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ABSTRACT

Faculty concerns about integrating computers in teacher education courses were studied for 26 members of the education faculty at a northwest university. Faculty members responded to the Stages of Concern about an Innovation Questionnaire and discussed their concerns in interviews. The Concerns-Based Adoption Model, which provided the conceptual framework, identifies seven dimensions of concern. Questionnaire data indicate that the faculty as a whole had the most intense and frequent concerns in the self-concern category of awareness, information, and personal. Experienced instructional users had more intense concerns about the impact stages of use than did the inexperienced users. The most important factor influencing the stage of concern was whether or not the respondent had experience incorporating computing assignments in courses. Implications of these findings for teacher education are discussed. One figure and two tables present study findings. (Contains 14 references.) (SLD)

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Faculty Concerns as Gateways to Teacher Competency with Computer Technologies

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Introduction and Background

Teacher preparation programs are faced with providing computing experiences by faculty who often have limited computing experiences and insufficient resources. The International Society for Technology in Education (ISTE, 1992) developed standards in educational computing applications for beginning teachers. Those standards have also been approved as accreditation standards by the National Committee for Accreditation of Teacher Education, thereby increasing the pressure on Education programs to integrate educational computing components within courses. Determining needs of faculty for staff development and resource acquisition is an important step in the planning process.

The purpose of this study was to determine faculty concerns about integrating computers in teacher education courses. Education faculty responded to the Stages of Concern About an Innovation Questionnaire [SoCQ] (Hall, George & Rutherford, 1977) and discussed their concerns in interviews. Two questions guided this study. First, what are faculty concerns when considering integrating computer-based technologies in courses? And second, because some faculty had experience integrating computer activities in courses, what different concerns are there between those who have had that experience and those who have not?

The Concerns-Based Adoption Model [CBAM] provided the conceptual framework for this study. This theory assumes that change is a process that follows a seven stage developmental sequence regarding the concerns that faculty have when an innovation is adopted (Hall & Hord, 1987). This theory drew upon Fuller's (1969) work about the developmental nature of teacher concerns. She posited that preteachers are largely preoccupied with self concerns. As student teachers, they become concerned about managing the tasks of teaching. With more experience, they become concerned about impact on students. Hall, Wallace and Dossett (1973) found that these three sequences of concern (self, task, and impact) were also present when experienced teachers were faced with implementing innovations.

The three stages were expanded into seven dimensions of concerns, which may vary in intensity. Self concerns include three stages. The first is an awareness of the nature of the innovation. This is followed by a need for information. The third stage reflects personal concerns about the innovation. Fuller's task concerns are reflected in the fourth stage, when management of the innovation and implementation issues are priorities. The impact concerns were expanded to three stages. The fifth stage, once the innovation has been implemented, is a concern about the consequences or impact on students. Sixth, is a desire to collaborate with others, in particular, faculty of other departments or schools. The seventh stage is a refocusing of the innovation based on experience. This theory suggests that interventions and staff development should address the specific concerns of the faculty.

The CBAM model has had some application in educational computing at the K-12 level (Campbell, Fein, Scholnick, Schwartz & Frank, 1986; Cicchelli & Baecher, 1985; Wedman, 1986, 1985; Wedman & Heller, 1984; Whiteside & James, 1985-86), and limited application in higher education. Hall (1976) investigated concerns about use of instructional modules by teacher educators and Wedman and Strathe (1985) developed inservice for computer use by education faculty.

Methods

Twenty-six Education faculty at a Northwest university participated in this study. All participants had desktop computers. That teacher preparation program certifies an average of 400 teachers each year. Some faculty were highly experienced computer users, and other were novices. Students in this program also have access to student computer laboratories across campus.

Data Sources

Data were gathered in two ways. First, faculty completed the Stages of Concern About an Innovation Questionnaire [SoCQ] (Hall, George & Rutherford, 1977). Then, participants were interviewed about their most intense concerns. The SoCQ has five statements for each of the seven Stages of Concern that respondents indicate agreement on a 0-7 point Likert scale. The developers recommended interviewing respondents to verify relative intensities of each of the stages.

Data Analysis

For the SoCQ, raw scores for each of the seven sub-scales were tallied and converted to normed percentiles provided with the instrument for each of those seven categories . Averages of the raw scores were also computed for each sub-scale item for the whole faculty as a group and for those who were users of the innovation, and for those who were non-users.

Instructional users were those had actually developed instructional units that incorporated computer-based technologies as part of courses taught. *Non-users* were those who had not yet incorporated any educational computing activities in their courses. This group includes those who may use computers as a personal productivity tool, but had not developed computer related instructional modules; others were only beginning to become familiar with computers. Previous C-BAM studies have indicated that experience with an innovation was an important factor in the interpretation of the stages. Wedman (1986) argued that concerns profiles differed when different parts of "innovation bundles" (i.e., interactive video, computer-assisted instruction, word processing) were considered on different SoCQ scales. Additionally, studies of knowledge growth in the teaching profession indicate that teachers' understandings of how to teach particular topics were altered with experience teaching those topics (Shulman, 1987).

