One-to-One Computing in Teacher Education: Faculty Concerns and Implications for Teacher Educators

Loretta Donovan and Tim Green
California State University, Fullerton

Abstract

This study examines initial faculty concerns during implementation of a one-to-one laptop teacher education pilot program. The Concerns-Based Adoption Model of Change provides the theoretical framework and guides the methodology. In fall 2007, 29 teacher candidates began a one-year multiple-subject (elementary) credential program with an added emphasis on teaching and learning in a one-to-one laptop environment. Circumstances of faculty involvement in the pilot program were varied and not controlled. Eight instructional faculty and three field supervision faculty participated in this study. Results indicate that, as a group, faculty participants had high-level awareness, management, and impact concerns, yet highest concerns for individual faculty varied. Data pointed to three major implications regarding technology-rich teacher education and faculty issues to be addressed for program success: faculty readiness, faculty preparation, and faculty differences. Implications of this study extend to colleges of education implementing one-to-one initiatives or other technology innovations into their programs. (Keywords: 1:1 computing, teacher education, faculty concerns)

Integrating technology into teacher education coursework is nothing new. However, with the influx of one-to-one (1:1) laptop programs and the use of mobile laptop carts in K–12 schools and classrooms, there is an increasing need to better prepare teacher candidates for teaching in these technology-rich environments. Colleges of education have traditionally followed one of two models for preparing teacher candidates to use technology in the K–12 environment. One model has teacher candidates take a technology integration course as part of their credential program, whereas the second infuses technology into the majority (if not all) content area courses, thus allowing candidates to experience technology for learning *and* teaching (Vannatta, 2000). In many instances, this form of integration is evidenced by students completing a technology assignment such as a website evaluation, planning a technology-based lesson (e.g., using virtual manipulative websites for math), or creating a personal blog to show reflective practice.

Research (e.g., Duran, Fossum, & Luera, 2006; Friedman & Kajder, 2006) suggests that teacher candidates need multiple opportunities to have firsthand experiences with technology integration. With the assumption that teacher candidates often teach the way they were taught, the use of laptop computers in teacher education programs allows for teacher candidates to more fully experience technology integration that can naturally be transferred to inservice teaching (Fullan, 2007; Resta & LeBeouf Tothero, 2002). However, only a handful of colleges of education are implementing 1:1 laptop teacher preparation programs. It's not surprising that limited research is available in the area of laptop initiatives in teacher education and higher education. A search of popular education research databases resulted in fewer than 10 studies of 1:1 programs in teacher education. Research that is available (e.g., Kay, 2006; MacKinnon, Aylward, & Bellefontaine, 2006; Ni & Branch, 2004) focuses on student perceptions and uses, whereas others (e.g., Olsen, 2001; McVay, Snider, & Graetz, 2005) focus on implementation logistics of laptop programs in higher education in general and not necessarily specific to teacher education.

The purpose of this study is to examine initial concerns of faculty involved in a 1:1 laptop program in an elementary teacher credential program. Change literature (e.g., Fullan, 2007; Hall & Hord, 2006) suggests that examining innovation adoption from the perspective of those immediately involved in the change process allows for greater understanding of the innovation adoption. The focus of this study is the faculty, because the overall success of the program is held within their hands.

Faculty Concerns

It is rare for innovation adoption to occur in isolation (Fullan, 2007). When considering technology innovations, we must also consider that along with new technologies often comes new pedagogy. The Apple Classrooms of Tomorrow (ACOT) project research (Sandholtz, Ringstaff, & Dwyer, 1997) reported that in the ACOT classrooms (in which each student had desktop computer access at home and school, and the classrooms were equipped with additional technology such as printers and scanners), many experienced teachers were concerned about effective pedagogy and management in the same way they were as novice teachers. Donovan, Hartley, and Strudler (2007) found that teachers in a 1:1 initiative at the middle school level were concerned about how the initiative would impact them on a personal level as well as about how the use of the laptops would affect students. This sense of concern

is paralleled in higher education with technology innovation adoption.

With the enhanced opportunity and resources to integrate technology into teaching and learning provided by Preparing Tomorrow's Teachers to use Technology (PT3) grants, teacher education faculty have voiced concern about integrating technology into their own courses. For example, Gunter (2001) found faculty were concerned about effectively using technology in ways that would promote transfer to teacher candidate use of technology in the K–12 environment. Additionally, faculty had concerns stemming from the idea that students in the elementary schools have greater technological proficiency than the teacher candidates (and faculty) (Monroe & Tolman, 2004). In analyzing concerns of faculty in an agricultural college, Rockwell, Shauer, Fritz, and Marx (1999) concluded that faculty concerns centered around how the innovation (development of distance education courses) would affect faculty workload, cost benefit, technical support, incentives/rewards as compensation for being involved, and faculty–student relationships.

Monroe and Tolman (2004) expressed the need for research in teacher education to examine faculty comfort as crucial for effectively preparing teacher candidates to enhance teaching and learning through the use of technology. Further, in an examination of faculty concerns to teach distance education courses across several universities, Ansah and Johnson (2003) found variation in concerns; they suggested that awareness of challenges for each group of faculty concerns better equips change agents as they facilitate the change process. What distinguishes the current study from these is the focus of the study: First, where other studies focus on the general use of technology in teacher education, this study focuses on a changed educational environment represented by the 1:1 teacher candidate to laptop ratio. Second, our students were the ones with the actual innovation; however, this study examines the innovation adoption from the perspective of the faculty who facilitate their learning.

