TELECOMMUNICATIONS AND AN ALTERNATIVE PRACTICUM: COLLABORATIVE ENTREPRENEURSHIP IN TEACHER EDUCATION

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Abstract

As in many schools of education the Faculty of Education, at the University of Alberta, has initiated a number of collaborative projects with partnership schools in an attempt to remove the gap between the traditional, university-based component of practicum courses, and the practice of the school-based component. One model, described in this paper, uses telecommunications technology to deliver field-based experiences.

Technology-based, interinstitutional collaborative projects contain elements of innovation, that are usually managed with reference to change strategy processes described by Fullan (1982), Havelock (1973), Rogers (1983, 1986) and others. However, these processes take time and planning and may actually mitigate against adoption and implementation of rapidly evolving technologies.

In this paper, we argue that telecommunications technology-based, collaboratively developed models of teacher education may be better served by entrepreneurial thinking than by carefully-planned change strategies. One such project is described from initiation through implementation, and components of entrepreneurial partnering are suggested.

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" ... The means-end model of thinking has for so long dominated our thinking that we have come to believe that not to have clearly defined purposes for our activities is to court irrationality or, at least, to be professionally irresponsible (italics added). Yet, life in classrooms, like that outside of them, is seldom neat or linear."

Elliot Eisner, 1985.

Alberta's first and largest research university, The Faculty of Education at the University of Alberta (U of A), in Edmonton, Alberta, places about 1500 students in local elementary and secondary schools to fulfill the field experiences component of the B.Ed. degree. Instrumental concerns have determined the majority of the placements, which are typically urban. At times, students have been able to negotiate rural placements at a distance from the university and faculty supervision, but these placements have not, until very recently, been encouraged.

The in-school supervision of students in local placements is a cooperative effort involving faculty members, practicum associates, teachers, and school administrators. In the past, the split in practicum courses between a university-based experience, employing the traditional lecture format, and the school-based experience, where the student is expected to begin to practice being a teacher, has done little to prepare students for their actual experiences in the classroom. In this model, often the first day of in-school experience is the first opportunity for the student teacher to gain knowledge of the school culture and to begin to build a relationship with the supervising teacher and the students. Preparation of classroom materials for teaching has typically occurred in the compressed time related to the in-school experience.

As in many schools of education, the Faculty of Education has initiated a number of collaborative projects with partnership schools in an attempt to remove the gap between the University-based component of practicum courses and the school-based component (Samiroden, 1990; Chamberlin & Vallance, 1991). One model has been the placement of university instructors in the school, working with a group of teachers and student teachers. In this model, the university course is taught in the school setting, using the actual classroom in which the student will be expected to practice teach. Teacher education courses are collaboratively planned, and delivered, on-site with practising teachers, linking theory with practice in an immediate way (Borys, A. Browne, P., Samiroden, W., & Willson, K., 1991). While this model has proven extremely effective, it is dependent on a number of factors, including the ability of university personnel to split their teaching responsibilities between on-campus and in-school settings, the willingness of school personnel to participate, and the availability of adequate school facilities to accommodate additional staff and students for extended

periods of time. In spite of this, the potential of this model for providing better field experiences suggests that exploring alternative practicum models may contribute significantly to the improvement of the B.Ed. degree and enhance school/university partnerships (Blakey and others, 1989; Simms & Canales, 1990; Clandinin, Davies, Hogan, & Kennard, 1993).

The collaborative process has been described from a number of perspectives including the action research paradigm (Hollingsworth, 1991; Oja & Smulyan, 1989), from the cooperative group process perspective (Johnson, Johnson, & Holubec, 1986), and from special education's multidisciplinary team approach (Idol, Paolucci-Whitcomb, & Nevin, 1986). Collaboration is characterized by mutual understanding and consensual decision-making resulting in creative solutions, that are enhanced and altered from those that any team member would produce independently, and by common action (Idol, Paolucci-Whitcomb & Nevin, 1986; Oja & Smulyan, 1989; Tikunoff, Ward & Griffen, 1979). Advantages of the process which seem particularly applicable to interinstitutional collaborative partnerships in teacher education include increased sharing of material and human resources across professional disciplines, facilitation of liaison activities among institutions, and cost effectiveness (Idol, Paolucci-Whitcomb & Nevin, 1986); the generation of unique solutions (Falk & Johnson, 1977); and better decision-making that results from the pooling and recombination of resources (Laughlin, Branch & Johnson, 1969; Intriligator, 1983).

