Mentoring Student Teachers Into The Profession: Intentionally Creating a Culture of Inquiry in the Context of Media and Technology Practice

Michele Jacobsen
University of Calgary

Sharon Friesen
Pat Clifford
Galileo Educational Network

Abstract

What is the nature of onsite and online mentoring which enables student teachers to design inquiry-based, technology rich learning experiences? In this case study, faculty and expert teachers worked with fifteen student teachers during an elementary school practicum. An online intelligent design environment supported the development of a community of practice and instructional design. Discussion focuses on teaching from an inquiry stance and engaging in the intellectual work of mentoring student teachers to teach with technology rather than just modeling practice.

Context For Inquiry

Preparing teachers today requires critical examination of what it means to teach and learn in increasingly networked, technology-rich classrooms. Most young people entering teacher preparation courses have not, themselves, experienced such schools. They and many of the students who will follow them for the next ten years, have been shaped by an education system that is still struggling to make the transition to teaching and learning in a post-industrial era. On campus and in schools, they are learning to be teachers guided by university faculty and experienced teachers who are, themselves, are only starting to come to grips with the pedagogical changes required to engage students in technology-rich learning environments.

Living this transition, new teachers cannot depend either on their own experience of K-12 schooling, nor yet on the widespread and effective use of technology for teaching and learning in schools and in post-secondary programs to provide the images or the expertise they will need to move their own practice beyond currently conventional uses of technology. At the moment, technology use in schools and on campus tends to replicate and reinforce familiar practices of schooling: do an Internet search on…present your report in PowerPoint…word process your assignments…access your readings from the course outline. Even when they, themselves, are fluent technology users in their lives outside school, few student teachers express confidence about using technology in creative and interesting ways that transcend such practices (Clifford, Friesen & Lock, 2004). We have encountered few schools and university programs that devote critical and innovative attention to the ways in which teacher preparation courses and practicum experiences with ICT might help prepare student teachers *differently* for their future roles (Jacobsen, Clifford and Friesen, 2002). It is still too often the case that questions about technology revolve around matters of utilization rather than around questions of fundamental school reform.

Learning *with* technology, as distinct from learning *about* technology, has the capacity to transform learning environments in ways that are difficult for most educators to imagine. Coupled with the struggle many adults have in using basic computer functions such as email, search engines, and presentation software is the much larger issue that the children in today's schools have never known anything other than a digital world. For the first time in human history, the young are more confident and more fluent with the dominant technologies of the times than the adults charged to teach them. They are "digital natives" (Prensky, 2003) whose new abilities, skills, and preferences are to a large extent misunderstood and ignored by the previous generation of educators who speak and act with a distinct digital immigrant accent.

Finding ways to bring educators' attention to the implications of digital technologies for learning, and to bring those technologies into classrooms in increasingly meaningful, effective and innovative ways is one of the important tasks of teacher education. As Cochran-Smith (2003) notes, "whether by design or

by default, then, this means that teacher educators—those who teach the teachers—are now the linchpins in educational reforms of all kinds (p. 5)"

This paper is about a collaborative inquiry undertaken by an elementary school staff, a faculty member and a professional development organization to address the mentorship of student teachers by intentionally creating a culture of inquiry in the context of media and technology practice. This study is an example of design research that directly addresses the crucial intersection of teacher professional development, student teacher preparation and the practicum experience in both face-to-face and online environments (Bereiter, 2002). The questions we raise outline important research directions we have been following for a number of years. First, where technology is concerned, the old "follow the expert" model of teacher preparation becomes troublesome in significant ways. Currently, most experienced classroom teachers (that is, the ones who would conventionally provide models of exemplary teaching for practicum students) are, themselves, only beginning to learn how to think and work in new ways with technology. Furthermore, these teachers are caught in the transition to post-industrial practices of teaching and learning. Thus, taken-for-granted notions that field placements provide novices the opportunity to learn from the expert modeling of practice no longer hold. Because the expertise of experienced teachers is, itself, very much in flux, a very different approach to the practicum experience is called for, best captured in Cochran-Smith and Lytle's (2001) term "inquiry as stance":

Learning from teaching through inquiry assumes that beginning and experienced teachers need to engage in similar intellectual work. Working together in communities, both new and more experienced teachers pose problems, identify discrepancies between theories and practices, challenge common routines, draw on the work of others for generative frameworks, and attempt to make visible much of that which is taken for granted about teaching and learning. From an inquiry stance, teachers search for significant questions as much as they engage in problem solving. They count on other teachers for alternative viewpoints on their work. In a very real sense, the usual connotation of "expertise" is inconsistent with an image of teacher as lifelong learner and inquirer.

