utilize, these cooperating teachers look to their student teachers to arrive with more up-to-date computer backgrounds. With some exceptions, their student teachers have arrived on equal footing or are further along in computer knowledge.

The advanced computer knowledge of some student teachers relative to their cooperating teachers creates the possibility of a reversal of roles within the traditional student teaching apprenticeship model. It would appear that some student teachers in this situation take on a reputation in their buildings as a computer expert. The internalization of this role may lead to increased likelihood of employment of instructional computer use, in spite of placement with a relatively low computer-using cooperating teacher. Thus, the issue of cooperating teacher modeling may be much more complex than initially anticipated.

Still, the concept of modeling has become inherently linked with the role of cooperating teachers in this group. More than one of the members of the group spoke of struggles to come up to speed with their own utilization of computers in the classroom. In spite of their own struggles, in spite of their

recognition that time is too limited in student teaching, and in spite of the Phase 1 findings that placement with high computer-using teachers for 8 weeks did not yield significant changes, still the belief that modeling would hold positive benefit for student teachers held sway. These same teachers eventually reached consensus that they were under an obligation to model instructional computer use if they were to maintain and fulfill their roles as cooperating teachers.

Member Check of Qualitative Report

A copy of the qualitative report on the cooperating teacher focus group was submitted to a member of the focus group for review. Written directions for the review highlighted two specific components: (a) a determination of the extent to which the report paralleled interpretations of the group discussion by the reviewer and (b) identification of those areas in which the reviewer perceived a need for further amplification. The researcher conducted a phone interview with the reviewer at which time both components were addressed.

The reviewer stated that the qualitative report had done a good job of telling what had happened in the group session. The reviewer specifically mentioned agreement with several points: (a) the wide variance in hardware and software availability, (b) the concern of cooperating teachers in developing their own backgrounds with computer technology, and (c) the commonality of shared concerns that all teachers in the group appeared to embrace.

The reviewer clarified that the role reversal that had been mentioned in the qualitative report should be understood only in terms of computer knowledge. In cases where this did occur, it was felt to be very much due to an individual's personal computing background as opposed to institutional

preparation. The reviewer did not feel role reversal extended into any other areas such as general teaching practice or instructional techniques.

The reviewer described the whole issue of instructional computer use as "messy" and felt that it would stay so well into the next generation of teachers. The reviewer concluded by restating his comfort with both the group discussion and with the qualitative report as a representation of what had occurred.

CHAPTER V

SUMMARY AND CONCLUSIONS

The number of computers in American schools has risen dramatically in the past decade. The capabilities, and therefore the complexity of educational software, have increased dramatically as well. Computer knowledge represents a new component of professional knowledge for teachers. Recent advances in hardware and software sophistication, such as Internet capabilities and multimedia curriculum packages, have increasingly raised questions which lie beyond technical computer knowledge. Teachers need not only technical computer knowledge, but also procedural and conditional knowledge concerning appropriate, effective utilization of computers within the context of classroom instruction.

Widespread concern has emerged over the past decade over the lack of preparation for dealing with computers which many teachers have expressed. In particular, widespread criticism has been directed toward the preservice preparation of future teachers. These criticisms have formed the basis for a series of proposals aimed at reforming preservice computer preparation: (a) the revision of traditional audiovisual courses to provide a stronger computer emphasis early in the plan of study, (b) the integration of computers into all methods courses regardless of subject area, and (c) the placement of student teachers with cooperating teachers who employ a high degree of instructional computer use.

The final recommendation, for placement of student teachers with cooperating teachers who employ a high degree of instructional computer use, rests on the assumption that a relationship exists between such placements and

the likelihood of future employment of this particular innovation by student teachers.

The problem considered in this study was whether a relationship existed between changes in the concerns of student teachers toward instructional computer use and several factors involving student teachers themselves, cooperating teachers, and the broader institutional context of the classrooms in which those student teaching experiences take place. In particular, the study was concerned with movement across the Stages of Concern as outlined by the Concerns-Based Adoption Model (Hall et al., 1977).

A three-phase study was undertaken incorporating both quantitative and qualitative investigation. In Phase 1 of the study, The Stages of Concern Questionnaire (SoCQ) (Hall et al., 1977) was administered to student teachers before and after an 8-week student teaching placement. Pre- and postplacement information was obtained from 116 student teachers placed by a regional Midwest university in spring semester, 1995. The postplacement scores on the seven Stages of Concern served as dependent variables.

Seven independent variables were identified for investigation and were grouped into three clusters: those relating primarily to cooperating teachers; those relating primarily to student teachers; and finally, a measure of overall institutional context and its role in facilitating or inhibiting instructional computer use. Three variables were investigated which relate primarily to the student teacher: (a) the entering Stage of Concern toward instructional computer use, (b) the prior computer capabilities of student teachers, and (c) the student teacher's perceived degree of instructional autonomy.

Four variables related most directly to the cooperating teacher: (a) amount of instructional computer use employed by the cooperating teacher, (b) length of employment of instructional computer use, (c) perceived educational impact of computers, and (d) the amount of instructional computer use employed by pupils in the classroom. Last, the degree of facilitation provided by the institutional context was examined.

Student teachers provided information concerning prior computer competence, perceived instructional autonomy in connection with pre- and postplacement administration of the SoCQ. By completing a one-page questionnaire developed by the researcher, cooperating teachers provided information concerning the variables in the cooperating teacher cluster and institutional context.

Phase 2 of the research project utilized an interview with a focus group comprised of 8 student teacher participants. The focus group was used as a means of investigating the participant perceptions of student teachers regarding expectations, realization of those expectations in the student teaching experience, and general reaction to the conclusions drawn from a preliminary analysis of the Phase 1 quantitative data.

The final phase of the research project employed an interview with a second focus group comprised of 8 cooperating teacher participants. Similar to the Phase 2 focus group, this focus group was used as a means of investigating the participant perceptions of cooperating teachers regarding expectations, realization of those expectations, and general reaction to the conclusions drawn from a preliminary analysis of the Phase 1 quantitative data. In addition, the focus group also explored reactions to the Phase 2 qualitative data drawn from

the student teacher focus group. Exit interviews with the participant reviewers were conducted for Phase I and Phase 2 to establish areas of consensus and the need for further amplification of selected topics the qualitative reports.

In what remains of this chapter, a summary of results from the three phases will be presented, followed by conclusions drawn from analysis of the data. The chapter concludes with a review of limitations of the study and recommendations for further research.

Summary

This was an exploratory study designed to investigate assumptions underlying recent calls for placement of student teachers with cooperating teachers who employ a high degree of instructional computer use. The study utilized naturally occurring 8-week student teaching placements at a regional Midwestern university. A post hoc design was utilized to gather information regarding: (a) changes in the concerns of student teachers toward instructional computer use and (b) variables which held the potential to mediate such changes.

Descriptive Information

Placement in self-contained classrooms at elementary grade levels characterized about half of the student teachers. The student teacher participants reported themselves to be somewhat competent with several computer uses relevant to classroom instruction, and they reported feeling medium high to high instructional autonomy in their student teaching classrooms.