Statements from interview notes were categorized according to the seven concern categories by agreement among three analysts. Lists were compiled and tallied for categories of concern within each of the seven stages.

Results and Discussion

Figure 1 displays a line chart of the average percentiles for the respondents. Table 1 lists the percentile scores for the instsructional users and non-users. Thirteen faculty were classified as users of the innovation. That is, they had incorporated computing activities in courses and thirteen were non-users, who had yet to include computer components in courses. Table 2 displays the distribution of intensities of concerns between the two groups.

Insert Figure 1 and Table 1 & 2 here

SoCQ

Questionnaire data revealed that faculty as a whole had most intense and frequent concerns in the self concern categories of awareness, information, and personal. The most intense stage (27%) was information (percentile=70). However, the most frequent and second most intense stages were awareness (30%; percentile=61) and personal (7%; percentile=62). The lowest intensity of concerns was for management (percentile=48).

The experienced instructional users (n=13) had more intense concerns at the impact stages than the inexperienced users. They had the highest intensity for consequences (percentile=69) and refocusing (percentile=68) and lowest for awareness (percentile=42). Four had highest impact concerns (refocusing=2; collaboration=3; consequences=2) and two had highest task (management) concerns. One had a high self concern at the personal level; however, this person also had second highest levels of concern for impact concerns, in particular collaboration and refocusing. In contrast, inexperienced non-users (n=13) had the highest intensity for self concerns, particularly for

Figure 1. Stages of Concern

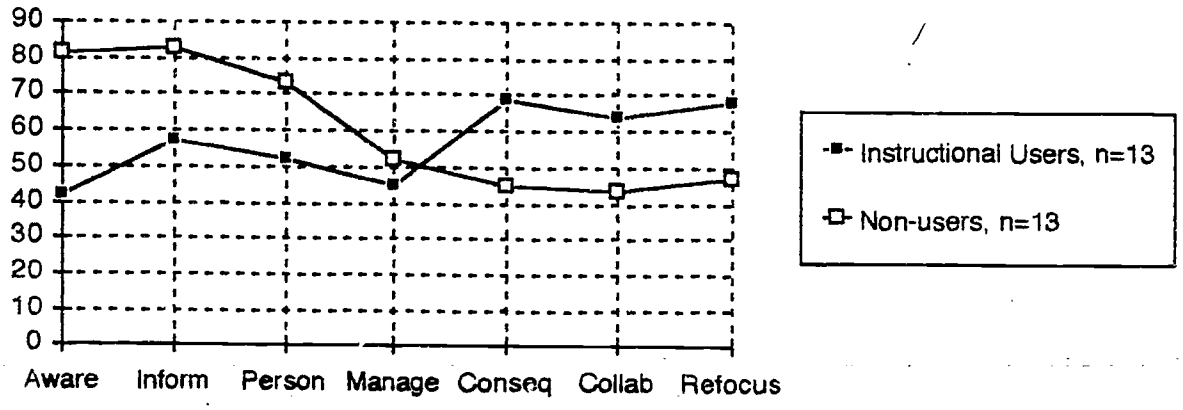

Table 1. Percentile Means

Stage	0 Aware	1 Inform	2 Person	3 Manage	4 Conseq	5 Collab	6 Refocus
Instructional Users, *n*=13	42	57	52	45	69	64	68
Non-users, *n*=13	81	83	73	52	45	43	47
Total: All Faculty	61	70	62	48	57	53	58

Table 2. Distribution of SoCQ Highest Intensity of Concern

Stage	0 Aware	1 Inform	2 Person	3 Manage	4 Conseq	5 Collab	6 Refocus
Instructional Users, *n*=13	1	1	2	2	2	3	2
Non-users, *n*=13	7	6	0	0	0	0	0
Total: All faculty	8	7	2	2	2	3	2
Percentage	30.7	26.9	7.7	7.7	7.7	11.5	7.7

information (percentile=83), and were least concerned about collaboration (percentile=43). All of the non-users scores revealed highest intensity for awareness and information.

Stages of Concern

Further analysis involved examining the average responses to each of the items on the sub-scales. The following is a discussion of the highest rated item for each of the sub-scales and representative comments of faculty about the most frequently mentioned categories of concern obtained during interviews.

Awareness. Items on the awareness sub-scale indicated two general ideas. One was related to knowledge about the innovation and the other was related to being involved with other issues, instead of the innovation. Among the non-users who had highest awareness concerns were those that did not feel that they were competent computer users as well as those who are more concerned with their own special research interests, rather than technology.

All of the items on this sub-scale were actually rated lowest on the instrument; however, when converted to percentile scores, even a low rating indicates a high intensity. The highest rated item was that of being "completely occupied with other things" (means: all faculty=2.8 on the 0-7 scale; users=1.8; non-users=3.3). One non-user spoke of having too much to teach in his course to "spend a week teaching computers." This person, as well as others, lacked an awareness of ways to facilitate existing course content with computer activities. An experienced user with highest awareness concerns, felt comfortable incorporating computing activities in classes, and was more concerned with educational issues other than technology.