Second, exploring creative and innovative ways to use technology puts everyone into a place of genuine inquiry about school reform. Thus, professional development becomes an essential component of the work, which must exist along a continuum of professional scholarship for student teacher learning through to teacher in-service and graduate work. Teacher preparation experiences closely tied to the learning of experienced teachers provides a powerful environment for change, both for experienced and for beginning teachers.

Third, field supervision of student teachers is not conventionally regarded as scholarly work. In many universities, field supervision is assigned to sessional instructors and seconded teachers, who are believed to be closer to "the reality of the classroom" and therefore particularly suited to model practical teaching expertise. Often, the major work of these instructors is to evaluate student teacher progress. In line with Cochrane-Smith and Lytle's (2001) work, however, we argue that a scholarship for teaching demands the active involvement of faculty in intentional communities of inquiry where "everyone is a learner, a researcher, a seeker of new insights, and a poser of questions for which no one in the group already has the answers" (p. 23).

Generally, practicum placements are arranged so that student teachers are assigned to individual teachers in schools with attention to their subject specialties, grade preferences and perhaps geographical proximity. In this project, a cadre of student teachers was assigned to a school along with a faculty advisor. The cadre placement was made (i) in order to create a diverse community of practice for the purposes of inquiring in a disciplined way into the changes to teaching and learning demanded by the effective use of ICT and (ii) to break down the conventional isolation of the classroom teacher in order to permit experienced teachers to work more effectively together; student and experienced teachers to function as teams; and the school to regard the cadre of students assigned to them as the responsibility of the school as a whole.

Through interventions in the conventional structure of student teaching experience, it was hoped that the study would seriously address the complexity of change that the effective use of technology in schools both enables and requires, and that it would do so in a way that was better able to prepare new teachers for post-industrial classrooms.

Research Method

Using a case study research approach (Merriam, 1998; Stake, 1995) we documented the nature of mentoring relationships developed with 15 student teachers who completed an extended practicum in an

elementary school in Fall 2003. The faculty member used Intelligence Online (io), an online learning environment and instructional design tool, to cultivate professional dialogue about practice and to provide mentoring support in the design and development of inquiry-based projects and learner assessments.

Riverbend Elementary School staff worked closely with a faculty member from the Faculty of Education to support a cadre of 15 student teachers in their extended practicum experience. Students spent 4 full days a week in classrooms. The faculty advisor spent two full days a week in the school working with student teachers, with partner teachers, and with Galileo Educational Network professional developers who were working with teachers to develop strong inquiry-based practice. Intentional goals that framed how field supervision was defined by the faculty member were to facilitate a gradual and graduated, reflective and rewarding learning experience for student teachers, to observe student teachers in a variety of learning and teaching situations, to support classroom teachers and student teachers in establishing and sustaining mentoring relationships, and to facilitate mentor teacher assessments of student teacher growth and development.

Community Building

From day one, the student teachers and the faculty member were welcomed with open arms and encouraged to become active participants in the school community. Sixteen new individuals in a school can create some challenges, from parking to borrowing resources to finding a seat in the staff room! In August, the school principal and faculty member planned how to create a welcoming environment for the student teachers and designed ways in which staff would be supported in working with the cadre of 15 student teachers. The principal and faculty member assembled keys, staff handbooks, policy documents, media center loan cards, and other materials to support student teachers in becoming active members of the learning community. A classroom was made available for student teachers as a home base during the semester.