Cooperating teachers in the study mildly agreed with statements concerning the positive impact of computers on students. The median for

average number of minutes per week of instructional computer use by teachers and their pupils was 30 minutes per week. Extreme variance was found however, ranging from zero minutes to over one thousand for teacher use, and for pupil use also. Cooperating teachers report that with the exception of planning time, most institutional factors are mildly encouraging of instructional computer use. On average, these cooperating teachers had been utilizing instructional computer use for about 5 years.

Inferential Analysis

Changes in concerns toward instructional computer use were established by administration of the Stages of Concern Questionnaire (SoCQ) (Hall et al., 1977) before and after student teaching.

A stage-by-stage plotting of pre- and post placement concerns indicated that the concerns of entering student teachers were in a generally heightened state of arousal across most stages. Overall, the profile reflected extremely interested, very concerned nonusers who are very interested in gathering specific information on instructional computer use and its personal ramifications for themselves as teachers.

Group means on pre- and postadministration of each stage were examined with a series of paired t tests. Significant change in the overall group means was found for the information concerns and personal concerns of the student teachers (p value $< .01$). In addition, there was change in the refocusing concerns of student teachers at a .10 significance level. While statistically significant changes had been found for information and personal stages between pre- and postadministrations, the postprofile of concerns

continued to peak in the areas of information and personal concerns, raising questions of practical significance.

A post hoc partitioning of subjects was conducted to determine if significant change had been masked by student teacher competency levels or by cooperating teacher instructional computer use. Response on these two factors were broken into half- high and low. SoCQ plots of student teacher change within these four partitioned cells differed substantially from one another.

In general, low competency student teachers experienced a lessening of intensity of most concerns during student teaching placements, regardless of cooperating teacher computer use. By contrast, high competency student teachers tended to increase the intensity of most concerns during student teaching. Based on these findings, it was concluded that changes in the concerns of student teachers toward instructional computer use do differ as a function of the computer competence of student teachers.

After placement with high computer use cooperating teachers, student teacher profiles reflected concern with management issues and the acquisition of ideas for possible solution of those concerns. Student teachers placed with low computer use cooperating teachers peaked in Stages of Concern earlier than management (i.e., informational concerns and personal concerns are still most intense). Based on these findings, it was concluded that changes in the concerns of student teachers toward instructional computer use do differ as a function of the extent of instructional computer use by cooperating teachers.

Correlation coefficients were examined and a stepwise multiple regression analysis was conducted. Based on these procedures it was

concluded that changes in the concerns of student teachers toward instructional computer use did not differ as a function of the other variables investigated in the study: (a) pupil computer use, (b) perceived educational impact, (c) student teacher autonomy, (d) history of instructional computer and, (e) institutional context.

Phase 2 Qualitative Findings

Expectations for computer use during student teaching were varied among student teachers, with some reporting high expectations based on recent knowledge of their placement sites and others reporting little expectation based on their own public school experiences. Most student teachers reported using the computer for instruction less than they had anticipated. This shortfall of expectations was attributed to the bombardment of simultaneous concerns during the 8-week placement.

In spite of being highly concerned with the role of the computer in the classroom, the student teachers appeared to be driven primarily by the actions and perceived expectations of the cooperating teacher and university evaluation criteria. This appeared to hold true regardless of student teacher level of computer competence and the amount of cooperating teacher computer use. Even in those cases where classroom teachers modeled instructional computer use, it appears rare that expectations for student teacher computer use went beyond the mentioning of possibilities.

Student teachers were aware that their own computer preparation could be strengthened. However, the current level of technical computer competence, albeit far from mastery, did not appear to be the primary explanation for the gap between intended computer use and actual computer use during student

teaching. Student teachers expressed uneasiness with management issues surrounding instructional computer use in group settings. Given these management concerns, they chose to utilize the computer as a personal production tool or to employ instructional computer use almost exclusively in individual settings. These findings highlight the role of pedagogic knowledge in computer preparation and the indirect role which the university supervisor plays in the inner workings of the student teaching triad.

Surprisingly, widely different student teaching experiences are reported to have yielded a similar outcome. Regardless of their placement, all participants reported being pulled toward increased instructional computer use during student teaching. Positive biases, the expectations of the marketplace, and societal expectations in general combine to maintain high levels of concern for the employment of instructional computer use in classrooms.

Phase 3 Qualitative Findings

The picture which emerged from the cooperating teacher focus group was one of busy professionals working hard to incorporate instructional computer use into their own teaching practices. With the exception of the industrial technology specialist, the teachers oriented themselves to the computer as primarily a text-processing tool.

Aware of the gap between their own university preparation and the computer capabilities they find themselves increasingly expected to utilize, these cooperating teachers look to their student teachers to arrive with more up-to-date computer backgrounds. With some exceptions, their student teachers have arrived on equal footing or are further along in computer knowledge.

The advanced computer knowledge of some student teachers relative to their cooperating teachers creates the possibility of a reversal of roles within the traditional student teaching apprenticeship model. Some student teachers in this situation take on a reputation in their buildings as a computer expert. The internalization of this role may lead to increased likelihood of employment of instructional computer use, in spite of placement with a relatively low computer-using cooperating teacher. Thus the issue of cooperating teacher modeling may be more complex than initially anticipated.

More than one of the members of the group spoke of struggles to come up to speed with their own utilization of computers in the classroom. In spite of their own struggles, a strong belief that modeling holds positive benefits for student teachers was voiced. The teachers reached consensus that they were under an obligation to model instructional computer use if they were to maintain and fulfill their roles as cooperating teachers.

Conclusions

The analysis of results indicated the following conclusions:

1. Change does occurs in the concerns of student teachers toward instructional computer use between the beginning and end of the student teaching experience. Of the seven Stages of Concern, significant change in the overall group means was found for the information concerns and personal concerns of the student teachers.

2. Changes in the concerns of student teachers toward instructional computer use differ as a function of the computer competence of student teachers. Multiple regression analysis supported the role of computer competence in explaining post placement collaboration concerns. In addition,

the role of computer competence was supported by post hoc partitioning of subjects. Low competency student teacher profiles did not indicate substantial intensifying of any concerns during the student teaching experience. High competency student teachers were typified by substantial increases in concerns, especially in the areas of personal, management and refocusing concerns. The substantial increase in personal, management, and refocusing concerns for high competency student teachers supports similar findings for high computer background college students.

However, the lack of substantial change in low competency student teachers stands in sharp contrast to the intensified collaboration and refocusing concerns of low prior background students in Reed's study.

> Those students having no prior experience experienced the most changes; they decreased their Awareness- and Personal- related concerns while increasing their consequence-, Collaboration- and Refocusing-related concerns. (Reed, 1990, p. 23)

A possible explanation for the discrepancy may lie in Reed's method of assessing computer background. Although both studies utilized self-reporting, Reed's study relied upon broad categories (no background, word processing background, and programming background). The current study asked for self-rating on nine specific computer competencies. This makes cross comparison highly speculative from the start. Obviously the settings of the two studies were also very different. Given the overwhelming number of competing concerns reported by participants in the student teacher focus group, it may be that low competence student teachers choose to attend to other features of classroom instruction. Such conjecture is speculative at this point and points to the need

for longitudinal studies which follow concerns profiles from college campus settings to student teaching and then into the beginning years of teaching.