Theoretical Framework

This study was conducted from a perspective of educational change. In particular, the Concerns-Based Adoption Model of Change (CBAM) (Hall & Hord, 2006) provides the theoretical framework for the study. The CBAM examines change from the perspective of those immediately involved in change process (Heck et al., 1981). Specifically, this study will examine the impact of a changing educational context (prompted by the addition of student laptops into the teaching and learning environment) on faculty concerns of their role as teacher educators. Assumptions of CBAM relevant to this study include the understanding that faculty involved in this 1:1 laptop teacher credential program will have different needs for professional development and such needs are influenced by concerns. Additionally, as this laptop initiative is a pilot program, determining concerns of faculty allows more accurate exploration of the potential of expansion and continuation of the program.

Methodology

The Technology-Rich Cohort and Study Participants

This study took place at a large state public university in Southern California. The teacher credential program in the Department of Elementary and Bilingual Education offers a two-semester program for college graduates to pursue an elementary teaching credential through coursework, K–8 school fieldwork requirements, and student teaching experiences. Students complete the program in cohorts. Each cohort has a faculty leader who organizes instructors and student-teaching supervisors, schedules courses, and monitors the educational progress of each student in the cohort. In August 2007, 29 students began their credential program in a technology-rich cohort. The technology-rich cohort maintains the same educational content as other cohorts; however, teacher candidates have enhanced opportunity to use technology in the teaching and learning environment.

The educational technology faculty (authors 1 and 2) within the department conceived the technology-rich cohort in response to existing department data indicating that students felt adequately (as opposed to very well) prepared to teach with technology only when they left the one-year (two-semester) multiple-subject credential program. Further, because the local school district with which the college collaborates for student-teacher placement and other professional activities (such as college and school accreditation, teacher professional development, and technology planning) has an existing 1:1 laptop program in 7 of the 20 district schools, we initiated this program to better prepare future teachers for work in the local educational community. The decision to provide students with 24/7 access to laptops instead of using computing labs or laptop carts was based on the successful reports of other 1:1 programs, such as that offered at the University of Texas at Austin.

During the planning stage of the technology-rich cohort, the faculty leader (an educational technology faculty member in the department) applied for internal funding to obtain a class set of Apple laptops for the teacher candidates to use during the two-semester program (as this was a pilot program, it was not appropriate to require students to purchase their own laptops). At that point, the department chair and college dean had already committed instructional faculty and field supervision faculty to the cohort, so there was not an opportunity to select different faculty who may otherwise have chosen to be part of a technology-rich program. Teacher candidates, however, were not selected, and a letter was sent to all admitted credential students with their acceptance to the college program inviting them to apply for the technology-rich cohort. Twenty-five students applied and all were accepted. An additional four students were added just days before the semester started. These four did not self-select for the technology-rich cohort.

At the commencement of the fall semester, funding for student laptops had

Table 1. Faculty Participants by Ranking and Courses Taught

Tenure-Track (TT) and Full-Time (FT) Faculty	Adjunct Faculty
Foundations of Education (TT)	Visual and Performing Arts in the Elem. School
Methods for Language Learners (TT)	Fieldwork and Student Teaching Supervision (3 faculty)
Math Methods (Author, TT)	Reading Methods/Language Arts Methods
Social Studies Methods (Author, TT)	Science Methods
PE, Health, Mainstreaming (FT)	

Table 2. Levels and Stages of Concern

Level	Stage of Concern	Description
0. Unrelated	Awareness	Just beginning to think about the innovation but not concerned about it at all
1. Self	Informational	Interested, but not concerned beyond curiosity about features of the innovation
2. Self	Personal	Concerned about own role in innovation adoption and how it will affect oneself as an individual
3. Task	Management	Concerned about how one is using the innovation, how best to find and use resources, and how much time/effort is put into the innovation
4. Impact	Consequence	Concerned about how the innovation is impacting others (e.g., students and community)
5. Impact	Collaboration	Concerned about sharing impact of innovation with others in local and global community
6. Impact	Refocusing	Concerned about modifying or replacing the innovation

not been approved; however, 27 of the 29 students had their own laptops (both PC and Macintosh) and brought them to class. All classes for the cohort were held in a computer lab that housed 16 PC desktop computers. The entire college campus where this study was conducted has a wireless Internet infrastructure. In December 2007, prior to the winter break recess, we received funding for the laptops and issued the students their own MacBook laptops.

Participants for this study are all instructional and field supervision faculty for the cohort during the first of two semesters. Eleven faculty are participants. The faculty leader is the lead researcher as well as an instructional faculty in the cohort and is considered a participant for the study. The second researcher is also instructional faculty and is considered a participant. Both researchers are considered experts in educational technology among the department faculty and, in addition to teaching in the credential program, serve as the instructional and advisory faculty for the master's degree in educational technology offered within the department. One faculty member teaches both the reading and the language arts methods courses over both semesters. Field supervision faculty participants are all adjunct faculty with supervision of student teachers as their only responsibility to the depart-

ment. Table 1 shows faculty standings and courses taught.