Information. Knowing "what resources are available" was the highest rated statement of this sub-scale (means: all faculty=5.4; users=5.2; non-users=5.6). The most common concern expressed during interviews in the information category was for knowing what software and hardware were available on campus for students to use, as well as kinds of programs being published by software developers. Other concerns were about acquisition of specific resources, such as a movable computer demonstration station with a projection pad. As one person stated, "We can't do it [demonstrate teaching with computers] if we don't have anything [hardware and software]." Concern was also expressed about funding for resources for faculty needs. One experienced instructional user scored highest for this stage and was curious about campus resources.

Personal. The highest rated item on this sub-scale was wanting "to have more information on time and energy commitments required..." (means: all faculty=4.5; users=4.4; non-users=4.6). Respondents indicated "time" as a major factor in learning to use the computer and develop instructional applications.

Management. The highest rated item on this sub-scale was a concern about "inability to manage all the innovation requires (means: all faculty=3.9; users=3.5; non-users=4.1). Details of scheduling computer laboratories and quantities of software were addressed. One respondent was concerned about being able to schedule a classes in laboratories so that students and professor could examine software as a group. Another stated that teacher candidates should use computers with children in actual classrooms rather than only in an education courses.

One interesting result was the rating by non-users of 3.3 for the item "Coordination of tasks and people is taking too much of my time." It would seem that those who had never incorporated computers in their courses were not thinking about coordinating computer activities for courses. It seems more reasonable that they would have marked to "0" ranking, meaning "not relevant."

Consequences. The highest rated item on this sub-scale was concern "about how the innovation affects students" (means: all faculty=5.3; users 6.7; non-users=4.6). Nearly all respondents made a statement expressing the need for candidates to know how to use computers. Non-users emphasized "familiarity;" whereas instructional users emphasized "effective" use of computer activities and had more intense concerns about impact on students.

Collaboration. The highest rated item in this category was for wanting "to coordinate my efforts with others to maximize the innovation's effects" (means: all faculty 4.9; users=5.1; non-users=4.7). This category is for comments about working with other faculty. One comment indicated we should "find out what teachers in the area are doing with computers." Another said: "The faculty needs to agree on what they will actually do in courses." Although this category received the lowest intensity rating by non-users, four of them indicated a willingness to include computer activities if they could get some help in using computers and developing assignments. There was also interest in knowing what other faculties were doing, in particular, public school teachers in the area. One indicated that there ought to be collaboration, but it would be difficult to find the time.

Refocusing. The highest rated item on this sub-scale was about modifying "use of the innovation based on the experiences of our students" (means: all faculty=4.3; users 5.0; non-users 3.4). Dissatisfaction was expressed about the quality of current materials which some felt were inadequate in numbers, failed to represent quality educational software applications, and were not representative of current state of the art. As there was no clear plan for integrating computer activities in courses in this program, several spoke about requiring computer courses or completing of computer activity checklists. Rather than refocus, several addressed the need for developing a focus or plan. There were also comments about which platform(s), i.e., PC, Apple II, Macintosh, that students should be required to use.

Implications

As the SoCQ is generic and applicable to many innovations, this study also provides information about the content of each of the seven stages of concern within the context of educational computing. It further provides an example of the application of CBAM theory in the context of higher education teacher preparation programs. Using Fuller's (1969) developmental framework of self, task, and impact concerns, the faculty as a whole had the most intense as well as most frequent concerns in the self concern categories. It should be emphasized that in many cases, there were only one, two , or three points difference between highest and second high intensity scores. The SoCQ was developed as an instrument to diagnose concerns so that the concerns could be addressed. It was not intended that individuals be labeled or judged on the basis of the responses. Results should be cautiously interpreted as the number of respondents in this study was small as well as being a non-random sample. The innovations that were used for developing the scales and norms appeared to have clearly defined conceptual frameworks, stated procedures, and associated materials for faculties to use. At the time of this study, the innovation was still in the definition and design phase. Therefore, the meaning of the phrase "Integrating Computers in Teacher Education Courses" would have had a much wider interpretation than a more clearly defined innovation. This may be problematical to compare this innovation with innovations on the percentile scales. Further studies of concerns of higher education faculty with clearly defined instructional computing expectations for faculty and students with a history of implementation would be beneficial. In such contexts, determation of the types of impact concerns would be informative in helping maintain implementation of educational computing innovations.

It appears the most important factor influencing intensity of stage of concern was whether or not the respondent had experience incorporating computing assignments in courses. Instructional users tend to have higher levels of intensity for impact concerns. Those with high collaboration and refocusing concerns could help facilitate a plan and work with other faculty needing assistance with developing instructional applications.

Instructional non-users,who may use computers as personal tools but had not included instructional applications in courses, had the highest self concerns. None had most intense concerns beyond information. Overviews and demonstrations of educational computing applications should be provided, perhaps by experienced instructional users, as well as guest speakers. Instructional development assistance should also be provided. It does not seem reasonable to expect that they include computer components without some assistance for this group, who expressed willingness to participate in some way in increasing computing abilities of other faculty and students.

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