However, interinstitutional collaborative partnerships, by definition alternative approaches to solving educational problems or improving educational practice, have an element of innovation. The usual adoption process for educational innovations, which has been described by Burkman (1987), Fullan (1982), Havelock (1973), Rogers (1983, 1986), and many others, is a process of diffusion involving early adopters who become evangelical as the innovation moves through their institutions. This movement picks up converts, metaphorically-speaking, along the way, until enough of a critical mass is reached for the innovation to be adopted and adapted to the context in which it is seen to be most useful. When the innovation has a technological element, as does the one described here, diffusion and adoption may be encumbered by user perceptions, of difficult complexity; and misconceptions, of an inordinate need for advance planning and continuing management. Too often, in teacher education we have been cautious in adopting innovative solutions generated through collaborative partnerships because we have been stuck in this rational prespecification of goals to which Eisner (1985) alludes.

This paper focuses on alternative, technology-based models for delivering field experiences. An underlying theme will be a model of collaborative entrepreneurship in identifying and obtaining resources for alternative technology-based approaches to teacher education, in this case, providing the practicum experience. The entrepreneurial process as we conceive of it will be described from its conception, early implementation, and preliminary evaluation phases.

Preparing Students to Use the Technologies

At the same time that the University of Alberta had been exploring collaborative, on-site models of teacher education with local school districts, pressure from regional school districts to extend participation (and its concomitant benefits) had increased. It

seemed desirable to begin to establish partnerships with these remote placement areas for many reasons, including the promise of internships and/or jobs for our students. In addition, practicum-at-a-distance attempts would encourage us to think about alternative delivery strategies for classroom teaching, and to increase access to post-secondary resources for all communities in the province. Although these proposed partnerships were supported in principle by the faculty and by accessible school districts, at the time of this project a remote placement was still arranged as a special case. However, since this project came together so quickly the time to negotiate entry to schools was much reduced; we weren't able to involve remote school districts in the pilot.

At the beginning of 1992, seed funding became available for the onetime purchase of computing resources for the instructional program. We were successful in obtaining a grant which enabled the purchase of 8 laptop computers (Apple's Powerbook 140) and accompanying portable printers. Given their convenience and portability we envisioned placing these resources directly into the hands of student teachers for a structured experience in which we would use telecommunications technology to deliver instruction, and support and supervise them during their student teaching experience. Specifically, we provided each participant with an E-mail account and access to Internet and University resources such as the library's on-line catalogue. With a way to communicate directly with faculty supervisors and partner teachers, while being able to access both computing resources from the schools and from university classrooms, we imagined linking the real world of the classroom with preparatory experiences. A model based in telecommunications would, we hoped, encourage peer-support groups and collaborative planning through E-mail and computer conferencing; one-to-one communication with university supervisors and reflective journalling through both individual, peer-group, and whole group computer conferencing; the establishment of relationships with teachers and classrooms before and after the practicum; and the use of information resources, such as Internet, in the preparation of teaching materials and in the actual teaching accomplished in the classrooms.

During the first phase of this model, in which six student teachers were learning to use Powerbooks as tools for teaching, we quite serendipitously fell into a trial of Apple's VISIT Video software. After a demonstration of the VISIT by a local service provider (Edmonton Telephones), one of the authors was asked if she saw any use for the technology in the Faculty. Although no specific program requiring this type of technological support was ongoing, we immediately agreed to participate in the trial for six months. As educational entrepreneurs, we knew that once we had the technology (and accompanying support systems) in hand we would be able to devise a meaningful and realistic trial. This approach is certainly contrary to a systematic planning model in which the problem would be described first and the intervention would come later; but we would like to suggest that traditional, hierarchical structures of organizational accountability do not well serve technological innovations for education.