Instrumentation
The primary tool for data collection for this study was the Stages of Concern Questionnaire (SOCQ) from the Concerns-Based Adoption Model (CBAM) of change (Hall & Hord, 2006). (See Appendix, pp. 147–148.) CBAM served as the methodology under which we conducted this study as well as the tool for data collection. The SOCQ is a tool for understanding change from the perceptions of those involved with innovation adoption (Hall & Hord, 2006). The SOCQ is a 35 item Likert-scale-type questionnaire that asks participants to respond on a scale of 0-7 (0 = irrelevant; 7 = very true of me now) to statements about innovation adoption. For example, participants respond to statements such as "I am concerned how the innovation affects students," "I would like to know the effect of the innovation on my professional status," and "I would like to know what other faculty are doing in this area." At the end of the survey, participants had an opportunity to express related concerns by answering an additional question: "What other concerns, if any, do you have at this time?" In addition to the SOCQ, the Stage of Concern dimension of the CBAM includes informal conversations (referred to as one-legged

interviews) between the researchers and participants. In this study, one-legged interviews were usually part of the conversation during collaborative teaching (in which the lead researcher assisted an instructional faculty member with technology-rich pedagogy during instructional time) and/or hallway conversations. In general, we used conversation starters such as "How's everything going with the laptops?" Both researchers kept a research journal to document informal interviews and observations.

Once we collected the data from the SOCQ, we represented it with seven stages of concern within four levels. We used data from informal interviews to triangulate survey data and to add to concerns profiles. Table 2 shows the stages of concern. It should be noted that this is a continuum, not a discrete list.

Data Analysis
All faculty agreed to participate in the study, and all completed the SOCQ. We conducted data analysis using the guidelines for evaluating concerns by Hall, George, and Rutherford (1998) and Hall and Hord (2006). The design of the SOCQ is such that individual items reflect different concerns (for example, items 2, 9, 20, 22, and 31 all relate to Stage 6—Refocusing concerns). To identify participant concerns, we first collated raw scores for each participant to
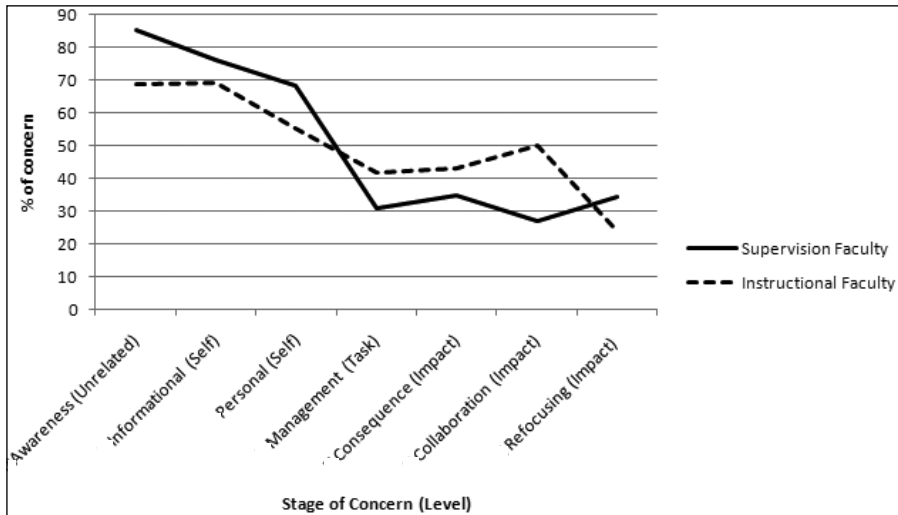
Figure 1. Instructional and supervision faculty concerns profiles.

reflect stage of concern data. Second, we converted the collated raw scores to percentages using the quick scoring table developed by Parker and Griffith (Hall & Hord, 2006, p. 284). Third, we created a group profile for all participants by averaging all participant percentage scores. We also created an instructional faculty profile and a supervision faculty profile. Once we identified the percentages, we created concerns graphs using the stage of concern for the x-axis and the percent of concern for the y-axis.

When analyzing concerns graphs, the focus is on the peaks and valleys, with peaks representing high-level concerns and valleys representing low-level concerns (Hall & Hord, 2006). We used data from one-legged interviews and data from the open-ended question for triangulation of the survey results and to paint a more vivid picture of faculty concerns during the initial implementation of the 1:1 laptop program.

Results and Discussion

All participants supplied an identifying number but did not hide their identities from the researchers, as they returned the surveys with their names on them. Four faculty members responded to the final question about other concerns. This section will discuss faculty concerns as a group profile; however, due to small sample size and range of individual profiles, this section will also more specifically report and individually discuss

instructional faculty concerns. Although group profiles are recommended for the CBAM SOC, identifying individual concerns with the small participant population will allow change agents to plan more individualized professional development.