3. Changes in the concerns of student teachers toward instructional computer use differ as a function of the extent of instructional computer use employed by cooperating teachers. Post hoc partitioning of variance supported this conclusion. The refocusing concerns of student teachers placed with low computer use cooperating teachers tended to begin relatively low and remained there. By contrast, the refocusing concerns of student teachers placed with high computer use cooperating teachers intensified substantially between during student teaching.

This aligns with Reed's findings of substantial gains in collaboration and refocusing concerns (1990), and Handler's findings concerning the perception by novice teachers that observation of computer use during student teaching field contributed significantly to feeling of preparedness toward classroom computer use (1993).

4. The literature on student teaching generally holds that cooperating teachers have greater influence on student teachers than do university supervisors (Watts, 1987). Participants in both student teacher and cooperating teacher focus groups spoke of the role of university evaluation criteria in prioritizing competing concerns during student teaching. These findings support the indirect, but nonetheless important role of the university supervisor in the student teaching triad.

5. Student teaching literature points to the active participation of novice teachers in their own socialization (Su, 1992; Zeichner & Gore, 1990). Student teachers placed with low computer use cooperating teachers interpreted the

situation as a temporary frustration, rather than as a model for their future teaching practices. Student teacher descriptions of being pulled toward increased computer use regardless of the student teaching situation support the idea that student teachers play an active role in their own socialization.

6. Wittrock (1962) suggested that student teachers are capable of impression management for the benefit of persons holding power over them, while retaining convictions regarding the value of ideas and teaching practices advocated by their college institutions. This study supports this theory in so far as student teachers appear to look to cooperating teachers for cues in establishing priorities under competing concerns. However, guidelines for interpretation of SoCQ profiles indicated that concerns profiles which peak with stronger personal concerns than management concerns forewarn of resistance to a specific innovation. The SoCQ profiles of high computer competence student teachers placed with low computer use cooperating teachers indicate that the personal concerns of the student teachers rose substantially. This finding casts doubt on the ability of student teachers to retain convictions about the value of instructional computer use in the presence of low computer-using teachers.

7. The Concerns-Based Adoption Model and its related Stages of Concern Questionnaire have been used repeatedly with college students and currently practicing teachers. By utilizing the Stages of Concern Questionnaire in a student teaching setting, this study extended its use to the transition period between these two periods of professional development. The results of this study support the use of the SoCQ in student teaching settings as a viable method of documenting change.

8. The current literature on preservice computer education relies primarily on the use of quantitative approaches to data collection. Both the quantitative and the qualitative data gathered in the current study provided unique insight into the nature of instructional computer use during student teaching and associated concerns. This supports the place of hybrid approaches to educational research.

Limitations and Recommendations

A review of the limitations of the current study follows, along with recommendations for further investigation.

1. The study as conceived and conducted was exploratory in nature as opposed to experimental. While pre- and postplacement data were collected, the research was limited to an examination of several variables in naturally occurring student teaching placements. As such, results should be considered as providing tentative insight into possibilities for further research. Replication should be undertaken to validate the conclusions drawn from the study.

2. The study was conducted using student teachers enrolled in one regional teacher preparation university in the Midwest. Further study utilizing a wider cross section of student teachers and a broader cross section of cooperating teachers should be undertaken to support the conclusions of the current study.

3. The current study explored changes in concerns toward instructional computer use over a relatively short 8-week student teaching placement. Replication across two such 8-week placements should be undertaken, as well as replication in a longer 16-week placement.

4. A similar recommendation moves beyond concern with the duration of student teaching placements. The Stages of Concern Questionnaire has been utilized to examine changes in concerns toward instructional computer use during student teaching. Similar use of the instrument has been reported in college students (Reed, 1990) and with classroom teachers (Ellis, 1989; Wedman, 1986). It is entirely possible that an individual's movement through the Stages of Concern in these varied settings is less sequential than Concerns-based theory would postulate. It is recommended that a longitudinal study be undertaken to follow changing concerns of future teachers as they make the transition from the world of the college campus to the world of classroom teacher.

5. The Stages of Concern Questionnaire was utilized in the study due to its linkage with changes in instructional practices and the substantial literature base concerning its use with preservice and inservice teacher education. However, some student teachers experienced difficulty interpreting the intent of some items on the SoCQ with respect to instructional computer use in particular. The development of a revised instrument specific to instructional computer use should be considered.

6. The need for computer-integrated methods courses has been addressed by several authors (Bitter &Yohe, 1989; Glenn & Carrier, 1989; Handler, 1993; Oke, 1990) as well as several professional organizations (AACTE, 1987; AECT, 1989). In spite of such recommendations, computer-integrated methods courses are still uncommon in teacher preparation programs (OTA, 1995). The importance of computer-integrated methods courses was supported by student teachers in the study. Continued efforts to

implement a multitiered approach to preservice computer preparation, including computer-integrated methods courses, should continue at the university level.

7. Placement of student teachers with cooperating teachers who employ a high degree of instructional computer use has been recommended by several authorities (Glenn & Carrier, 1988; Handler, 1993; Oke, 1992). This study gives support to such recommendations. Changes in student teacher concerns toward instructional computer use in this study did differ as a result of such placements. It is recommended that this aspect of preservice computer education be given consideration by university personnel involved in the placement of student teachers.

8. The role of university evaluation criteria in setting cooperating teacher expectations and influencing student teacher instructional behavior was strongly supported by student teachers and cooperating teachers in this study. University evaluation criteria, as much as possible, should provide explicit expectations for instructional computer use during student teaching.

To summarize, this study examined changes in the concerns of student teachers toward instructional computer use during an 8-week student teaching placement. The tentative findings support the role of cooperating teacher computer use and student teacher computer competency as contributors to changes toward instructional computer use. By providing documentation and further insight into the role of the factors in the student teaching setting, the study added significantly to the current literature on preservice computer education.

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Appendix A

Phase 1 Instrumentation

Computer-using Competency Questionnaire
(Prior to Student Teaching)

Based on your prior computer experience, indicate your ability to perform each of the following computing tasks according to the following scale:

0 = not competent
1 = somewhat competent
2 = very competent

1. _____ utilizing drill and practice software
2. _____ using a word processor
3. _____ using a database
4. _____ using a spreadsheet
5. _____ creating a stack by using Hypercard or similar program
6. _____ using electronic mail
7. _____ using the Internet for long distance communication
8. _____ using the Internet to access distant information
9. _____ using a computer language such as BASIC or Logo

Instructional Autonomy Questionnaire
(After Student Teaching)

Instructional autonomy refers to the amount of freedom a teacher has in making decisions regard teacher, how would you categorize the level of autonomy extended to you by your cooperating teacher?

_____ low
_____ medium low
_____ medium high
_____ high

SOCQ 54
OER

Stages of Concern Questionnaire

The purpose of this questionnaire is to determine what people who are using or thinking about using various programs are concerned about at various times during the innovation adoption process. The items were developed from typical responses of school and college teachers who ranged from no knowledge at all about various programs to many years experience in using them. Therefore, a good part of the items on this questionnaire may appear to be of little relevance or irrelevant to you at this time. For the completely irrelevant items, please circle "0" on the scale. Other items will represent those concerns you do have, in varying degrees of intensity, and should be marked higher on the scale.