Thus, the VISIT strand of the practicum project was conceived after the Powerbook strand and after the "contract' with the participating service providers (Edmonton Telephones and Northern Telecom) had been approved. With the delivery

and installation of six VISIT stations, we were ready to add video conferencing to our vision of access to the real world of the classroom. The next part of this paper describes how the two technologies were integrated into the alternative practicum model.

The Powerbook Strand

We believed in the early planning stages that we would have to build in highly structured, carefully sequenced activities introducing the students to the basics of information technology. We also needed to frame these activities in the context of teaching with information technology, as we expected the students to model this approach in their host classrooms during their practicum. Consequently, we designed active experiences that were always practically related to the expectations for teaching: that is, using the technology to find curriculum resources, plan and share lessons, develop peer support groups in which feedback would be provided, join online conversations about teaching, schedule the teaching day, continue a dialogue with a faculty supervisor, prepare teaching aids, and so on. To facilitate these activities, each Powerbook was supplied with a Fax modem; copies of Excel, Word, and HyperCard; and each student was assigned a computing ID that permitted access to the University's VAX and the Internet.

Phase I

By the time all the Powerbooks were in inventory, the first cohort of student teachers had been in their practicum placement for one week. We debated delaying the project until the next round of placements, but instead decided to go ahead with the inservice activities on-site. We felt that there might even be benefits to this arrangement--mainly, the opportunity to apply new learnings immediately in the classroom. On the down side, different teaching assignments and schedules presented a challenge for the timing of workshop sessions, we would have to negotiate access to and space in the host school, topics would have to be of immediate use in teaching or would be considered extraneous and burdensome, and the learning curve would necessarily be flattened. In large part, the decision to go ahead was related to the nature of the host school and the identity of the faculty supervisor. In the first case, a cohort of six students, three women and three men, had been placed in a new junior high school, T.D. Baker; which was designed on a technology model, and the faculty supervisor, one of the authors of this paper, was very familiar with and committed to the model that was proposed. We felt that what was missing in advance preparation was compensated for in the opportunity to immediately implement the technology. The students were introduced to the Powerbook one morning before school. At this first meeting, each student received a loaded Powerbook and a quick demonstration on getting started, completed the necessary inventory paperwork, and applied for a network ID. The rest of the week was to be spent working through the tutorials built into the software. They reacted with disbelief and amazement that they would be entrusted with such a scarce commodity for a full four months, and were being encouraged to use the tools in any way that would help them in their teaching or academic work.

The second week we returned to the school with the assigned network ID's and practised sending simple messages to each other via the Profs system. Another of the

authors was standing by in her office on campus to help demonstrate synchronous conferencing. The students were left with the assignment to check their E-mail daily and reply to any messages they received from the project team.

In the third week, the faculty supervisor began to work with the idea of peer journalling via E-mail, defining activities and issues and encouraging critical reflection on their teaching. For example, students were asked to describe a teaching act that worked well, and speculate on the factors that led to success. Other suggested uses were:

•submitting weekly teaching schedules for the planning of supervisory classroom visits, via the electronic calendar

•addressing strategy questions to faculty content area experts that were identified

•responding to lead-in sentences or phrases like, "My planned lesson works best when...."

•posing "larger" pedagogical questions to the group for discussion

•passing on teaching tips

By the end of this week, the six students had clearly developed a personal stance toward the technology. Of the three females (one of whose father was a professional in the computing field), only one, Leanne, actively used the E-mail facility and was exploring bulletin boards and news groups on her own. The other two maintained that they had not been able to overcome technical problems and had virtually abandoned the Powerbooks, except for word processing. Although the technical problems were either overcome or shown to be nonexistent, we were never able to entice them back to full involvement in the project.

All three of the males represented themselves as more sophisticated users than the women, but one almost immediately dropped out of sight (he was an E-mail nonentity). One male, Mark, however, not only eagerly explored the capabilities of his Powerbook, but began to coach the others in the uses of the technology.