Both the principal and the faculty member wrote letters of welcome to the student teachers that included information about the school, the cadre approach to field experience, the case seminar and initial expectations for classroom observations and relationship building. The faculty member also wrote a letter of introduction to each classroom teacher to thank them for working with student teachers, to explain when she would be in the school and to outline the schedule for case seminars in the school. The principal and faculty member hosted a welcome session very early in September for school staff and student teachers to discuss the cadre approach to the extended field experience, to provide an opportunity for people to meet and mingle, and to help student teachers to learn about the culture of the school. The pair also collaborated on the design of an early seminar with the school's teacher librarian that helped student teachers to become aware of and make good use of the vast physical and technological resources in the school.

Matching Mentees and Mentors

Many of us can remember how important good mentors were to our early development. The need for mentoring new teachers is well documented in literature on teacher attrition (Gold, 1996). New teachers need continued mentoring and support in the field as they begin to experience and reflect on what it means to teach in technology-infused, inquiry-based learning environments (Jacobsen & Lock, 2004; Jacobsen, Clifford & Friesen, 2002; Jacobsen & Goldman, 2001). Our research has demonstrated that onsite and online approaches to professional development and mentoring that supports teachers in designing, implementing and evaluating technology rich learning environments for students can lead to transformed and sustainable classroom practices (Jacobsen, Clifford & Friesen, 2002; Friesen & Clifford, 2002; Jacobsen, 2003, 2002, 2001a, 2001b).

Instead of randomly assigning student teachers to a mentor, school administrators and the faculty member worked together to support people in initiating and developing mentoring relationships amongst themselves. In the first week, student teachers were encouraged to introduce themselves to teachers and to observe and help out in a number of classrooms in their division. Mentor teachers welcomed student teachers into their classrooms to learn more about their instructional plans, inquiry projects, assessment and classroom management strategies and learning cultures. After the first week, the principal and faculty member began to formalize mentoring relationships and student teaching arrangements based on feedback from mentor and student teachers. While some found this approach to matching mentors and mentees stressful, widespread feedback indicated that most teachers and student teachers appreciated the extra time and opportunity to meet more of the children and teachers, to learn more about the school, and to establish mentoring relationships based on shared interests.

Continuous Professional Development

The case seminar was unique in that weekly meetings took place each Tuesday afternoon at the school. The faculty member and student teachers had their our own classroom in the school which gave student teachers a place to gather for professional dialogue within and beyond case seminars, to collaborate on instructional planning and research and to access technology. Student teachers also congregated and collaborated with teachers in classrooms, in the staff room and in the media center before, during and after school.

A meaningful and much valued outcome of holding the case seminar at the school was the regular participation by school administration, mentor teachers and a Galileo Network teacher, Dr. Sharon Friesen. Teachers and administrators facilitated several case seminar discussions about multiage classrooms, authentic assessment, class management and differentiated instruction. Sharon led a popular and valued seminar on issues to do with teaching elementary school mathematics. Teachers also hosted lunch hour and after school discussions about teaching issues and topics with the cadre of student teachers. The faculty member was able to serve as an academic resource and a liaison to the University of Calgary. School staff approached Michele with questions about graduate programs and continuous professional development opportunities on campus. Several teachers are pursuing graduate study in the Faculty, and others approached her with questions on preparing an application for graduate school. The faculty member was invited to lead a professional development session with Riverbend staff and student teachers on the relationship between teaching quality standards and narrative assessment of student teachers.

IO - An Online Professional Development Environment

The teachers at Riverbend School work in an online environment, *IO* (Intelligence Online) developed by Galileo Educational Network and Axia NetMedia (Jacobsen & Gladstone, 2004). *IO* is a fully mentored online professional learning environment for student and experienced teachers. In addition to being fully mentored, *IO* is a situated learning environment (Herrington, 2002; Herrington & Oliver, 1997; Herrington & Oliver, 2000; Herrington, Oliver & Reeves, 2002; Herrington, J., Oliver, R., Herrington, A., & Sparrow, H.,2000) in which teachers are guided through an inquiry-based instructional design process as they create authentic learning tasks for their students and develop performance assessments for these tasks.