As a group, faculty have highest-level Awareness concerns, yet supervision and instructional faculty differ in secondary concerns. Figure 1 shows faculty concerns. From this, it is evident that field supervision faculty actually have higher-level Self concerns (Awareness, Information, Personal) than instructional faculty, whereas faculty have higher-level Task (Management) and Impact (Consequence, Collaboration) concerns. Perhaps most interesting is the peak at Stage 4—Consequence concerns of the supervision faculty. High-level concerns at this stage indicate concern about impact on students and the community. This is not surprising, given that this is a teacher education program and a technology-rich cohort may affect others in the community, such as master teachers and K–8 students.

Although not a steep peak, a second peak at Stage 6—Refocusing reflects a concern about modifying the technology-rich cohort program. This perhaps indicates their concerns about the program based on knowledge of what is occurring in field experiences.

Instructional faculty, including both researchers, have highest-level Infor-

mation concerns, with a second peak at Collaboration. This is interesting, because as a faculty who often say we are collaborative, instructional participants are perhaps unsure about how the collaboration for this innovation adoption will work. Comments by instructional faculty articulate this concern: "I do not have any concerns. I would just like to know more and to collaborate with others on how to incorporate more technology into my classes."

Another faculty member commented that she is excited to be teaming (team teaching/collaborating) to enhance the program with technology. As a group, instructional faculty have low-level Management concerns, which we interpret to be a result of the lead researcher having discussed the laptop program with the instructional faculty and having explained that they would be responsible for content and the researcher would help facilitate the technology. For example, the lead researcher sat with the language arts faculty member and talked about blogs as a way to use technology for the writing process and showed her how to use the Inspiration concept mapping program.

After removing the researchers' data from the faculty concern profile, the instructional faculty profile looks quite different. This is important data analysis because it highlights the different concerns based on comfort and proficiency with the technology, a consideration that's important for professional development and support. Figure 2 (p. 144) shows instructional faculty (without the technology faculty facilitators) and the individual educational technology faculty facilitator profiles. It is evident that, as facilitators of the one-to-one laptop initiative, the educational technology faculty have strikingly different concerns than the instructors. It is interesting that both facilitators (and authors) have-higher level Task and Impact concerns, with Author 1 having low-level Personal concerns but highest-level Management concerns. High-level Management concerns demonstrate that the attention is on the processes and tasks of using the laptops and resources, and

in particular concerns about efficiency, organization, scheduling, and time (Hall & Hord, 2006, p. 140). This makes sense, as the first author was the cohort leader and needed to make sure the logistics of the initiative were dealt with. For the first author, the success of the pilot was considered a personal responsibility and a matter of professional pride. Thus, ensuring effective integration and management of students, faculty, and laptops was crucial to ensure success of the program.

What is perhaps most interesting about Figure 2, however, is the general trend of the educational technology faculty profiles in comparison to the other instructional faculty profiles. Hall and Hord suggest a relationship between stages of concern and degree of experience as a user of the innovation. The high-level Self concerns moving to low-level Impact concerns of the instructional faculty is representative of nonusers, whereas the low-level Self and high-level Task and Impact concerns is representative of experienced users. This is an important finding, because as change agents planning a 1:1 laptop program, involvement of educational technology faculty in the initiative would greatly affect areas of concern to be addressed during planning stages. By considering the roles of the educational technology faculty in this pilot (cohort leader, cohort facilitator, instructor), it was clear that the role of the faculty affects the type of concerns and consequently the form of support that may be needed. The distinction of concerns is made clear by a comment from one of the educational technology faculty (instructor role) who commented, "I am concerned how the program will be funded for future cohorts," versus the concerns of the first (cohort leader), who stated, "I am concerned that this program works as well as possible," and the second author (cohort facilitator), who stated, "I am concerned about the effect the laptops will have on the teacher candidates' learning." By focusing only on the group profile including the educational technology faculty, the [researchers?] may have missed the importance of allowing time for management and discussion
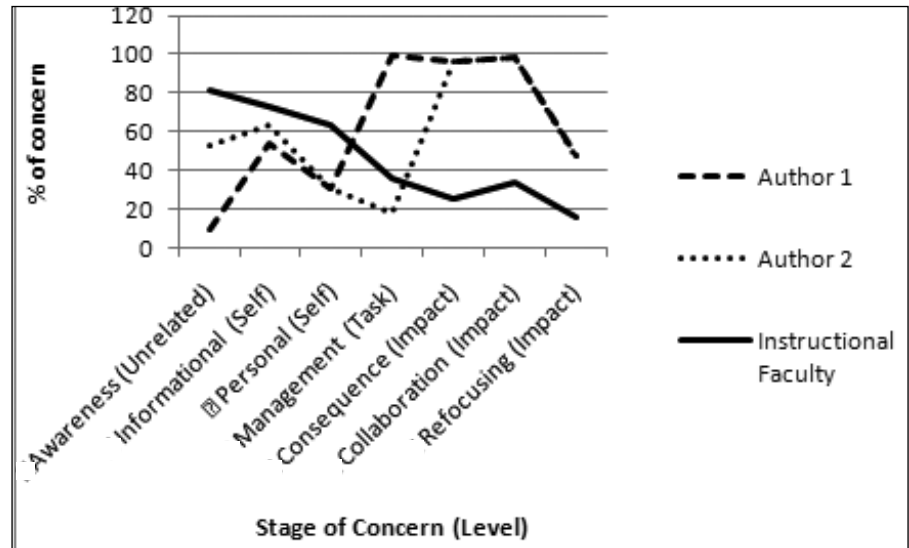

Figure 2. Instructional faculty and researcher concerns profiles.

of the technology faculty's consequence concerns.