Mark was an interesting case. This was his second attempt at the practicum; he had failed his first round. Of all the students, he probably felt under the most pressure. Instead of viewing the project as one more competing demand for his attention and commitment, however, he approached it as an opportunity to increase his chances for success--by becoming a better time manager, by seeking expert advice, and by using productivity tools to improve his own teaching. Mark admits that "when the project began I was somewhat apprehensive because I was not familiar with computer use and was completely ignorant of electronic mail. The introduction to the program intrigued me, however, and I soon found myself sending and receiving E-mail notes through the Profs network on a regular basis" (Mark, April, 1993). Mark found out that although there were obstacles to becoming proficient at E-mail, he could use the system itself as a tool to solve his problem. For example, he used E-mail to solicit (and receive) help with file transfers. Unexpected benefits included renewing an acquaintance with a former professor and stumbling onto several Bulletin Boards (BBS). Of particular use to Mark was the use of the Fax modem: "The fact that we did not initially have the use of a printer was offset by the Fax modem. I was able to send any document straight from the word processor to the school's Fax machine from my home and pick it up at the office when I arrived in the morning" (Mark, April, 1993). Mark goes on to speculate

how the technology would ease planning roadblocks in schools: "This would be very useful for any teacher to have in the event of unexpected illness. A complete, up-to-date plan for the substitute teacher could be sent to the school in minutes" (Mark, April, 1993).

By the fourth week of the project, we realized that technology workshops, even though delivered on-site, were viewed as "one more demand" on limited time. We decided to discontinue the active intervention and focus on electronic journalling and related Profs activities. We kept in daily touch this way by posting announcements, asking questions about teaching successes or disappointments, linking one student with another, requesting access to electronic calendars, and so on. We did want to provide some synthesis to the project, however, so we planned a late afternoon session on campus, at which all project members and technical guest experts would be present to answer questions, solve communications problems, and identify issues for the next phase.

Phase 2

The timing of the practicum in our Faculty allowed us two months to regroup. During this time, we were able to identify additional faculty supervisors who would be open to participating in the project; and continued to develop our relationship with T.D. Baker Junior High School. At this time we were also implementing the first phase of the VISIT project; T.D. Baker was one of our partner sites. We envisioned a parallel stream, although we weren't sure yet how the pieces might fit together.

The practicum with which we were working was the field experience component of a course in the Department of Secondary Education. Since the students would regularly attend weekly classes together before being assigned to their host schools, we thought that beginning the Powerbook component during their time on campus would achieve a better integration of the technology in their thinking about and planning for teaching. In addition, we would more easily be able to sequence and deliver the inservice training necessary for the level of personal acceptance missing in the first phase. The first task was to approach a likely instructor; once we had his interest he was quite willing to enlist four students deemed most open to a technological requirement during student teaching. Once again, we supplied each student with a fully loaded Powerbook and Internet access: we also made it quite clear that nonparticipation would result in a withdrawal of the Powerbook privilege. Computing resources being what they are on most campuses, the four month exclusive access to a personal computer and printer virtually guaranteed the commitment of the group.

Mark and Leanne were back on-campus for their last term before graduating. Mark had been an effective peer coach in the first phase of this project and we wanted to see him experience continued success in his remaining courses. His participation in the project had apparently opened up new vistas for him in his thinking about ways of teaching. Mark says, "This project may prove to be the catalyst for a significant change in future goals" (Mark, April, 1993), and he goes on to identify an interest in distance education as one of those goals. (In fact, Mark was able to obtain an interview for a teaching position in southern Alberta on the basis of his experience with communications technology). We suggested that he continue with the project as a

mentor, a peer facilitator. In exchange for working with us to plan and deliver the inservice training, and working with the students in their school placements, encouraging them to continue to use the technology in their teaching, Mark would receive the use of a Powerbook and credit for independent study. Leanne didn't need extra credit, but she was also interested in continuing to work closely with the project. Thus, the four students were divided into two groups, each with a mentor/coach who would work to develop a more personal, peer relationship both in person and electronically. One advantage to this arrangement was the removal of perceived coercion: the mentor/coaches were seen as peers rather than evaluators, facilitators rather than taskmasters. We anticipated that this relationship would be important in maintaining commitment to the project once the students were away from the University and at arm's length to the project managers.