For example:

This statement is very true of me at this time.	0	1	2	3	4	5	6	7
This statement is somewhat true of me now.	0	1	2	3	4	5	6	7
This statement is not at all true of me at this time.	0	1	2	3	4	5	6	7
This statement seems irrelevant to me.	0	1	2	3	4	5	6	7

Please respond to the items in terms of your present concerns, or how you feel about your involvement or potential involvement with **instructional computer use**. We do not hold to any one definition of this program, so please think of it in terms of your own perceptions of what it involves. Remember to respond to each item in terms of your own present concerns about your involvement or potential involvement with the above named innovation.

Thank you for taking time to complete this task.

Soc Questionnaire Items - Instructional Computer Use

	0 1 2 3 4 5 6 7	
	Irrelevant Not true of me now Somewhat true of me now Very true of me now	
1.	I am concerned about students' attitudes toward this innovation.	0 1 2 3 4 5 6 7
2.	I now know of some other approaches that might work better.	0 1 2 3 4 5 6 7
3.	I don't even know what the innovation is.	0 1 2 3 4 5 6 7
4.	I am concerned about not having enough time to organize myself each day.	0 1 2 3 4 5 6 7
5.	I would like to help other faculty in their use of the innovation	0 1 2 3 4 5 6 7
6.	I have a very limited knowledge about the innovation	0 1 2 3 4 5 6 7
7.	I would like to know the effect of reorganization on my professional status.	0 1 2 3 4 5 6 7
8.	I am concerned about conflict between my interests and my responsibilities.	0 1 2 3 4 5 6 7
9.	I am concerned about revising my use of the innovation.	0 1 2 3 4 5 6 7
10.	I would like to develop working relationships with both our faculty and outside faculty using this innovation.	0 1 2 3 4 5 6 7
11.	I am concerned about how the innovation affects students.	0 1 2 3 4 5 6 7
12.	I am not concerned about this innovation.	0 1 2 3 4 5 6 7
13.	I would like to know who will make the decisions in the new system.	0 1 2 3 4 5 6 7
14.	I would like to discuss the possibility of using the innovation.	0 1 2 3 4 5 6 7
15.	I would like to know what resources are available if we decide to adopt this innovation.	0 1 2 3 4 5 6 7
16.	I am concerned about my inability to manage all the innovation requires	0 1 2 3 4 5 6 7
17.	I would like to know how my teaching is supposed to change.	0 1 2 3 4 5 6 7
18.	I would like to familiarize other departments or persons with the progress of this new approach.	0 1 2 3 4 5 6 7

Soc Questionnaire Items - Instructional Computer Use

0 Irrelevant 1 Not true of me now 2 3 4 Somewhat true of me now 5 6 7 Very true of me now

19.	I am concerned about evaluating my impact on students.	0 1 2 3 4 5 6 7
20.	I would like to revise the innovation's instructional approach.	0 1 2 3 4 5 6 7
21.	I am completely occupied with other things.	0 1 2 3 4 5 6 7
22.	I would like to modify our use of the innovation based on the experiences of our students.	0 1 2 3 4 5 6 7
23.	Although I don't know about this innovation, I am concerned about things in the area.	0 1 2 3 4 5 6 7
24.	I would like to excite my students about their part in this approach.	0 1 2 3 4 5 6 7
25.	I am concerned about time spent working with nonacademic problems related to this innovation.	0 1 2 3 4 5 6 7
26.	I would like to know what the use of the innovation will require in the immediate future.	0 1 2 3 4 5 6 7
27.	I would like to coordinate my efforts with others to maximize the innovation's effects.	0 1 2 3 4 5 6 7
28.	I would like to have more information on time and energy commitments required by this innovation.	0 1 2 3 4 5 6 7
29.	I would like to know what other faculty are doing in this area.	0 1 2 3 4 5 6 7
30.	At this time, I am not interested in learning about this innovation.	0 1 2 3 4 5 6 7
31.	I would like to determine how to supplement, enhance, or replace the innovation.	0 1 2 3 4 5 6 7
32.	I would like to use feedback from students to change the program.	0 1 2 3 4 5 6 7
33.	I would like to know how my role will change when I am using the innovation.	0 1 2 3 4 5 6 7
34.	Coordination of tasks and people is taking too much of my time.	0 1 2 3 4 5 6 7
35.	I would like to know how this innovation is better than what we have now.	0 1 2 3 4 5 6 7

Cooperating Teacher Questionnaire

This questionnaire concerns **instructional computer use**. Instructional computer use is defined as use of a computer by students as a means of meeting instructional objectives, or use of a computer by teachers in the presence of students as a means of meeting instructional objectives.

A. Extent of instructional computer use in the classroom.

1. On average, how many minutes per week would you say that you, the teacher, are engaged with instructional computer use?_____

2. On average, how many minutes per week would you say that the typical student in your class is engaged with instructional computer use?_____

B. Length of employment of instructional computer use. How long have you employed instructional computer use in your classroom, not counting this year?

___never ___1 yr ___2 yrs ___3 yrs ___4 yrs ___5 yrs ___6 yrs or more

C. Perceived Educational Impact.* Please use 0,1,2, or 3 to respond to these statements:

strongly disagree	mildly disagree	mildly agree	strongly agree
0	1	2	3

1. ____ Computers are valuable tools to improve the quality of a child's education.
2. ____ Using computers in class leads to more productivity among students.
3. ____ Students are more attentive when computers are used in class.
4. ____ Computers help to teach more effectively.
5. ____ My way of teaching is positively affected when using a computer for teaching
6. ____ Computers in school enhance students' creativity.
7. ____ The achievement of students can be increased when using computers for teaching.
8. ____ A computer is not suited for teaching purposes.
9. ____ Using a computer in a classroom makes a subject more interesting.

D. Influence of Institutional Context. Please indicate how the following factors influence instructional computer use in your building? (Please use 0,1,2, or 3)

strongly disagree	mildly disagree	mildly agree	strongly agree
0	1	2	3

1. ____ the amount of available hardware
2. ____ the amount of available software
3. ____ the amount of planning time
4. ____ the availability of on-site resource people
5. ____ the amount of inservice training offered
6. ____ the amount of administrative support

E. Code: List the last five digits of your student teacher's university ID number: _ _ _ _ _

Return: Use enclosed evelope, or within AEA7, return to Rod Winters, Orchard Hill, Cedar Falls

*International Association for Evaluation of Educational Achievement (1989), permission granted.

Appendix B

Phase 2 Instrumentation

Student Teacher Focus Group Protocol
Qualitative Data

Purposes of the Interview:

A. To investigate participant perceptions of factors militating against and facilitating for employment of instructional computer use in the student teaching experience.
B. To investigate participant reaction to conclusions drawn from quantitative data in Phase 1 of the study for goodness of fit.

Research Questions:

1. Going into student teaching, what, if any, expectations did you have about the use of the computer in the classroom?

   1A. Where do you think those expectations came from?

   1B. Did the use of computers match your expectations?

2. In your student teaching experience, did you use the computer for instruction more or less than you had anticipated?

   2A. Do you have any ideas about why it might have turned out that way?

   2B. What, if anything might have encouraged you to use the computer more?

3. In the first part of this study, we collected information from cooperating teachers and student teachers and looked for links between the two. I'd like to share some of the conclusions that have been drawn from that information and see if how well they fit what you feel is going on.