After reviewing the data of the educational technology faculty separately from the general instructional faculty, it became evident that in an initiative where instructional faculty are small in number, looking at individual concerns profiles may be more valuable than group profiles for ensuring the success of the initiative. Figure 3 shows the concerns profiles for two of the tenure track instructional faculty. Faculty A is a recently hired tenure track faculty member who considers herself to be high tech and was very willing to collaborate with the lead researcher (cohort leader). Faculty B was not willing to collaborate and integrate more technology into the teaching and learning experience. This faculty member has been at the institution for approximately five years and was going through the tenure and promotion process at the time of this study. Faculty B has high-level Awareness concerns and a second, less pronounced peak at Stage 3—Management. One might conclude from this that this faculty member sees little personal benefit of the technology, either for self or students, and her lack of willingness to be involved is reflective of that. This was evidenced in the lack of any comment in the final SOCQ survey and the limited discussion of the laptops in informal conversations. Anecdotally from researcher journals, it appears that Faculty B did not change her teaching at all with

the introduction of the student laptops. Faculty A, on the other hand, had peaks at Personal and, to a lesser extent, Consequence stages (it was this faculty member who expressed concern about future sustainability and cost). In light of Faculty A being in her first semester as a tenure-track faculty member, her new faculty status is clearly reflected by the Personal concern (what is my role in this?). Thus, although Faculty A was comfortable integrating technology in K–12, she was not comfortable doing so in teacher education courses. This could be interpreted as not due to her lack of technology knowledge and experience, but rather to her number of years teaching in higher education. When involving faculty in 1:1 initiatives, researchers should consider other factors, such as the number of years teaching, familiarity with the curriculum and the department climate, personal experience, and comfort with technology, along with external factors, such as the tenure and promotion process.

Non-tenure-track instructional faculty showed similar variation in that where one faculty member had high Information concerns, others had high Personal concerns. Statements on the open-ended concerns question of the SOCQ, such as "I have not used laptops in the classroom, so before I do I want to be trained in their use," are illustrative of Personal concerns. Further, the non-tenure-track faculty member who taught the visual and per-
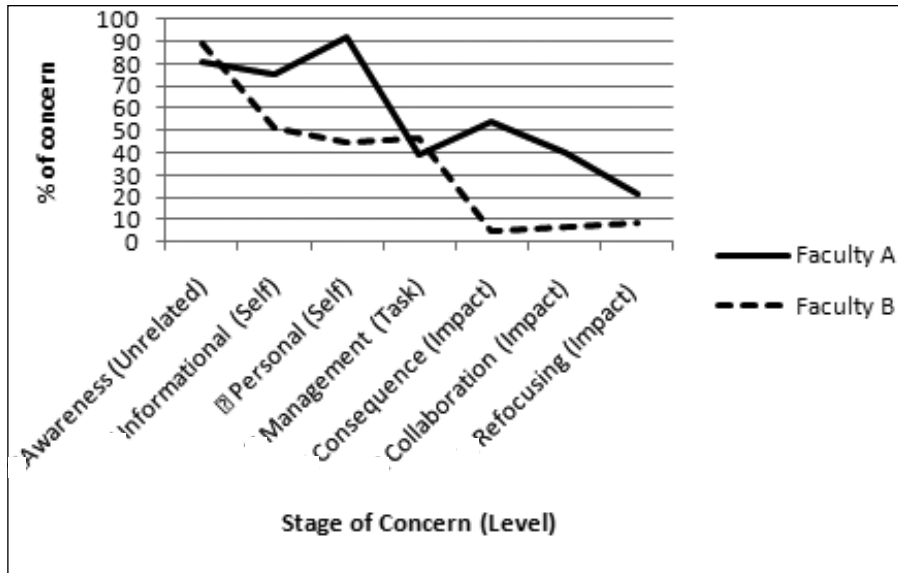
Figure 3. Concerns profiles for two tenure-track faculty.

forming arts course was concerned about losing the traditional approach to the arts (such as drawing and using paper media) and had little experience with applications such as iMovie, Kidpix, and GarageBand that she could use in her course. This led to the conclusion that both tenured and non-tenured faculty concerns were dependent on their comfort with technology personally and in teacher education, their understanding of the technology-rich cohort, and their content-area expertise. What was interesting is that no faculty member, either in the open-ended question or during informal interviews, expressed concerns about classroom management, platform, or supplemental equipment, perhaps indicating a case of "what you don't know can't hurt you." This information can now be used to plan meaningful collaboration and professional development for faculty. It is clear that one-on-one professional development and collaborative efforts will be far more effective and meaningful than group meetings.