With much more lead time, we were able to begin the inservice activities six weeks prior to the beginning of the student teaching round. The project participants committed, in writing, to a weekly two hour workshop with additional activities to be completed electronically. We also provided copies of the MacAcademy videotape series to cover topics of individual interest. Workshops were conducted in the Faculty's Macintosh lab, which is fully networked. A mix of on-campus experts provided sessions on the Profs system; organizing and permitting calendars; E-mail and distribution groups; exploring the Internet; news groups and library searches; productivity for teachers; Powerbook and printer functions; and basic technical problem solving. The course instructor, in turn, discussed related curriculum issues. The student response to assigned follow up activities was closely monitored, mostly by the mentor/coaches who actively encouraged their consistent participation. That is, Mark and Leanne were "in charge" of their cohorts and managed their own distribution lists. Activities and assignments included scheduling meetings for all members of the cohort, sharing reflective journal entries, joining news groups, and competing, in teams, in an Internet Treasure Hunt devised as a synthesis activity.

Once again, however, we encountered resistance to using the technology in the actual school setting. Frequency of communications fell off almost as soon as the practicum began and, even though Mark and Leanne faithfully visited the classrooms, eventually disappeared entirely. Mark recalls how surprised he was when communication just disappeared. His initial impression that "they were likely just too busy with preparation for teaching" was replaced with the insight that their stage of development as "teachers" prohibited consistent contact with the university:

Another possible reason for the low response rate is the fact that this was an early phase II practicum. Not only were these students likely unfamiliar with their roles as teachers, but their exposure to the university climate was still quite limited as well. It seems logical that students will be more prone to participate in a project such as this once they are more familiar with their roles as students and as teachers (Mark, April, 1993).

A cause for optimism was the report that the Powerbooks were being used for productivity--lesson plans and grade books were almost exclusively produced using Word and Excel. Although we were disappointed that we were not able to maintain the

electronic links, we still felt that we had achieved one important goal - to model the use of the technology in the classroom.

We turned our attention, then, to trying to discover reasons why the telecommunications thrust of the project had been successful in neither of the two trials. This investigation took the form of face-to-face interviews with the participants, analysis of the E-mail logs, and, in Mark's case, a paper submitted to his instructor (Al Olson) in partial fulfillment of the requirements of his independent study.

The VISIT Strand

Educational applications of the VISIT were almost immediately apparent to us. The Faculty was seeking ways of either providing supervision for student teachers in remote placements, or facilitating contact with schools at a distance; supporting components of distance education courses; and working collaboratively with local school districts to try to remove the gap between the University and school-based components of the teacher education program. In addition, various teaching departments were exploring ways of bringing University expertise to pupils in public school classrooms.

Key to establishing successful inter-institutional collaborative partnerships is the involvement of all participants in the planning and implementation of shared activities (citation). The VISIT activities provided one model for the collaborative implementation of technology for improving practicum experiences and school links in the teacher education program.

The core project team of Katy Campbell, Sharon I. Jamieson, and Alton Olson identified at least six goals for an alternative practicum model using the VISIT. These goals were shared with our school partners and in the process reoriented us to better address their ongoing instructional and administrative concerns. At the same time, our practicum partners shared their visions for technology, and what began to develop were innovative ways to think about delivering and supporting teacher education and professional development initiatives. Not surprisingly, once the technology was in the schools the curricular links began to appear as teachers and students began to think of ways that they could adapt broad project guidelines to their instructional and learning needs.

Goal 1: Building a knowledge of the school setting

We anticipated that education students preparing for their Phase II practicum at one of the project schools would have the opportunity to VISIT with their assigned cooperating teachers while still in the University setting.

In fact, we were able to organize visits that not only introduced student teachers to their prospective schools, but to each other. At the same time, the teaching staff in two of the project schools were able to establish links with each other through the video conferencing facility of the VISIT. Both technology-based junior high schools in Edmonton, each provides a model of instructional innovation both in their neighbourhoods for North-Central Alberta, and as far away as Stanford University. The VISIT link opened collaborative sites for teacher-initiated inservice delivery and instructional planning, to name two activities.