IO provides teachers with the tools and processes to choreograph a complex inquiry-based learning environment, and to communicate and learn with other *IO* members. *IO* is designed to create and to support online professional learning communities that work. It contains

- content to assist teachers in thinking about inquiry,
- suggestions for how to involve students in meaningful ways right from the outset,
- examples that illustrate each aspect of the design process,
- a workspace for the developing inquiry task,
- spaces for asynchronous communication with others,
- a publishing feature that lets teachers create websites to involve parents and students in the evolving inquiry,
- templates for the co-creation of assessment rubrics that map directly to tasks designed for students,
- functionality to create class lists and student records,
- mechanisms that permit online mentoring by Galileo Educational Network professional developers around the actual inquiries and problems of classroom implementation.

Through *IO*, student teachers, faculty, cooperating teachers, and professional developers were bound together in ways that invited the student teachers into what it means to teach. *IO* provided a space where experienced teachers, professional developers, student teachers and faculty could all come together to design engaging work for the classroom and to work out the difficulties of meaningful practice together.

When speaking about the value of having the support of *IO*, one of the student teachers stated, "*…then with using IO … being able to plan on that. That opened my eyes to what planning could be, assessment could be, [it] forces you to integrate technology in ways that I think I have even resisted in the past but also gives you the courage and confidence in yourself that you can because there are models to look at and show you how. And then you start to understand the benefits for the students. But you have to get past yourself as a stumbling block and understanding how it can be used*" (Clifford, Friesen & Lock, 2004).

During the student teachers extended field experience at Riverbend, *IO* provided a place for asynchronous communication. University faculty, teachers, student teachers and experts in the field explored together the living character of what it means to teach from an inquiry stance. One of the preservice students reflected on the experience during a post-semester interview. "*Yeah, it was very nice to go through that process with them and for it to be such an open discussion so that you are not sitting there thinking, 'I'm not really understanding this.' It was really good to know that people who have been in the field for that long were having the same sort of difficulties and struggles*" (Clifford, Friesen & Lock, 2004).

Inquiry and Technology

Researchers are only beginning to understand the value and potential of distributed learning environments made possible by networked technologies and are starting to document the range of uses to which these tools can be put to support and extend the student teaching experience in the field. Case seminars focused on *Reflective Inquiry as a Sense-Making Process* and living cases were based on key issues that arose from field experiences in the school. Student teachers were expected to regularly reflect on their teaching experiences, decisions and actions. In addition to maintaining daily reflections and observations in a field journal, weekly reflections on key questions, events and issues that arose during the week were submitted to the faculty member via email. In many cases, Michele responded to these weekly journals through email.

Student teachers participated in discussion groups that the faculty member initiated in the *IO* online community that extended the case seminar discussion on several topics: classroom management, assessment, inquiry-based learning, and virtual education. The student teachers also took the initiative to host a range of online discussions in *IO* about various topics within the cadre.

Student teachers individually or collaboratively designed a technology enhanced inquiry project for children using Intelligence Online *(IO)*, a web-based instructional design environment. Although it was considered optimal for professional development that the student teacher had the opportunity to not only plan the inquiry project, but also to teach it, this was not a requirement given the variety of instructional schedules and plans that were in place in the school. Feedback on the inquiry projects was provided in four areas: instructional unit design, assessment rubric(s), academic rigour and active exploration.

The Galileo Network supported the student teachers in the development of inquiry projects using Intelligence Online, in exploring innovative uses of technology for learning, and in finding rich resources and connections with experts to expand their instructional repertoires. Dr. Sharon Friesen contributed to onsite case seminars on a regular basis, co-planned instructional and assessment strategies with the faculty member, and supported and extended student teacher dialogue in online discussions. A rich community of inquiry developed from the sharing and professional development that evolved in the school between mentor teachers, student teachers, university faculty and Galileo Network professional development experts.

Student teachers used a range of technologies in support of student learning across the curriculum, from digital cameras and the Smartboard, to Internet research, computer-based artwork and digital filmmaking. Several classes of division one students produced interpretations of Ted Harrison paintings using KidPix, a computer based art and animation tool. Student teachers learned how to support several division two classes that were involved in digital filmmaking projects. A number of student teachers researched, reviewed and assembled lists of web-based resources that supported student research and learning across the curriculum. Children across the grades wrote stories and poetry using the AlphaSmarts, which are mobile and inexpensive text editing devices that can connect to computers for more sophisticated editing and printing.