Figure 4 (p. 146) shows the individual concerns profiles for the supervision faculty. Supervisors 1 and 2 are retired school administrators who were informed of the technology-rich cohort prior to its commencement. Supervisor 3 is a former teacher who works with other cohorts in addition to the technology-rich cohort, supervising more than 20 student teachers each semester. It is evident from these individual concerns profiles that, similar to the instructional faculty, the supervisors also have different levels of concerns. This variation could be reflective of individual level of comfort with technology and other responsibilities. In informal discussions with Supervisors 1 and 2 about their concerns with the program, it was evident that these two supervisors were concerned about the impact of their involvement in the technology-rich cohort on their job security as supervisors. We interpreted comments such as "Will I still be able to use my same teachers?" as indicative of concern about Self and Consequence. One of the supervisors asked an additional question about not owning her own laptop, further supporting the Personal concerns. It should also be noted that Supervisors 1 and 2 were not tech savvy, and Supervisor 2 was not even comfortable with e-mail communication.

Implications

The data pointed to three major implications regarding 1:1 laptop teacher education programs and faculty issues that need to be clearly addressed for a program like this to be successful. Although issues could occur with any technology innovation, we address them here solely in relation to 1:1 teacher education programs. The results of this study are adding to the limited data on 1:1 laptop teacher education programs specifically. The three issues are faculty readiness, faculty preparation, and faculty differences.

Faculty Readiness

Understanding faculty readiness to participate in a 1:1 initiative is essential. This can be accomplished by administering the SOCQ instrument at an early stage (i.e., weeks prior to the start of the innovation). The information gathered during the readiness phase can help a change agent uncover any hidden issues that might deter faculty from embracing the innovation. For example, some of the participants in this study were concerned about having to be personally proficient at the laptop applications and were uncertain about how they could maintain best practice with the addition of the laptops in the classroom. Knowledge of these issues can guide the planning, support, and pacing of the technology innovation adoption.

It is important during the readiness phase for change agents to provide opportunities for faculty to discuss the technology innovation to deal with any misconceptions that faculty may have. In our department, misconceptions from faculty participants and nonparticipants who had awareness of the laptop cohort included the idea that the students would be following a different curriculum, and one faculty (nonparticipant) thought the laptop program was an online program. Additionally, allowing time for involved (or potential) faculty to discuss concerns prior to the start of the experience would provide insight into the differences the faculty share. As a result, those who are not ready to be part of the technology innovation could be identified. For these individuals, colleges of education could offer informational sessions about the 1:1 program and provide an opportunity for questions. After our cohort had already begun, several faculty approached us to be involved, which, if possible for the first-year pilot, could have affected the support structure. Appropriate professional development could address concerns and misconceptions and allow time for the late adopters to become

more comfortable with the innovation by seeing how others they view as having the same technology skill level are implementing the adoption.

Faculty Preparation

Preparation of faculty participants before the experience begins is crucial. For this study, faculty who met with the cohort leader to discuss the program at the beginning of the semester and were interested in collaboration had lower-level Personal concerns than faculty who indicated little desire to collaborate. The key element of this preparation is to provide faculty with as much information about the program as possible, but more important, to guarantee support during the implementation process. It is also important to allow faculty to ask questions during this phase. A preparation phase will most likely help faculty move away from Awareness and Self concerns toward Impact concerns. The more preparation faculty have, the more likely they will be able to focus on Impact (how can innovation implementation be advanced) rather than Self concerns (how will the innovation affect what I need to do). Offers of collaboration with faculty appear to have relieved some of the pressure that may have been induced by asking instructional faculty to focus on curriculum *and* a new pedagogy. In this study, it was evident that even if faculty did not feel they had as much technological proficiency as they felt was necessary to be involved, offers of support and collaborative teaching (e.g., co-teaching a lesson, educational technology faculty modeling use of technology in the classroom, planning together) contributed to lower Personal concerns and allowed for the instructional and supervision faculty to focus on what they were comfortable with.

Faculty Differences

Faculty differences with technology innovation adoption are to be expected. In this study, we found individual differences, but also differences based on roles and responsibilities within the cohort. Differences seem to exist between faculty teaching the courses and those
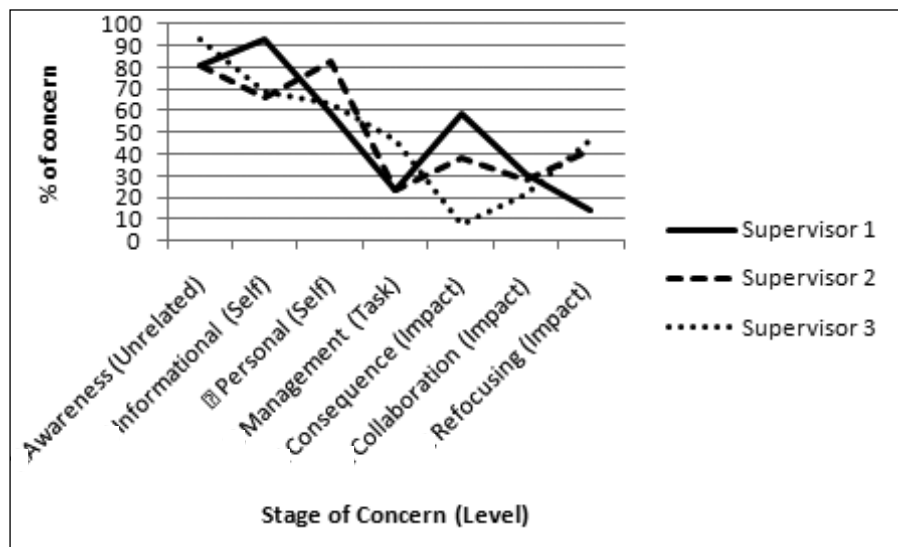