Goal 2: Building a relationship with the supervising teacher and the classroom

The student teachers initially involved with this project were Science and Math majors, who were placed in a project high school with links to the University through the Centre for Math, Science and Technology Education (CMASTE). Teachers at this school are linked in a further activity with a feeder junior high school, at which the Grade Nine students are provided with advance science placements. The natural extension of this initiative is to provide high school students with similar advance placements in University level science courses. Through the file sharing, screen-sharing and parallel voice links, graduate students and pre-practicum students at the University were able to meet teachers and students at both schools and work with them on course-based software, providing a curriculum context for our students in advance of their placements.

Goal 3: Maintaining a school-faculty connection during the practicum, and

Goal 4: Facilitating access to post-secondary resources

An interesting dimension to this project was made possible through the addition of the University's Curriculum Library as a VISIT site. While in the schools, student teachers make extensive use of the Library, which houses a collection of resources supporting the Alberta Curriculum. Through videoconferencing and modem access the reference staff were able to provide on-line assistance in identifying and providing instructional resources otherwise unavailable to the schools.

A second connection was made, again with video and voice conferencing, file transfer and screen-sharing, with the faculty's Macintosh software consultant, Bob Bolt. Mr. Bolt provided on-line consultation to pupils at the project high school who were developing HyperCard stacks in Social Studies courses. This was extended to providing on-line content expertise (in the subject areas) at specified call-in times during the week. This type of consultation extended resources to both student teachers and classroom teachers.

A related effort was made to communicate with other VISIT sites provincially and internationally. For example, the high school was partnered with a rural school district, themselves in partnership with the Alberta Distance learning Centre, to explore the use of the VISIT to deliver high school level Japanese. Both the rural district's high school and the project high school had on staff Japanese teachers who were unique in the districts. Linking via telecommunications technology facilitated a supportive peer relationship as well as offering the potential to extend the language opportunity to other schools in both areas.

Of particular interest to the project high school, in context of their involvement with CMASTE, was the contact with sites in science facilities at universities and laboratories across the continent. A Physics Lab was contacted at both the University of Alberta and the University of Calgary and access was permitted to NASA aeronautical engineers during a school-wide project to develop hypothetical living environments for Mars.

Goal 5: Developing a peer support group for student teachers

The trial project involved partnering student teachers at three Edmonton Public Schools through desktop video conferencing. Once relationships were established, concerns about planning, classroom management, teaching strategies, and

interpersonal communications could be shared. Initially, we piloted this strategy using Powerbooks with a limited number of students to whom we assigned E-mail accounts.

Goal 6: Curriculum support for the schools

An activity that was very successful involved a writer-in-residence program in which a project junior high had an ongoing participation. In this program, students share their writing in progress with a real author. Resources are such that each school in the program is funded for one session only with the author. The VISIT enabled us to provide access to the author to a number of sites simultaneously. In the first session, twelve student authors submitted their draft writing on a single diskette to the author in advance of the consultation. During the actual session, the screen-sharing and videoconferencing applications were invoked so that the manuscripts could be annotated and discussed on-line. The students were then able to save their annotated documents for later revision. This type of activity has promise, again, in a distance learning context; especially for linking more remote authors and even in federally-sponsored literacy initiatives.

Implementation Issues

The following are a sampling of the issues that need to be addressed when trying to implement an innovative telecommunications project with public schools.

Telephone access

Schools will have to think differently about access to telephones in each classroom, including budgeting for toll charges.

Although schools are interested in making information technology available to students and faculty, relatively few are willing to install telephone service to each classroom. Often, the only phone lines to be found, particularly in elementary schools, are in the main office and the library/learning resource centre. One of the authors recently visited a local school that has a partnership with IBM. Participation in the project included the installation of a fiber optic backbone throughout the school complex. However, the school board is reluctant to provide telephones to the teachers because they're afraid that teachers will abuse the privilege. In fact, intercom-type phones link the classrooms, but teachers have to phone the office switchboard to utilize them! In the meantime, the IBM courseware includes a powerful communications program which is not utilized, while the students have letter penpals.