   3A. (cooperating teacher variables)

   3B. (student teacher variables)

   3C. (institutional context variables)

Appendix C

Phase 3 Instrumentation

Cooperating Teacher Focus Group Protocol
Qualitative Data

Purposes of the Interview:

A. To investigate participant perceptions of factors militating against and facilitating for employment of instructional computer use in the student teaching experience.
B. To investigate participant reaction to conclusions drawn from quantitative data in Phase 1 of the study for goodness of fit.
C. To investigate participant reaction to conclusions drawn from qualitative data in Phase 2 of the study for goodness of fit.

1. What, if any, expectations do you have for student teaching concerning the use of the computer for instruction in your classroom?

   1A. To what extent did you feel your student teacher was prepared to use the computer for instruction?

   1B. Other than computer knowledge, what, if anything, do you think was blocking more use of the computer by your student teacher?

2. In the first part of this study, we collected information from cooperating teachers and student teachers and looked for links between the two. I'd like to share some of the conclusions that have been drawn from that information and see how well they fit what you feel is going on.

   2A. (cooperating teacher variables)

   2B. (student teacher variables)

   2C. (institutional context variables)

3. In Phase 2 of the study, I met with a group of student teachers to discuss the use of the computer for instruction during their student teaching. I would like to get your reaction to some of the key points in those discussions to see how close the fit is with what you feel is going on.

   (3 key points of student teacher discussion)

Appendix D

Student Teacher Videotape Script

Student Teacher Videotape Script
Pretest

I. Opening

Good afternoon. Over the past decade, as computer technology has increasingly become part of the classroom landscape, concerns have grown over the ability of teachers to effectively employ computers for classroom instruction. Recently, attention has turned to similar to concerns in preservice teacher education.

2. Background/Rationale

Several proposals for reform in the computer education of preservice teachers have emerged. While many of the reforms concern college course work, the effect of student teaching upon preservice teachers in this regard is an area about which very little is known.

College courses do contribute to the working knowledge and teaching practices of beginning teachers. However, student teaching has been cited by many teachers as one of the more valuable elements of their undergraduate preparation.

It would appear therefore, that the lack of studies concerning instructional computer use during student teaching represents a blind spot in discussions about reform. This semester I will be working on a research project aimed at understanding computer use and student teaching.

The project has three goals: First, we will attempt to document the concerns that student teachers hold toward instructional computer use before student teaching begins. Secondly, we will attempt to determine if those concerns change during student teaching. Third, we will attempt to find relationships between change and several factors involving student teachers themselves, the classroom teachers they are placed with, and the schools in which they are placed.

3. Overview of Research

The research project will unfold in three distinct phases as well. The first phase of the research involves the broadest collection of data and is anchored by a questionnaire involving concerns toward instructional computer use which will be given to student teachers before and after the first student teaching placement. In addition, a separate questionnaire will be mailed to classroom teachers during this time to gather information about the classroom practices and beliefs of the cooperating teachers being utilized for student teaching mentors.

Phase 2 of the study will involve a one-hour group interview where results of the questionnaires will be discussed and student teacher insight into specific student teaching experiences will be explored. 8 student teachers would be selected from one of the student teaching centers immediately surrounding the UNI campus will be invited to participate in this group interview.

Finally, Phase 3 of the study will involve an additional group interview giving cooperating teachers the opportunity to discuss results of the study. This interview will utilize 8 cooperating teachers from the school districts immediately surrounding the UNI campus.

4. Involvement

I would like to personally invite you to participate in this search for information regarding the impact of student teaching upon classroom computer use. Immediately following this videotape, you will be given the opportunity to participate in Phase 1 of the study by completing a 20-minute questionnaire. Your student teaching coordinator has agreed to administer this questionnaire during the regularly scheduled seminar time today and again during the final week of your first student teaching placement .

That will be the extent of your time commitment. Participation in Phase 1 does not necessarily involve participation in the Phase 2 group interview, even if you are attending a seminar in one of the student teaching centers immediately surrounding the UNI campus. If your center is selected for participation in Phase 2, a separate contact will be made to solicit volunteers for the one-hour group interview.

5. Confidentiality

There are some things that you as a potential participant in a research study should understand. First, this research project involves collection of data for purposes of studying groups only, not individuals. Therefore, your identity, and the identity of your cooperating teacher will be shielded by use of numeric coding. The information you provide for this study will be kept in the strictest possible confidence.

Second, no unusual discomfort is anticipated as a result of your participation in the project. However, should you decide to withdraw from participation in the study, you are are free to discontinue participation at any time with no negative consequences.

6. Conclusion/Thanks

The research study that I have described for you is designed to provide new insight into the student teaching experience and its effect upon the concerns of student teachers toward instructional computer use. Discussions of reform in the education of preservice teachers are certain to continue into the future.

This study is an attempt to inform those discussions by documenting change in naturally occurring student teaching settings. Your student teaching experience should in no way be changed or altered by this study. However, your status as a student teacher provides a unique voice for informing proposals often put forward by people far removed from your experience. Hopefully through your participation in this project, we will be able to impact the course of future teacher education. Thank you.

Videotape Script
Posttest

1. Greeting

Good afternoon. Earlier this semester, you completed a questionnaire regarding instructional computer use. You will recall the questionnaire was part of a pre and posttest research design to investigate the impact of student teaching upon concerns toward instructional computer use. The questionnaire results obtained in January provided baseline data for the project. Now that you are nearing completion of your first student teaching placement we can begin to gather data to examine any changes which may have occurred in the past few months.

2. Post-Test Involvement

Immediately following this videotape, you will be asked to complete the Concerns Questionnaire again. In addition, you will be asked to respond to one additional question concerning the degree of decision-making power you have experienced in your student teaching setting.

3. Remaining Project Overview

Combining the pre and post student teaching data with the information obtained from the questionnaires your cooperating teachers filled out, will conclude the data collection for Phase 1 of the project. Through the modern magic of computers and statistical procedures, these data will be interpreted to determine if significant change has occurred, and if so, to identify possible explanations for such change.

Once the numbers have been analyzed and interpreted, I will make tentative findings available to your student teaching coordinator. Researchers have grown increasingly skeptical however, of the ability of numbers to capture the full description of any situation.

As a researcher, I am very interested in your reactions to those tentative findings. Eight student teachers from one of the student teaching centers near UNI will be chosen for participation in an hour-long group interview where the results will be discussed and further insight will be explored.

You may recall that an additional group interview with cooperating teachers is planned. Due to the time line of the project however, it is unlikely that results of that interview can be disseminated during spring semester.

4. Invitation/Thank you

Just to recap, you are being asked today to give a 2nd response to the concerns questionnaire about instructional computer use. The pre and post questionnaire results will be forwarded to your coordinator for sharing later this semester.

The issue of better preparation for computer-using teachers will only expand in the coming years. I thank you for your contribution to the ongoing discussion. Thank you, and good luck in your second student teaching experience.