Figure 4. Concerns profiles for supervision faculty.

supervising the teacher candidates during fieldwork and student teaching. Specifically, the data indicated supervision faculty had higher-level Consequence concerns about how the community will react to the technology-rich program. Although an unexpected finding, it seems logical because supervisors often work as liaisons between the schools and faculty. They are responsible for securing student teaching placements and maintaining relationships with teachers and administrators. Faculty teaching courses often are not involved in the schools. As change facilitators, this is an important consideration at all levels of innovation adoption. Supervision faculty would benefit from having a broad perspective of the program so they can share it with the community in which they spend their time, whereas the instructional faculty need a more distinctive perspective based on the courses they teach.

It was evident (and expected) that the educational technology faculty had dramatically different concerns to the nontechnology faculty. However, even within the educational technology faculty, differences in concerns existed. In this study, the cohort leader and cohort facilitator (the authors) had distinctly different concerns to the other faculty (Faculty A) who had technology expertise. As change facilitators, it would have been easy to overlook the concerns of Faculty A because of her technol-

ogy expertise, when in reality many of her concerns stemmed from non-technology-based issues. These individual differences highlight the importance of focusing on individual concerns in addition to whole-group concerns. By focusing on individual concerns rather than the group profile, as recommended by the developers of the CBAM, change agents will better be able to address concerns at both group and individual level, thereby further supporting the sustainability of the innovation. It may also help to identify reoccurring issues that faculty teaching courses and faculty supervising the teacher candidates might have. One such issue in this study is that supervisors needed assistance with communicating with master teachers and administrators about the technology-rich program, whereas instructional faculty needed support and assistance at many levels (such as effective integration and understanding relevance of the initiative to 21st-century learning). There will be other issues that arise could be unique to each program and each group of faculty.

Future Research

It is important to keep in mind that this study focused on initial concerns of faculty immediately before implementation of the 1:1 initiative. We identified these concerns within the first week of involvement in the program and, to a lesser extent, through the one-legged

interviews over the course of the first semester of involvement. Our current research focuses on how faculty profiles change during involvement in the laptop program. This research will shed light on the impact of collaborative and support efforts. Similarly, as the technology-rich cohort transitions from a pilot to a permanent program within the department, with a new group of teacher candidates and as other department faculty continue to seek out involvement in the cohort, an examination of their initial concerns will allow for comparison of concerns between those seeking involvement and those simply involved out of circumstance. One-to-one teacher education programs (as organized cohorts or as a result of more teacher candidates owning laptops and expecting to use them as part of their program) will continue to expand and will eventually become the norm. With the limited research available in the area of 1:1 teacher education programs, establishing a trend of faculty concerns can be beneficial to all change agents, as these can be used in decision-making, planning, supporting, and implementing these initiatives.

Author Notes

Loretta Donovan is an associate professor in the Department of Elementary and Bilingual Education at California State University, Fullerton. Her teaching responsibilities and research interests center on effective integration of technology in K–12 and higher education environments, with a particular focus on 1:1 laptop programs. Correspondence regarding this article should be addressed to Loretta Donovan, CSUF EDEL, PO Box 6868 (EC 324), Fullerton, CA 92834. E-mail: ldonovan@fullerton.edu

Tim Green is a professor in the Department of Elementary and Bilingual Education at California State University, Fullerton. He teaches courses on instructional design, teacher education, and technology integration. His current research examines online teaching and learning as well as technology integration, including laptop programs and Web 2.0 in teacher education. Correspondence regarding this article should be addressed to Tim Green, CSUF EDEL, PO Box 6868 (EC 324), Fullerton, CA 92834. E-mail: tgreen@fullerton.edu

References

Ansah, A. O., & Johnson, J. T. (2003). Time will tell on issues concerning faculty and distance education. *Online Journal of Distance Learning Administration 4*(4). Retrieved February 18, 2008, from http://www.westga.edu/~distance/ojdla/winter64/ansah64.htm

Donovan, L., Hartley, K., & Strudler, N. (2007). Teacher concerns during initial implementation of a one-to-one laptop initiative at the middle school level. *Journal of Research on Technology in Education, 39*(3), 269–283.

Duran, M., Fossum, P. R., & Luera, G. R. (2006). Technology and pedagogical renewal: Conceptualizing technology integration into teacher preparation. *Computers in the Schools, 23*(3), 31–54.

Friedman, A., & Kajder, S. (2006). Perceptions of beginning teacher education students regarding educational technology. *Journal of Computing in Teacher Education, 22*(4), 147–151.

Fullan, M. (2007). *The new meaning of educational change (4th ed.).* New York: Teachers College Press.

Gunter, G. A. (2001). Making a difference: Using emerging technologies and teaching strategies to restructure an undergraduate technology course for pre-service teachers. *Educational Media International, 38*(1), 13–20.

Hall, G. E., George, A. A., & Rutherford, W. L. (1998). *Measuring Stages of Concern about the innovation: A manual for use of the SoC questionnaire.* Austin, TX: Southwest Educational Development Laboratory.