Internet access

Schools need free, or relatively inexpensive access to the Internet, giving the classrooms access to research libraries, newsgroups, bulletin boards, information services, and correspondents all over the world.

Although Internet access is becoming more available then ever, schools often must find a relatively large sum of money to gain access to a gateway. In New York state, for example, schools can join NYSERNET, for an annual subscription of $5000. This amount of money can be difficult to find in shrinking school budgets. School consortia may be a possible solution, as are university/school partnerships in which partner schools can use the university's gateway.

Disdaining rational prespecifications

We need to stand back and let teachers do what makes sense to them once they have the technology, rather than trying to control their exploration based on some preconceived plan or evaluation scheme.

At the start of the VISIT strand of this project, we invested a lot of energy in trying to find curriculum links for our partner schools. Although some of these connections were utilized by the teachers and students, many others that seemed like exciting opportunities to us did not mesh with ongoing programs in the classrooms. We've come to believe that placing the technology in the classrooms and putting support systems in place will be more productive in the long run. We know from personal experience with technological innovations in our own work that utilization is linked with immediate need rather than projected interest. To understand this think about your first forays into word processing or desktop publishing. Working through a program manual is less effective than referencing appropriate chapters when you need to perform a specific task such as indenting.

Flexible setups

We have to plan for the flexible way computers are used in schools.

At the beginning of the VISIT strand we asked partner schools to designate a Mac station that would be permanently available at any time for desktop videoconferencing. Although each school was able to identify computing resources even T.D. Baker, the most technologically organized of the schools, was unable to guarantee access at any time. The reality is that schools must reallocate computing resources on a daily basis as program and administrative needs arise. Somehow we had envisioned making video contact with any school at any time, but realistically we had to first phone our school contacts and make an appointment for a VISIT visit. As technological solutions become more and more a standard part of the educational landscape, and we believe that they will, the constant anxiety of too few resources for too many fascinating applications will eventually fade.

We have described a telecommunications project with two distinct strands from initial planning through implementation and evaluation within the framework of technological innovation. It is our contention that projects such as these provide fertile ground for exploring collaborative
partnerships and alternative models for imagining the field experiences of preservice teacher education. In the next section, we turn our attention to a parallel thesis: after Eisner (1985), we don't always have to proceed with innovations only when we have the preconceived ends in sight. Sometimes we gain more by simply putting the means, that is the resources, into the hands of teachers and students, getting out of the way, and supporting whatever initiatives emerge. We call this collaborative entrepreneurship.

Future Directions

The promise of communications technologies in teacher education will become the reality only if universities and schools can successfully recast their relationships. This has been a common theme of late in the movement toward partnership arrangements and collaborative agreements between universities and school systems (citation). Although educators at all levels sense that these movements are right and need to be pursued, there is much to be dome before any measure of success can be

claimed. It is much like Tom Peters (1991) said of partnerships in the business world, "The fact that the rhetoric of partnerships outstrips the reality is really no surprise; not long ago we didn't even have rhetoric."

Components in Partnering

Forming alliances

If the Powerbook project and Project VISIT are thought of as components in partnering then one important factor in this relationship is the cost of building systems. Systems of this sort become too big and expensive for any one of the partners to build and maintain. In true partnerships the cost and risks must be distributed. In some form the universities, the schools, and the student teachers must form an alliance that is value-added for all three parties. These alliances must be formed to solve commonly held problems and exploit mutual opportunities. Teacher education that involves these three groupings is not a borderless, seamless enterprise but the advent of these communications technologies is moving us inexorably toward it.

Capacity for change

An impediment in fuller utilization of the technologies is the obvious immaturity of the parties to conceptualize the opportunities to do better. There seems little doubt that these partnering technologies could have far-reaching impact on teacher education practices, but that contrasts sharply with the capacity of all parties to absorb such potential changes. Education in general and teacher education in particular have always operated as hierarchic systems, that is, some part of the system provides the executive function. Make no mistake, this has served the needs of the educational enterprise well. However, it is not a useful model for functioning in the introduction of technologies that enable participants to do things that they have historically not been able to do. It is not a useful model because there is no one there to provide the executive function. There is also a certain immaturity in the technology itself. The hardware and software that is available is an impediment because of its proprietary characteristics. Over time compatibility issues have become less obtrusive, but they have not gone away. Openness of standards is absolutely essential for true partnership arrangements to flourish.