Appendix E

Directions to Student Teaching Coordinators for Gathering Phase 1 Data

Directions for Gathering Pretest Data

Planning for Data Collection

- Pretest data may be gathered at any time during the first student teaching seminar of the semester.
- For the data collection to go well, you should be familiar with the directions before beginning.
- Materials provided in the packet: informed consent forms, questionnaires, answer sheets, video
- Materials you need to provide: videotape player, TV, extra #2 pencils
- Time Needed: 8 minutes for videotaped introduction
  7 minutes for distribution of materials and directions
  25 minutes for completion of questionnaire
  40 minutes

Videotape Introduction

The videotape will give an overview of the research project, describe its intent, and invite participation from students. Introduction to the videotape should be kept brief. You may wish to use the following script.

Say: The next segment of our time will concern a research project which has been proposed for this semester. The study concerns student teacher attitudes toward classroom computer use, and your participation is being sought. We have a short videotape which will explain the study, and then invite you to participate.

Begin videotape.
(The videotape has two sections. A marker will appear on screen to indicate the end of the first segment. Shut the videotape off when you see the marker. RETAIN THE VIDEOTAPE. The second segment will be used as a brief reorientation when it is time to administer the Posttest Questionnaire later in the semester.)

After the videotape has been turned off ...

Say: I am going to pass out a form with information concerning the study and your participation. Read the form over carefully. If, after reading the form, you agree to participate in the study, please sign and date it at the bottom. If you decline to participate, please leave the form blank and simply wait.

Distribute the informed consent forms and allow students time to read and respond to them.

Say: Please turn your forms face down and pass them forward.

(continue on next page)

Administering the Stages of Concern Questionnaire (SoCQ) Pretest

Check to make sure that student tables are clear and that each student has a No. 2 pencil with an eraser.

Say: You will be using a machine-scorable answer sheet to answer several items on a questionnaire. I am going to hand out the answer sheets now. Handle it carefully. Do not fold it or make any marks on it until I tell you to.

Distribute machine-scorable answer sheet.

Say: Now look up here. The answer sheet looks like this. You will not be providing your name on the answer sheet. Instead, you are asked to use the last four digits of the number appearing on your university I.D. Entering the last four digits in the boxes labeled ....

When all students have completed marking of their ID numbers, continue ...

Say: I will now pass out the questionnaire. When you receive the questionnaire, please leave it unopened on your table top. (Pass out questionnaire). Please read the directions at the top of the page to yourself as I read them aloud. They say:

"The purpose of this questionnaire is to determine what people who are using or thinking about using various programs are concerned about at various times during the innovation adoption process. The items were developed from typical responses of school and college teachers who ranged from no knowledge at all about various programs to many years experience in using them. Therefore, a good part of the items on this questionnaire may appear to be of little relevance or irrelevant to you at this time. For the completely irrelevant items, please utilize the "0" on the scale. Other items will represent those concerns you do have, in varying degrees of intensity, and should be marked higher on the scale."

For example:

This statement is very true of me at this time.	1	2	3	4	5	6	7	8
This statement is somewhat true of me now.	1	2	3	4	5	6	7	8
This statement is not at all true of me at this time.	1	2	3	4	5	6	7	8
This statement seems irrelevant to me.	1	2	3	4	5	6	7	8

Say: The appropriate level of intensity has been circled on the questionnaire. However, you will not be writing on the questionnaire itself. The answer sheet that you have been given includes ten columns for each question. You will be answering by filling in on the answer sheet which most closely indicates the intensity of your agreement with each statement. You will be use only the first 8 columns. No marks should appear in columns 9 and 10.

This questionnaire deals with your concerns regarding instructional computer use. It is expected that it will take you approximately 15 - 20 minutes to complete the questionnaire. However, there is no time limit. When you finish, please turn your answer sheet over, and find something quiet to do while waiting for others to finish.

If you have questions once your begin, please raise your hand and I will come to you. Now, please read the final paragraph at the bottom of the page, then turn to page 2 and b egin.

(Questions for clarification of the coding scheme, or marking columns should be answered directly. However, questions concerning the intent of specific items should be redirected to students for their own interpretation.)

Directions for Gathering Posttest Data

Planning for Data Collection

•Posttest data will be gathered following the last week of the first placement, preferably
•However, data must be returned no later than March 16th
•For the data collection to go well, you should be familiar with the directions before beginning.
•Materials provided in this packet: a 1-page addition to the SOCQ, answer forms
•Materials you need to provide: videotape player, TV, Segment #2 of the videotape shown earlier
•Time Needed: 5 minutes for videotaped reorientation (Segment #2)
5 minutes for distribution of materials and directions
20 minutes for completion of questionnaire
30 minutes

Videotape Introduction

The videotape will give a review of the research project, describe its intent, and reorient participants to the posttest instruments. Introduction to the videotape should be kept brief. You may wish to use the following script.

Say: The next segment of our time will concern the research project which was began at the beginning of the semester. Those of you who participated will recall that you completed a questionnaire during the first seminar. The researcher needs to ask you to complete the same questionnaire again now that you are near completion of your first student teaching experience. A brief videotape segment will provide a quick reorientation for you.

Begin videotape segment #2.
(The videotape has two sections. You utilized Segment #1 during Seminar #1. You need to begin the videotape now at segment #2.)

(continue on next page)

Readministering the Stages of Concern Questionnaire (SoCQ) Posttest

Check to make sure that student tables are clear and that each student has a No. 2 pencil with an eraser.

Say: Just like last time, you will be using a machine-scorable answer sheet to answer several items on a questionnaire. I am going to hand out the answer sheets now. Remember to handle them carefully.

Distribute machine-scorable answer sheet.

Say: Just as last time, you will be asked to use the last four digits of your university I.D. Enter the last four digits in the boxes labeled "IDENTIFICATION NUMBER"

When all students have completed marking of their ID numbers, continue ...

Say: To the left of your identification number, find the column labeled months, and fill in the oval in front of March. DO NOT fill in other columns. Leave the day and year blank.

Say: I will now pass out the questions. You will be receiving the Stages of Concern Questionnaire just as you did the first time. However, this time, you will also be receiving an additional page with three questions to be answered after you have completed the Stages of Concern Questionnaire. (Pass out questionnaire and "Instructional Autonomy" sheets).

Please review the directions at the top of the first page as I read them aloud. They say: "The purpose of this questionnaire is to determine what people who are using or thinking about using various programs are concerned about at various times during the innovation adoption process. The items were developed from typical responses of school and college teachers who ranged from no knowledge at all about various programs to many years experience in using them. Therefore, a good part of the items on this questionnaire may appear to be of little relevance or irrelevant to you at this time. For the completely irrelevant items, please utilize the "0" on the scale. Other items will represent those concerns you do have, in varying degrees of intensity, and should be marked higher on the scale."

For example:

This statement is very true of me at this time.	1	2	3	4	5	6	7	8
This statement is somewhat true of me now.	1	2	3	4	5	6	7	8
This statement is not at all true of me at this time.	1	2	3	4	5	6	7	8
This statement seems irrelevant to me.	1	2	3	4	5	6	7	8

Say: You will be using the first 8 columns of the answer sheet that you have been given. You are to fill in the oval on the answer sheet which most closely indicates the intensity of your agreement with each statement at this point in time. Remember, no marks should appear in columns 9 and 10.

Once again, there is no time limit. When you finish, please use the bubble answer sheet to answer the three questions on the additional page you have been given. When you are done, please turn your answer sheet over, and find something quiet to do while waiting for others to finish.

