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Teachers' Working Conditions and the Unmet Promise of Technology

Elizabeth Delacruz

University of Illinois

Correspondence regarding this article should be addressed to the author at the University of Illinois, School of Art and Design, 118 Art and Design, Champaign, IL 61820. E-mail: edelacru@uiuc.edu

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I consider the promise of computer-facilitated technologies for enriching the practice of teaching art. Selected art education writings highlight the potential of computer technologies for K-12 art education. In search of an understanding of K-12 teachers' experiences and perceptions about technology utilization, I examine aspects of teachers' widely varying technology working conditions. Research on technology and other staff development initiatives are then shared as they inform my own inquiries. In conclusion, I offer recommendations for those interested in facilitating teacher utilization of current and emerging technologies.

Working in an electronic age is both exhilarating and frustrating for teachers and teacher educators. Currently, many United States schools are outfitted with sophisticated networked computing facilities. Technology standards are listed by state boards of education as essential components of a K-12 education. School districts expect teachers to apply new technologies in their classrooms. Writings in art education highlight the promise that electronic technologies have for this profession. But what assumptions are made about teachers and their ability to join the technology revolution? Although I share a sense of optimism about the potential of technology, I seek to understand working conditions that impact teachers' incentives and abilities to integrate new technologies into their professional lives. I base my recommendations on my past 7 years of working with practicing teachers in varied subject areas and grade levels as they have learned how to utilize computer technologies in their own classrooms.

Technology and Art Education

Art educators have written about the importance of embracing computer technologies for over 20 years. These writings, predominantly descriptive, prescriptive, and promotional, explain the possibilities and values associated with utilizing electronic technologies in the art room. Authors have described how the electronic frontier and the profession of art education fit together, and offer compelling arguments in support (Madeja, 1983; Ettinger, 1988; Hubbard & Greh, 1991; Hicks, 1993; Krug, 1996; Freedman, 1997; Tomaszkiewicz, 1997; Halsey-Dutton, 2002, Garber, 2004). Art educators have explored how laser disc, CD-ROM, hypermedia, the Internet, and distance learning technologies facilitate and/or enrich inquiry (Anderson, 1985; Hubbard, 1989; Marschalek, 1989; Schwartz, 1991; Dunn, 1996; Keifer-Boyd, 1996, 1997; Roland, 1997). Some describe how students learn to make graphic images with computers (Greh, 1986; Stokrocki, 1986; Freedman, 1991; Madeja,

1993). Others consider how technology-savvy art teachers may assume leadership positions in their schools (Dunn, 1996). Art educators have suggested that teachers might write their own software programs (Gregory, 1989), or design educational web pages (Marschalek, 2002). Many extol the interactivity that occurs among teachers or between teachers and students in designing and engaging curriculum (Dunn, 1996; Heise & Grandgenett, 1996; Koos & Smith-Shank, 1996; Krug, 1996; Keifer-Boyd, 1997; Marschalek, 2002; Carpenter & Taylor, 2003). Studies also draw attention to the interactivity that occurs among students as they learn new skills in computer labs (Freedman, 1991; Chia and Duthie, 1993).

In recent years, art educators have also talked about how computer-facilitated inquiry can contribute to an examination of postmodern conceptions of art (Efland, Freedman, & Stuhr, 1996). Some suggest ways to engage students in consideration of philosophical, sociological, and political dimensions of the technology revolution (Freedman, 1991; Duncum, 1995-1996; Freedman, 1997; Garoian & Gaudelius, 2001; Krug, 2002; Freedman, 2003). Recent writings have explained how a technology-enhanced curriculum facilitates constructivist educational goals (Prater, 2001; Carpenter & Taylor, 2003). And writers have acclaimed the dialogical and liberatory aspects of hypermedia and electronic communication networks (Carpenter & Taylor, 2003). Finally, art educators have considered how computer aided inquiry and curriculum design might fit into pre-service education programs (Anderson, 1985; Keifer-Boyd, 1996; 1997; Galbraith, 1997; Krug, 1999, 2002; Stankiewicz & Garber, 2000; Taylor & Carpenter, 2002; Keifer-Boyd, Amburgy, & Knight, 2003; Garber, 2004). Comparatively few writings in the art education journals explicate problems associated with technology related gender equity issues (Morbey, 1997), ethical dilemmas (Mercedes, 1996), or adverse political, social, and environmental consequences of our increasing reliance on rapidly advancing technologies (Gregory, 1996; Congdon, 1997; Francis, 1997).