Mutual Benefits of the Cadre Approach

There are a number of benefits in the cadre approach for both school staff and student teachers. School staff appreciated having the field advisor in the school two days per week to discuss emergent issues and concerns, to celebrate student teacher strengths and accomplishments, to compare approaches to instructional planning and field journaling, to clarify university expectations and approaches to narrative assessment, and to ask about graduate programs. The regular onsite presence of the field advisor allowed for more communication and continuity between the mentor teacher, student teacher and the faculty member. Teachers recognized and appreciated the many ways in which the cadre of student teachers supported each other, shared information, plans, assessments and resources and introduced new ideas. Mentor teachers often commented on the benefits of articulating what they knew and held intuitively about

instructional planning, assessment and curriculum with those who were new to the profession. Teachers enjoyed sharing their expertise with the entire cadre of student teachers in a small group setting, such as case seminar or during a lunch hour session.

Being part of a cadre offers a number of benefits to student teachers. The fifteen student teachers felt very connected to each other and appreciated the opportunity to build an authentic and meaningful mentoring relationship with their field advisor who was there two days per week. Student teaching, like other internships, involves emotional highs and lows and daily encounters with ill-structured (Jonassen, 1997) and unanticipated problems. Becoming connected to an onsite and online community of peers who are going through a similar experience in the same place is reassuring. Student teachers drew on each others' strengths while building relationships with children and teachers in the school and becoming acclimatized to the school culture. They appreciated the opportunity to work together as a group, to share curricular resources and expertise, and to critically discuss strategies and methods as they took on more teaching responsibilities. Student teachers valued frequent teacher involvement in case seminar and regular access to the school principal to discuss what was happening in the school, to analyze emergent issues and to explore living case topics. Student teachers posed questions, investigated decisions, and analyze possible responses and solutions as a learning community in case seminar, in online discussion groups and during thousands of serendipitous and planned meetings within and beyond the school. The student teachers recognized both the value of being a part of two different classrooms and observing two different teaching styles as well as the consistency of being with one partner teacher through the entire student teaching experience. This cadre of student teachers highly valued the opportunity to participate in the culture of inquiry that was establishing in case seminar and lived out daily by children and teachers.

Student teachers benefited from their onsite and online collaboration with Galileo teachers, who supported student teachers with their instructional planning in IO by providing resources, teaching ideas and prompt feedback. Students valued Sharon's participation in case seminars, and appreciated her helpful advice and expertise about teaching elementary mathematics.

Developing a technology-enhanced inquiry project using IO increased student teacher's understanding of inquiry, instructional planning and learner assessment. Working through IO challenged student teachers to think about the big picture and how to make projects meaningful for children. Student teachers became more aware of all the planning involved in doing an inquiry project by answering the questions and filling in the different sections in IO. Investing time in instructional planning using IO helped student teachers to intentionally create rubrics that connected learning objectives to the big ideas important to the subject or idea. The majority of student teachers agreed that other student teachers should have access to IO to learn more about instructional planning and assessment for inquiry-based learning.

Discussion and Findings

The nature of onsite and online mentoring that enables student teachers to use inquiry-based approaches to technology integration is responsive and flexible (Jacobsen, Clifford and Friesen, 2002). Our goal for using *IO* was to connect student teachers with each other, with education faculty, and with professional colleagues who share an interest in questioning teaching practice, pursuing inquiry-based learning for children and themselves, and developing innovative uses of technology for learning. We established an online mentoring environment for student teachers with the goal of helping them to resist the urge to "teach the way they were taught" as they encountered the many challenges that come with learning through inquiry and technology. The online mentoring approach was flexible, responsive and emerged specifically in response to the needs and experiences of the student teachers themselves.