If you have questions once you begin, raise your hand and I will come to you.

Read the final paragraph at the bottom of the page, then turn to page 2 and begin.

(Questions for clarification of the coding scheme, or marking columns should be answered directly. However, questions concerning the intent of specific items should be redirected to students for their own interpretation.)

Appendix F

Human Subjects Consent Forms

Phase 1
Student Teacher
Informed Consent Statement

The Purpose of This Research Project
The purpose of this research is to give teachers, student teachers, and university personnel a better understanding of the factors involved in student teaching settings that influence student teacher attitudes toward instructional computer use.

Your Rights as a Potential Participant
Participation in this research is voluntary. You are free to discontinue participation at any time. Your identity will be shielded. The information you are providing will be kept in the strictest possible confidence.

How You are being Asked to Participate
First, it is asked that you fill out the attached "Stages of Concern Questionnaire". This questionnaire consists of several questions concerning the intensity of your concerns toward particular aspects of instructional computer use. In addition, you are asked to complete a brief "Computer-using Competency Questionnaire".

Following your first student teaching placement, you will be asked to once again complete the "Stages of Concern Questionnaire", and and to answer a question relating to the degree of instructional autonomy you experienced during student teaching.

Researcher: Mr. Roderick E. Winters
Research Advisor: Dr. Sharon Smaldino

Department of Curriculum and Instruction
University of Northern Iowa
Department Phone #: (319) 273-2167
Office Phone #: (319) 273-3250

If you have any questions about the research or your rights in participating, please contact the office of the Human Subjects Coordinator, University of Northern Iowa, (319) 273-2748.

I am fully aware of the nature and extent of my participation in this project as stated above. I hereby agree to participate in this project.

Your Signature:_____Date:_____

Please Print Your Name: _____Signature of Researcher:

Phase 1
Cooperating Teacher
Informed Consent Statement

The Purpose of This Research Project
The purpose of this research is to give teachers, student teachers, and university personnel a better understanding of the factors involved in student teaching settings that influence student teacher attitudes toward instructional computer use.

Your Rights as a Potential Participant
Participation in this research is voluntary. You are free to discontinue participation at any time. Your identity will be shielded. The information you are providing will be kept in the strictest possible confidence.

How You are being Asked to Participate
It is asked that you fill out the attached "Cooperating Teacher Questionnaire". This questionnaire consists of several questions related to the following topics: amount of time spent with instructional computer use, perceived impact and history of such use, and the effect of institutional factors upon computer use. It is asked that you return the questionnaire along with this signed form in the self-addressed, stamped envelope which has been provided.

Researcher: Mr. Roderick E. Winters
Research Advisor: Dr. Sharon Smaldino

Department of Curriculum and Instruction
University of Northern Iowa
Department Phone #: (319) 273-2167
Office Phone #: (319) 273-3250

If you have any questions about the research or your rights in participating, please contact the office of the Human Subjects Coordinator, University of Northern Iowa, (319) 273-2748.

I am fully aware of the nature and extent of my participation in this project as stated above. I hereby agree to participate in this project.

Your Signature:_____Date:_____

Please Print Your Name: _____Signature of Researcher:

Phase 2
Cooperating Teacher
Informed Consent Statement

The Purpose of This Research Project
The purpose of this research is to give teachers, student teachers, and university personnel a better understanding of the factors involved in student teaching settings that influence student teacher attitudes toward instructional computer use.

Your Rights as a Potential Participant
Participation in this research is voluntary. You are free to discontinue participation at any time. Your identity will be shielded. The information you are providing will be kept in the strictest possible confidence.

How You are being Asked to Participate
It is asked that you participate in an hour long discussion concerning your experience as a cooperating teacher as it relates to instructional computer use. The discussion will center around themes of expectations for computer use, the realization of those expectations, and brainstorming of possible factors in the student teaching experience which have moved you further toward or further away from employment of instructional computer use in the classroom.

Researcher: Mr. Roderick E. Winters
Research Advisor: Dr. Sharon Smaldino

Department of Curriculum and Instruction
University of Northern Iowa
Department Phone #: (319) 273-2167
Office Phone #: (319) 273-3250

If you have any questions about the research or your rights in participating, please contact the office of the Human Subjects Coordinator, University of Northern Iowa, (319) 273-2748.

I am fully aware of the nature and extent of my participation in this project as stated above. I hereby agree to participate in this project.

Your Signature:_____Date:_____

Please Print Your Name: _____Signature of Researcher:

Phase 2I
Cooperating Teacher
Informed Consent Statement

The Purpose of This Research Project
The purpose of this research is to give teachers, student teachers, and university personnel a better understanding of the factors involved in student teaching settings that influence student teacher attitudes toward instructional computer use.

Your Rights as a Potential Participant
Participation in this research is voluntary. You are free to discontinue participation at any time. Your identity will be shielded. The information you are providing will be kept in the strictest possible confidence.

How You are being Asked to Participate
It is asked that you participate in an hour long discussion concerning your experience as a cooperating teacher as it relates to instructional computer use. The discussion will center around themes of expectations for computer use, the realization of those expectations, and brainstorming of factors in the student teaching experience which may have an impact upon the likelihood that student teachers would engage in instructional computer use.

Researcher: Mr. Roderick E. Winters
Research Advisor: Dr. Sharon Smaldino

Department of Curriculum and Instruction
University of Northern Iowa
Department Phone #: (319) 273-2167
Office Phone #: (319) 273-3250

If you have any questions about the research or your rights in participating, please contact the office of the Human Subjects Coordinator, University of Northern Iowa, (319) 273-2748.

I am fully aware of the nature and extent of my participation in this project as stated above. I hereby agree to participate in this project.

Your Signature:_____Date:_____

Please Print Your Name: _____Signature of Researcher:

Appendix G

Letters

(District Permission Letter)

November 8, 1994
1222 College Street
Cedar Falls, IA 50613

«Superintendent»
«Name»
«School»
«Address»
«CSZ»

«Superintendent»,

Recently, widespread concern has been voiced over the adequacy of new teachers to effectively employ classroom computer use. A recommendation has surfaced which would restrict placement of student teachers to settings which feature a cooperating teacher who employs a high degree of instructional computer use. Due to the weak knowledge base supporting such recommendations, I have proposed a study of instructional computer use by UNI student teachers and cooperating teachers during spring semester, 1995.

The study would investigate changes in concerns toward instructional computer use which student teachers experience under current placement procedures. While the study would focus upon student teachers, cooperating teachers would be asked to complete a one page questionnaire concerning the following: amount of time spent with instructional computer use, perceived impact and history of such use, and the effect of institutional factors upon computer use. The questionnaire, to be mailed to cooperating teachers during late January, 1995 can be completed in approximately ten minutes. In addition, 8 cooperating teachers from surrounding districts would be invited to the UNI campus for a one-hour group interview during an evening in April.

The study has been reviewed by the human subjects review committee at UNI. The identity of individuals and districts participating in the study would be masked. Information gathered would be held in confidence.

Enclosed is a participation authorization form, granting permission for the researcher to contact teachers within your school district. Please take a minute to complete the form and return it in the self-addressed stamped envelope. If your district requires utilization of its own forms, please forward those as well.