Prior to the invention of the World Wide Web, Hubbard (1989) predicted that, "The availability of virtually unlimited information will offer teachers the opportunity to take whatever fits their needs and then fine tune it to correspond with either their own professional philosophies or locally defined curriculums" (1989, p. 63).[1] Within a few years of Hubbard's prediction, Madeja (1993) observed that electronic imaging had become a "prerequisite for entry to almost every field of study in the visual arts" (p. 11). By the first year of the new century, Burton (2001) surmised that electronic technology would be one of the most decisive and far-reaching dimensions of education in the 21st century. But little in these writings tells us much about how practicing teachers view or learn to apply electronic media in their professional lives.

[1] At that time, Hubbard was referring to hypermedia, electronic databases, and laserdisc technologies, and not the Web.

Teachers' Use of Technology

Hubbard (1995) identified teacher resistance to change as one of the greatest hurdles to the utilization of computers in the classroom, observing that, "teachers may perceive multimedia instruction to be a threat to their autonomy" (p. 51). Some educators have also discussed art teacher resistance to technology integration (D'Angelo, 1988; Hicks, 1993; Heise & Grandgenett, 1996). Perhaps for art educators born before the computer age, technology is a source of frustration, anxiety, and a feeling of being left behind, made obsolete (Villeneuve, 2002). Writings about barriers to technology implementation highlight art teacher concerns that one finds with any attempts at educational reform: lack of access to needed resources, inadequate training, and time constraints (Heise and Grandgenett, 1996; Orr, 2004).

From my perspective, teachers' reluctance to technology adoption may also be considered in terms of a practicality ethic (Doyle, 1986; Lankford & Mims, 1995) that teachers tend to employ when faced with top-down reform efforts. A practicality ethic, simply put, is a teacher's criterion for determining whether or not a reform initiative is (a) worth the time and attempts, and (b) feasible within the particulars of the teaching situation. More importantly, teachers may not be buying into what has been termed the mythologizing language that often accompanies technology advocacy. This phenomenon is described in studies aimed at how teachers deal with staff development initiatives associated with educational reform (Clandinin & Connelly, 1995; Zhou, Pugh, Sheldon, & Byers, 2002). While we might actually know quite a bit about teachers, educational reform, and staff development, little in the art education literature advocating technology adoption reflects that kind of knowledge. As a result, this literature gives only casual consideration of key components necessary for changing teacher practice: working conditions, feasibility, and incentives for change, or in a word, *context.*

Hubbard (1995) made an important distinction in ways art teachers seemed willing to integrate computers into the art curriculum, noting a preference for employing computers for graphic imaging rather than utilizing computers to develop and deliver instruction. Discussing results of a 1999 nationwide survey of high school art teacher instructional practices in the United States, Burton (2001) summarized that most high school art teachers reported that they used electronic technologies to make handouts and to assess/grade, and about half of these art teachers reported using computers for research on the WWW in preparation for lessons. Extrapolating from Burton's summaries, however, it appears that almost two-thirds of these art teachers infrequently, rarely, or never used electronic technologies for direct instruction. Among the art teachers surveyed, 39% reported that they use technology infrequently, rarely, or never. In a more recent study of how secondary art teachers were using

technology in Illinois, Obiokor (2002) reported 79% used computers for word processing, 68% for preparation of lesson plans, 65% for e-mail, and 50.9% for studio/creative work. Of the art teachers responding, 49% said that they used computers for research, 24.6% used computers in actual instruction, and 10% for maintaining electronic portfolios.

Burton's (2001) and Obiokor's (2002) findings suggest that computer use by high school art teachers was on the rise. But they also revealed that by the early 2000s those teachers studied utilized only rudimentary applications. It appears from these studies that high school art teachers were using computers for graphic imaging, to find resources for the development of lesson plans or instructional materials (mostly handouts), and, to a lesser degree, for assessment. We might assume that due to the recent availability and relative ease of use, utilization of teacher-developed or commercially produced digital slide presentations, websites, hyper-media, and digital video is now on the increase in K-12 art programs. However, we do not know—if a significant number of, why, or why not—art teachers are engaging with dialogical inquiry processes and inventive multimedia applications in the innovative manner described in the art education literature.