Student teachers were required to develop one cross-curricular inquiry project for children that employed media and technology in creative and meaningful ways. Intelligence Online supported student teachers in their instructional design tasks of establishing curricular connections and goals, preparing essential questions and designing inquiry tasks, and developing performance and assessment rubrics. Each student created a technology-enhanced, inquiry project for children, either individually or in pairs. All of the student teachers reported that (i) they would recommend that other student teachers have access to the Intelligence online design tools to support instructional design and development, and (ii) that they would benefit from using this online design support tool as a beginning teacher. Student teachers reported that the online instructional design process took a significant amount of time but they expected that subsequent design tasks would take less time.

We know from first hand experience with student teachers in *IO*, that "design-based activities not only provide a rich context for learning, they also lend themselves to sustained inquiry and revision that

will help designers come away with the deep understanding needed to apply knowledge in the complex domains of real world practice" (Koehler, Mishra, Hershey, & Peruski, 2004, p. 32). Analysis and reporting of results focused on the efficacy of online design and discussion spaces for ill structured problem-solving (Jonassen, 1997). Key findings are that (i) Intelligence Online did support mentors and student teachers in sustaining meaningful professional dialogue throughout the semester, and (ii) the online design tools enabled student teachers to develop inquiry-based, technology enhanced projects for children. Student teachers participated frequently in instructor-designed, community discussion spaces that supported and sustained ongoing professional dialogue about a range of key pedagogical issues and concerns. In community and one-to-one discussions online, the faculty member and professional educators were able to provide intentional mentoring and sustainable support to student teachers that built and extended upon face-to-face encounters. Our analysis reveals that online spaces provide a risk-reduced space to work out some of the dilemmas and ill-structured problems that characterize early and ongoing teaching efforts. All of the inquiry projects designed by student teachers using Intelligence Online demonstrated acceptable uses of technology for learning. Further, most student teachers (75%) were able to develop robust and authentic inquiry projects for children that implemented innovative, creative and meaningful uses of media and technology.

References

Bereiter, C. (2002). Design Research for Sustained Innovation. *Cognitive Studies, Bulletin of the Japanese Cognitive Science Society, 9*(3), 321-327.

Clifford, P., Friesen, S., and Lock, J. (2004) Coming to Teaching in the 21st Century: An Analysis of Innovative Teacher Preparation Practices for ICT Integration in Alberta. Research Report for Alberta Learning.

Cochran-Smith, M. (2003). Learning and unlearning: the education of teacher educators. Teaching and Teacher Education, 19, 5-28.

Cochran-Smith, M. & Lytle, S.L. (2001). Beyond certainty: Taking an inquiry stance. In Lieberman, A. & Miller, L. (eds). Teachers Caught *in the* Action. NY, Teachers College Press.

Gold, Y. (1996). Beginning teacher support: Attrition, mentoring and induction. In Sikula, Buttery & Guyton (Eds.), *Handbook of Research on Teacher Education* (2nd Edition, pp 548-594). New York: Macmillan Publishing.

Friesen, S. & Clifford, P. (2002). The challenge of turning professional development into professional practice. *Proceedings E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare and Higher Education. Montreal, CA.*

Herrington, J. (2002). *Designing authentic activities for web-based courses*. In M. Driscoll & T.C. Reeves (Eds.), Proceedings of E-Learn 2002, World Conference on E-Learning in Corporate, Government, Healthcare, & Higher Education (pp. 18-27). Norfolk, VA: AACE. Available: http://dl.aace.org/9338

Herrington, J. & Oliver,R. (1997) Critical Characteristics of Situated Learning: Implications for the Instructional Design of Multimedia. Herrington, J. & Oliver, R. (1996). The effective use of multimedia in education: Design and implementation issues. In C. McBeath & R. Atkinson (Eds) *The Learning Superhighway: New World, New Worries. Proceedings of Third International Interactive Multimedia Symposium,* (pp 169-176). Perth: Promaco Conventions.

Herrington, J., & Oliver, R. (2000). *An instructional design framework for authentic learning environments*. Educational Technology Research and Development, 48(3), 23-48.