Hall, G. E., & Hord, S. M. (2006). *Implementing change: Patterns, principles, and potholes (2nd ed.).* Boston: Allyn and Bacon.

Olsen, F. (2001). Chapel Hill seeks best role for students' laptops. *Chronicle of Higher Education, 48*(4), 31–32.

MacKinnon, G. R., Aylward, M. L., & Bellefontaine, J. (2006). Electronic discussion: A case study of the range of applications in a laptop university. *Computers in the Schools, 23*(1/2), 59–71.

McVay, G. J., Snyder, K. D., & Graetz, K. A. (2006). Evolution of a laptop university. *British Journal of Educational Technology, 36*(3), 515–524.

Monroe, E., & Tolman, M. (2004). Using technology in teacher preparation; Two mature teacher educators negotiate the steep learning curve. *Computers in the Schools, 21*(1), 73–78.

Ni, X., & Branch, R. M. (2004). *Experience of using laptop in higher education institutions: Effects with and of ubiquitous computing under natural conditions.* Paper presented at Association for Educational Communications and Technology Conference, Chicago, IL. (ERIC Document Reproduction Services No ED484993).

Resta, P., & LeBeouf Tothero, M. (2002). *Establishing a ubiquitous computing environment for teacher preparation students and faculty: The University of Texas at Austin Laptop Initiative.* Retrieved September 20, 2007, from http://www.edb.utexas.edu/education/life/UTAustinLaptopInitiative.pdf

Rockwell, S. K., Shauer, J., Fritz, S. M., & Marx, D. B. (1999). Incentives and obstacles influencing higher education faculty to teach via distance. *Online Journal of Distance Learning Administration 2*(4). Retrieved February 18, 2008, from http://www.westga.edu/~distance/rockwell24.html

Vannatta, R. A. (2000). Evaluating to planning: Technology integration in a school of education. *Journal of Technology in Teacher Education, 8*(3), 231–246.

Appendix

Multiple-Subject Credential Program, Technology-Rich Cohort Stages of Concern Questionnaire

The purpose of this questionnaire is to determine the concerns of faculty involved in the technology-rich cohort at XXXX. The items in this questionnaire were developed from typical responses of school and college teachers who have been part of educational change and ranged from no knowledge about new technologies to many years of experience with the technology. At this stage, some of the items may be of little relevance or irrelevant to you.

For items that are completely irrelevant, circle 0. Other items will represent those concerns you do have, in varying degrees of intensity, and should be marked higher on the scale—1 being not true of me now to 7 being very true of me now.

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 is irrelevant to me.	⓪ 1 2 3 4 5 6 7

Please respond to items in terms of your present concerns or how you feel about being part of the technology-rich cohort at XXXX. The results of this questionnaire will be used to report on the technology-rich cohort to the university and in professional journals and presentations.
Thank you for your time.

(Test/retest reliability range is from .65 to .68 and validity [alpha-coefficients] range from .64 to .83.)

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' attitude toward the laptop program. 0 1 2 3 4 5 6 7
2. I know of some other approaches that might work better. 0 1 2 3 4 5 6 7
3. I don't even know about the laptop program. 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 laptops. 0 1 2 3 4 5 6 7
6. I have very limited knowledge about the laptop program. 0 1 2 3 4 5 6 7
7. I would like to know the effect of the laptop program 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 laptop. 0 1 2 3 4 5 6 7
10. I would like to develop working relationships with both our faculty and outside faculty involved in a laptop program. 0 1 2 3 4 5 6 7
11. I am concerned about how the laptop program affects students. 0 1 2 3 4 5 6 7
12. I am not concerned about the laptop program. 0 1 2 3 4 5 6 7
13. I would like to know who will make the decisions in the laptop program. 0 1 2 3 4 5 6 7
14. I would like to discuss the possibility of using the laptops. 0 1 2 3 4 5 6 7
15. I would like to know what resources are available for the laptop program. 0 1 2 3 4 5 6 7
16. I am concerned about my inability to manage all the laptop program requires. 0 1 2 3 4 5 6 7
17. I would like to know how my teaching or administration 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 the laptop program. 0 1 2 3 4 5 6 7
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 laptop program'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 laptops based on the students' experiences. 0 1 2 3 4 5 6 7
23. Although I don't know about the laptop program, I am concerned about other things in the area. 0 1 2 3 4 5 6 7
24. I would like to excite my students about their part in the laptop program. 0 1 2 3 4 5 6 7
25. I am concerned about my time spent working with nonacademic problems related to the laptops. 0 1 2 3 4 5 6 7
26. I would like to know what the use of laptops 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 laptop program'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 the laptop program. 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 the laptop program. 0 1 2 3 4 5 6 7
31. I would like to determine how to supplement, enhance, or replace the laptop program. 0 1 2 3 4 5 6 7
32. I would like to use feedback from students to change the laptop 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 laptops. 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 the laptop program is better than what we now have. 0 1 2 3 4 5 6 7
36. What other concerns, if any do you have at this time? (Please describe them using complete sentences.)
37. Please select an identifying number that will allow us to track your responses but will allow you to remain anonymous: _____
    (Make sure you record this number for yourself.)