Permeable boundaries

This discussion of openness refers to matters of hardware, but there is a parallel issue of openness in the organizations that are participating. Successful partnering using these communication technologies would seem to require a shared commitment to a vision of education. A network of parties each pursuing its own proprietary self-interests cannot last because of the tremendous energy cost. Consider an example: suppose a high school class is examining the issue of pay equity. Members of the class together with their teacher use a communication technology to access information from the education library of the local university. If the library is implicitly defined by all parties as a warehouse of factual information then the cost of the library's responding is quite high. The education library will feel that this task is not really in their mandate, that the task of responding is an infringement, etc. There would likely be all kinds of questions about who was really in charge, and so on. All of this would make the response costly. If the vision of the educational enterprise is shared these impediments

are substantially reduced. Also, not only is the vision shared but the work assignments would not be nearly as distinct. For instance, the library staff would have to "know" high school students and their information needs in order to respond in a thoughtful way to their request for help. Is the role of the library staff not one of teaching in that case? In this scenario the distinctions between the library staff and the teachers are blurred. For a less exotic example, consider the student teacher who asks her university instructor about a teaching strategy for a certain topic. Certainly that would presume a shared vision about what should be going on in the student teacher's classroom. In addition it would imply that the university instructor had a strong sense of that classroom and the students in it. That is the kind of openness and permeable boundaries required of all parties if we wish for success in the use of communication technologies.

When the participants in the educative process are independent actors with definitive functional boundaries, many of the real or potential capabilities of individuals are not fully utilized. With the openness and integration of function that is possible in these new communications technologies, individuals and small groups are empowered to act and create value in the educative process.

Educating in time

It should also be noted that communications technologies allow for a sense of immediacy that is not the norm in education. Normally we assume that the events in a lesson or a series of connected lessons include significant time lags between connected events. For instance the time difference between a library search for information about a discussion topic and the discussion itself could be quite great. With the use of communication technologies that needn't be the case. In time educators will sense the need to educate in time.

If education were to operate in real time then any arrangements other than small work groups would prove to be too unwieldy. These small work groups would share commitment to their enterprise but would operate relatively independently of other groups in that setting. The groupings would come together to achieve some group-defined objective.

The cooperative enterprise

Of course, the promise of the new communication technologies will be realized only when the participants are willing and able to form a cooperative enterprise. This will be a cooperation borne not of obligation or derived from moral principles but emerging from mutual self-interest. It is the kind of cooperation that one finds on a sports team, in a championship game: Players cooperate out of mutual self-interest. If a vision of what education should be is shared by all parties then individuals will cooperate out of mutual self-interest. As an example, the notion of cooperation that presently exists between school-based personnel and their university-based counterparts would have to be extended to become the modus operandi of the whole educative process.

As can be seen this educative process is based on commitment rather than some form of control. There is necessarily a lessened hierarchical administrative structure in favour of networked arrangements that allows and capitalizes on the empowerment of individuals and small groups to create value.

Conclusion

The authors of this paper had the opportunity to become involved in creating a model of a technology-based practicum experience, in a process that could be uncharitably characterized as haphazard. To be fair, this is a view that is justifiably held for the most part: Many innovations have faltered in implementation because of hurried, ill-timed, or ill-conceived adoption strategies. However, we are convinced that the increasingly rapid pace of technological innovations, especially those that are telecommunications-based, demand bolder approaches than ever before. Collaborative partnerships between faculties of education and schools quite often evolve spontaneously in response to sudden opportunities that are available for limited periods of time. Proactive strategies, while essential, do not always position us to take advantage of the unexpected: Institutionally accountable, hierarchical structures hinder our ability to react imaginatively and productively to these temporary windows of opportunity. This paper is a case for trusting our instincts, our partners, and the entrepreneurial spirit to frame new models of collaborative teacher education. As Robin Williams, in "Dead Poets Society", exhorts us, we must "seize the day"!

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