Thank you for your cooperation in this matter. If you have further questions or concerns, I can be reached during the morning hours at Orchard Hill Elementary (319-266-1605) or at home (319-266-1605). If you would prefer, Dr. Sharon Smaldino, my research advisor, can be contacted at (319) 273-3250. If I have not received the reply by December 1, I will follow up by phone. Thank you.

Sincerely,

Roderick E. Winters
Ed. D. Candidate
University of Northern Iowa

Research Participation Authorization

"An Investigation of Changes Toward Instructional Computer Use During Student Teaching"

____ Permission to contact teachers in our district for purposes of this study is hereby given.

____ Permission to contact teachers in our district for purposes of this study cannot be granted until the enclosed district forms are completed and returned.

____ Permission to contact teachers in our district for purposes of this study cannot be granted until the following concerns are addressed:

____ Permission to contact teachers in our district for purposes of this study is denied for the following reasons:

Signed _____ _____

District _____ _____

(Cooperating teacher permission letter)

January 20, 1995

«Name»
«School»
«Address»
«CSZ»

«Name»,

Your willingness to serve as a mentor for a UNI student teacher this semester indicates a commitment to the development of future educators. Because of your commitment, your help is being sought in a study of UNI student teachers.

Recently, widespread concern has been voiced over the adequacy of new teachers to effectively employ computers for instruction. Many recommendations have been made to strengthen the computer education of preservice teachers. However, one of those recommendations directly concerns cooperating teachers. It has been suggested that student teaching placements be restricted to cooperating teachers who employ a high degree of instructional computer use. Very little information has been gathered from classroom teachers on the effects of current placement procedures, or on the effects of the proposed changes. Due to the weak knowledge base underlying such recommendations, I have proposed a study of instructional computer use by UNI student teachers and cooperating teachers during spring semester, 1995.

The study will investigate changes in concerns toward instructional computer use which student teachers experience under current placement procedures. Your student teacher has agreed to participate in Phase 1 of the study which is a collection of quantitative data. While the study is focused upon student teachers, information concerning cooperating teacher computer use, attitudes, and institutional support is also needed.

Your school district has granted permission to contact you and invite you to participate in this study. Please consider taking a few minutes to complete the enclosed one-page questionnaire and return it in the self-addressed stamped envelope. Data that you provide will be reported in group form only. Neither individual teachers nor individual districts will be identified.

Thank you for your cooperation in this matter. If you have further questions or concerns, I can be reached during the morning hours at Orchard Hill Elementary (319-266-1605) or at home (319-266-1605). If you would prefer, Dr. Sharon Smaldino, my research advisor, can be contacted at (319) 273-3250.

Sincerely,

Roderick E. Winters
Ed. D. Candidate
University of Northern Iowa

(Cooperating teacher permission - 2nd request)

«Name»
«School»
«Address»
«CSZ»

Dear «Name»,

Recently, a questionnaire was mailed to you concerning computer use in the classroom. The questionnaire was part of a larger study dealing with UNI student teachers and field preparation.

There is no record yet that it has been returned. Enclosed is a second copy of the questionnaire. Would you please consider taking a few minutes to fill it out and return it in the enclosed stamped envelope. Your help in this undertaking would be very much appreciated. Thank you.

Sincerely,

Roderick E. Winters
Ed.D. Candidate
University of Northern Iowa

The University of Northern Iowa

November 8, 1994

Rod Winters
1222 College Street
Cedar Falls, IA 50613

Dear Mr. Winters:

Your project, "Changing Concerns Toward Instructional Computer Use", which you submitted for human subjects review on November 8, 1994 has been determined to be exempt from further review under the guidelines stated in the UNI Human Subjects Handbook. You may commence participation of human research subjects in your project.

Your project need not be submitted for continuing review unless you alter it in a way that increases the risk to the participants. If you make any such changes in your project, you should notify the Graduate College Office.

If you decide to seek federal funds for this project, it would be wise not to claim exemption from human subjects review on your application. Should the agency to which you submit the application decide that your project is not exempt from review, you might not be able to submit the project for review by the UNI Institutional Review Board within the federal agency's time limit (30 days after application). As a precaution against applicants' being caught in such a time bind, the Board will review any projects for which federal funds are sought. If you do seek federal funds for this project, please submit the project for human subjects review no later than the time you submit your funding application.

If you have any further questions about the Human Subjects Review System, please contact me. Best wishes for your project.

Sincerely,

Norris M. Durham, Ph.D.
Chair, Institutional Review Board

cc: Dr. David A. Walker, Associate Dean
Dr. Sharon Smaldino
Dr. Rob Boody

Graduate College 1 Seerley Cedar Falls, Iowa 50614-0702 (319) 273-2748 FAX: (319) 273-2243

The University of Northern Iowa

December 12, 1994

Dr. Shirley Hord
SW Educational Development Lab
211 E. 7th Street
Austin, TX 78701

Dr. Hord,

As specified in our recent telephone conversation, please find a request for permission to photocopy and utilize the Stages of Concern Questionnaire in connection with the study entitled "An Investigation of the Changing Concerns of Preservice Teachers toward Instructional Computer Use during Student Teaching".

The proposed research would investigate the relationship between changes in the attitudes of student teachers toward instructional computer use and several factors involving student teachers themselves, cooperating teachers, and the broader institutional context of the classrooms in which the student teaching experiences occurs. In particular, Phase One of the study would concern movement across the stages of concern hypothesized in the Concerns Based Adoption Model. Phases Two and Three of the study would involve hour-long focus group interviews with student teachers and cooperating teachers respectively to gain participant insight and reaction to the tentative findings of Phase One data.

If permission is granted, please sign and date the form below. Thank you.

Roderick E. Winters

Roderick E. Winters
Ed. D. Candidate
Curriculum & Instruction

Permission is hereby granted for photocopying and utilization of the Stages of Concerns Questionnaire in connection with this research project.

Signed Shirley Hord Date 12/19/94

Curriculum and Instruction 618 Education Center Cedar Falls, Iowa 50614-0606 (319) 273-2167 FAX: (319) 273-6997

INTERNATIONAL ASSOCIATION FOR THE EVALUATION OF EDUCATIONAL ACHIEVEMENT

• *Chairman:*
Dr. Tjeerd Plomp
University of Twente
Department of Education
P.O. Box 217
7500 AE Enschede
The Netherlands

The Hague, 10 March 1995

Ed.D. Roderick E. Winters
The University of Northern Iowa
1222 College STreet
Cedar Falls, IA 50613
U.S.A.

Dear Mr. Winters

IEA hereby grants to the University of Northern Iowa, permission to use "Perceived Educational Impact Scale" for research purposes only, in response to your letter and attachments of 7 March 1995.

This assumes you will reference IEA in any and all publications or documents and that you will respect the IEA copyrights of this document.

For copies, please request from :

Dr. Hans Pelgrum
Centre for Applied Research in Education (OCTO)
Department of Education
University of Twente
P.O. Box 217
7500 AE Enschede

Thank you for your inquiry.

Sincerely,

Dr. W. Frank Hull IV
Executive Director, IEA.

• Phone : •- 3153 - 893 595 • Fax : •- 3153 - 356 531
• Easy- Direct : TOPLOADWellENUTS