A logical response to a lack of creative utilization of electronic technologies among art teachers would be to focus on pre-service art teacher education. Several art teacher educators have noted the importance of teacher education as a catalyst for change (Anderson, 1985; Hubbard, 1995; Keifer-Boyd, 1996; Keifer-Boyd, 1997; Galbraith, 1997; Stankiewicz & Garber, 2000; Krug, 1999, 2002; Garber, 2004). More extensive research would be useful in ascertaining how pre-service art teacher education programs engage with electronic technologies. But this leaves the question of how to address the needs of teachers already in the field.

Observations from Work with K-12 Teachers

How feasible is it for currently practicing teachers to both learn and creatively utilize emerging technologies in their classrooms in the kinds of ways described in the art education literature? During the past 7 years, I have had the opportunity to ask this question. Interested in working with teachers who want to learn about educational applications of computer technologies, I developed a graduate course[2] for practicing teachers.[3] Using a variety of widely available software programs with imaging and hyper-linking capacities, teachers developed computer-facilitated curriculum materials, lessons, or units of study that engaged an inquiry-based learning approach.[4] During class sessions teachers learned how to use selected software and equipment needed for instructional presentations (both formal and informal) and for student electronic access, developing curriculum content, and working through problems associated with implementation of computer-facilitated teaching and learning in their particular schools.

[2]Students dealt with graphic design considerations, interactive information design, constructivist educational approaches and instructional strategies, student learning styles, and assessment. The course met for 14 weeks for 3 hours each week and teachers worked independently on their projects during each week between class meetings. They earned 4 hours of graduate credit for their work.

[3]Elementary teachers, remedial reading and special education teachers, K-5 art teachers, middle school and secondary teachers in Art, Social Studies, PE, Language Arts, Health, Chemistry, Math, English, Business Education, Accounting; a H.S. Developmental Services teacher; a Pre-K teacher for the visually impaired; and a speech therapist have taken the course. Most of these teachers lived and worked in suburban schools located in middle and upper middle-income communities near a major midwestern city.

[4]Curriculum development projects included teacher selected units of study in their subject areas, developed into teacher designed websites and PowerPoint presentations, linked to a variety of curricular materials and resources.

continued

These were designed for both formal presentation by the teacher (to set up and explain to students how the materials could be used in completion of assignments) and for student use, collaboratively and individually, independent of the teacher.

I surveyed these teachers at the beginning of each semester in order to better understand their technology needs and perceptions, asking them to share what they knew about technology policies and resources within their schools. I encouraged them to tell stories about their experiences throughout the semester and to bring to class technology standards and policies their schools had adopted. I visited teachers in their schools and talked to district administrators, building principals, and technology support personnel. I saw these teachers as typical novice adopters of technology. As I came to know them better, and as I heard similar stories during different semesters, patterns emerged in terms of what concerned them. I listened to stories about a wide range of technology resources and technology support disparities that existed between neighboring school districts. These stories illuminated aspects of teachers' working conditions that significantly impacted their ability to utilize new technologies. Addressing these teachers' working conditions became part of the technology course content, and fundamental to their success in utilizing the work created during their semester with me. Following is what I learned about these teachers' working conditions and how such conditions may influence the manner in which teachers integrate new technologies into their professional practice.

Human infrastructure/administrative management. It became evident that teachers' technology utilization in the classroom is as much a result of administrative policies/behaviors and institutional support mechanisms, as it is the result of teachers' personal and professional interest in and access to computers. I found that district level administrators are deeply invested in the development of technology plans for schools; staff development, incentives, and assessments; for the establishment of policies for appropriate technology use; and for management of district technology budgets, infrastructure, and tech-support personnel. School principals are responsible for scheduling and staffing school computer labs and for allocating computers to classrooms. School principals also oversee implementation of technology standards and policies. Technical support personnel, individuals with computer science degrees or specific technical training, address hardware, software, and connectivity needs, maintain computer labs, make purchase recommendations, and, in some cases, train and assist teachers.