Herrington, J., Oliver, R., Herrington, A., & Sparrow, H. (2000). *Towards a new tradition of online instruction: Using situated learning to design web-based units*. In R. Sims, M. O'Reilly, & S. Sawkins (Eds.), Learning to choose: Choosing to Learn: Proceedings of the 17th Annual ASCILITE Conference (pp. 305-315). Lismore, NSW: Southern Cross University Press. Available: http://www.ascilite.org.au/conferences/coffs00/a2k_main_conf04.html

Herrington, J., Oliver, R. & Reeves, T. (2002). Patterns of engagement in authentic online learning environments. In A. Williams, C. Gunn, A. Young & T. Clear (Eds.), *Proceedings of the 19th Annual Conference of ASCILITE*. Auckland, NZ: UNITEC University of Auckland, (pp 279-286).

Jacobsen, D. M., & Lock, J. V. (2004). Technology And Teacher Education For A Knowledge Era: Mentoring For Student Futures, Not Our Past. *Journal of Technology and Teacher Education*, an AACE Journal (http://www.aace.org/).

Jacobsen, D. M., & Gladstone, B. (2004). "Educational Reform Meets NetMedia". Chapter in Mitchell, S., Klinck, P., and Burger, J. (Eds.). *Worldwide Partnerships for Schools with Voluntary Organizations, Foundations, Universities, Companies and Community Councils (pp. 33 - 63)*. Lewiston, NY: The Edwin Mellen Press.

Jacobsen, D. M. (2003). The Galileo Educational Network: Helping teachers change their practice. *Curriculum Perspectives: Point And Counterpoint Vol 23*, No 3. Editor, Sue Trinidad.

Jacobsen, D. M., Clifford, P., & Friesen, S. (2002). Preparing Teachers for Technology Integration: Creating a Culture of Inquiry in the Context of Use. *Contemporary Issues in Technology and Teacher Education* [Online serial], 2(3). Available: http://www.citejournal.org/vol2/iss3/currentpractice/article2.cfm

Jacobsen, D. M. (2002). *Building Different Bridges Two: A Case Study of Transformative Professional Development for Student Learning With Technology*. Paper presented at AERA 2002: Validity and Value in Educational Research, the 83rd Annual Meeting of the American Educational Research Association, New Orleans, LA: April 1 - 5, 2002. [On-line]. Available: http://www.ucalgary.ca/~dmjacobs/aera/building_bridges_two.html

Jacobsen, D. M. (2001a). *Building Different Bridges: Technology Integration, Engaged Student Learning, and New Approaches to Professional Development*. Paper presented at AERA 2001: What We Know and How We Know It, the 82nd Annual Meeting of the American Educational Research Association, Seattle, WA: April 10 - 14. [On-line]. Available: http://www.ucalgary.ca/~dmjacobs/aera/building_bridges.html

Jacobsen, D. M. (2001b). *The Galileo Network - Case-Specific Report*. A Report on the Galileo Network Case Study for the Office of Learning Technologies (OLT) Evaluation Of Learning Technologies Initiatives In Continuing Professional Development (CPD). Final Report Submitted to the Office of Learning Technologies (OLT), Human Resource Development Canada. [On-line]. Available: http://www.ucalgary.ca/~dmjacobs/papers/gena_olt_exec.html

Jacobsen, D. M., & Goldman, R. (2001). "The Hand-Made's Tail: A Novel Approach to Educational Technology". In Barrell, B. (Ed.). *Technology, Teaching and Learning: Issues in the Integration of Technology*, p. 83-112. Calgary, AB: Detselig Enterprises Ltd.

Jonassen, D.H. (1997). Instructional Design Models for Well-Structured and Ill-Structured Problem-Solving Learning Outcomes. *Educational Technology: Research and Development, 45*(1), 65-95.

Koehler, M. J., Mishra, P., Hershey, K., & Peruski, L. (2004). With a little help from your students: A new model for faculty development and online course design. *Journal of Technology and Teacher Education, 12*(1), 25-55.

Merriam, S. (1998). *Case study research in education: A qualitative approach*. San Francisco: Jossey-Bass Publishers.

Prensky, M. (2003). Overcoming Educators' Digital Immigrant Accents: A Rebuttal. *The Technology Source*, May/June 2003. Retrieved from the world wide web October 14, 2004: http://ts.mivu.org/default.asp?show=article&id=2013.

Stake, R. (1995). *The art of case study research*. Thousand Oaks, CA: SAGE.