In a study of K-12 teachers who attempted to carry out teacher-created technology projects in their classrooms Zhou, Pugh, Sheldon, and Byers (2002) assessed administrative and institutional support factors in terms of what they called a healthy human infrastructure necessary for teachers' successful utilization of new technologies. Their study suggests the need for: a supportive and informed administrative staff, a flexible and responsive technical staff, a knowledgeable and communicative group of translators, and well informed institutionalized policies and procedures for technology investments, maintenance, and uses by teachers and students.

Teachers enrolled in my technology classes have had varying degrees of understanding about technology-related human infrastructure. Their stories provided snapshots of unrealistic expectations and disappointing experiences, filtered by an awareness of the complex issues that their districts attempted to address. Most teachers reported that their districts mandated that they use computers in their teaching. Many were frustrated that they were not given adequate time, training, or support to carry out these mandates. Teachers were expected to reach specific levels of technology proficiency, to use new software in their curricular planning, and to develop lessons that involve students in computer-facilitated learning. In one district, teachers who did not acquire basic computer skills were negatively evaluated and sanctioned.

Some teachers were particularly frustrated with several local issues, including, for example, their school's lack of technology support personnel, as reflected in this teacher's comments: "*Our elementary district has beautiful computer labs but do not hire staff support in the labs. They tried parents but that didn't work... So the labs go unused.*" Others expressed frustration with lack of coordination: "*We go to technology meetings and classes and then the district is not online or there are not enough computers.*" Teachers also identified legal concerns. Some of their comments seemed foreboding: "*I find myself constantly worried, because I don't want to worry about lawsuits.*" "*Many teachers are concerned they'll get in trouble/lose their jobs (and some have) if a student gets on an unauthorized site. It's very hard to supervise 25 children at once on the Internet, accidents can happen and teachers' jobs can be on the line.*" For some teachers, new technologies came with potential problems that they were unprepared for, and some reported that they did not feel adequately protected by their school districts. Regardless, these teachers were eager to engage in technology-facilitated approaches to teaching: "*What helps me the most is my ability to have no fear of technology. This allows me to try new things and experiment.*"

Training. Teachers reported that they attended technology training provided by their schools. Participation was often required, and typically took the form of after school or in-service workshops of varying duration, usually 2-3 hours, taught by either a technology specialist or a tech-savvy teacher in their district. Some teachers adapted technology-enriched lessons after seeing what other teachers were already doing at their schools, or at conferences, and/or through Web resources. Interestingly, a few of these teachers reported learning about new technologies from upper class students, spouses, and their own children. Many teachers, notably the younger ones, were building on technology knowledge learned in pre-service education courses. In many districts, school media resource personnel and librarians (sometimes the same individual) taught computer classes for students and provided workshops and assistance to teachers. In some districts, a separate technology teacher fulfilled this role. These

"techie-teachers" sometimes left their teaching positions to move into technical support roles. Some remained in their classrooms and took on additional technical support responsibilities, with release time and/or additional salary.

Teachers had much to say about the training and support provided by their school districts. Comments offered reflected teachers' understanding that technology integration happens not through administrative mandate or visionary pronouncements, but though modeling and meaningful application: "*I think a helpful way to introduce and integrate would be to give teachers training in a hands-on way. Children learn though hands-on manipulation. I feel that teachers need to do this as well.*" "*If given a presentation, we should also have a chance to work on materials presented. Possibly, it would be good to see some of these new processes at work in schools that have new ideas that work.*" Teachers commented that school workshops allowed too little time for practice, that the training was inadequate or worse yet, that the workshops were a waste of time: "*Where my district 'fails' us is training. We are given many great programs and systems, but we are not taught how to use them.*" "*Tech classes need to be set for different levels. Too often classes cater to the lowest denominator. I'm afraid to sign up for any classes for fear I'll know more than the teacher.*" These comments demonstrated the difficulty administrators were having in providing effective staff development. Oddly, developmentally appropriate lessons that took into account learners' (in this case, teachers') prior knowledge, and that provided relevant models, meaningful guidance, and reliable feedback (basic components of good teaching practice) seemed to be missing in many district-sponsored technology training sessions.

These findings about teachers' experiences with training and support are confirmed in other studies. Of particular relevance was a study conducted by Zhou, Pugh, Sheldon, & Byers (2002) of teachers' degrees of successful integration of their technology-enriched curriculum projects. Zhou et al. observed that the technology workshops offered to teachers in their study gave little attention to pedagogical or curricular connections, and even less attention to helping teachers develop their knowledge of the social and organizational aspects of the school. Rather, in-service technology workshops often took the format of motivational speeches by a forward-looking visionary, or sessions on how to use a piece of software, with no attention to subject area or content. For Clandinin and Connelly (1995) the practice of embedding prescriptions for teacher behavioral changes (reform) within a set of vision statements, and packaging those prescriptions into workshops and policy statements, may contradict teachers' practical working knowledge and value systems. Codified within what Clandinin and Connelly (1995) describe as the "rhetoric of conclusions", these prescriptions for reform function as a sacred story, one based on abstracted moral premises that have little resemblance to teachers' own

moral landscapes. Teachers' moral landscapes are grounded in their phenomenological worlds of everyday classroom experience. They formulate their personal and practical knowledge about what works and what is best for their students within those contexts (Clandinin & Connelly, 1995). Clandinin and Connelly explain that teacher resistance to reform efforts is often the result of teachers' personal and professional beliefs that lead them to reject the abstracted and often mythologized rhetoric of top-down reform efforts. Zhou et al. (2002) conclude similarly that when policy mandates, embedded in visionary pronouncements, conflict with teachers' personal knowledge, teachers simply do not buy into the reform mythology. Lacking opportunities to help establish policies for change, lacking adequate support, and useful curricular applications, teachers often find top-down prescriptions for change alien to their practical knowledge. It is no wonder that teachers become frustrated with technology reform initiatives.

Time. Poor training and support, and problematic policies, although important to these teachers, were not their biggest issue. Invariably, the teachers identified time constraints as their greatest concern. The following comments encapsulate what many said: "*They want us to use this software, but there is no time given to develop it for the classroom.*" "*Time to learn is crucial. Supported time. Things change so quickly that time to learn becomes vital.*" Yet, as revealed in one comment offered, some schools have developed the capacity to meet teachers' needs: "*Our school got a grant that allowed 24 teachers to take an Internet course and provided each of us with a laptop to use for the duration of the course. We then had the option of purchasing the laptops at half price. We got release time and after school tech support.*" Teachers in some districts have worked on technology teams, have been given release time, and/or summer salary incentives to develop computer facilitated educational applications. These disparities were wide between how neighboring districts provided for demands on teacher time, and teachers were often aware of these differences.

Other disparities. The disparities described here suggest how difficult it is to generalize about contextual factors impacting teacher incentives to utilize new technologies. Teachers expressed frustration that equipment broke down, programs did not work when needed, server networks were down, and support personnel were not available at critical times. Yet, in neighboring communities, teachers were integrating wireless computing and digital peripheral equipment into instruction with ease. Some teachers reported that they were often left out of technology policy deliberations; others reported that they were heading up technology committees. In some districts, teachers were restricted to commercially produced Web templates to maintain a uniform look. In one district, teachers were not allowed to build Web pages with outside links, as someone had determined that a student, following such a link, might subsequently follow

other links and find objectionable material. Some teachers were liable for litigation that might ensue as a result of a parent finding objectionable material on a teacher's website. Yet, in neighboring districts, teachers had rich and quirky, graphically sophisticated websites, passwords to school servers, and school-provided laptops to use at home. In some districts, art teachers served as technology leaders. In other districts, art teachers were the last to receive computers or have access to labs. Access, as this and other studies reveal, has vastly different meanings in different schools. Finally, most teachers realized that as schools came online, were outfitted with computing labs, and hired technical staff, resources for other educational priorities were reduced. Some teachers resented what they saw as a draining of school resources for technology.

Working strategy: Understanding contexts and negotiating support. Despite poor or varied technology working conditions, teachers participating in my technology classes wanted to use technology in their classrooms. Far from seeing these teachers as powerless, I viewed them as resourceful, resilient, and optimistic. By necessity, my course had to accommodate their teaching situations. One of the most important lessons I have learned and then incorporated into my technology classes has been helping teachers navigate their own technology working conditions. The following describes how, in my more recently offered technology classes, teachers' technology working conditions inform their technology-facilitated curriculum development projects.

During their first research assignment, teachers are now required to systematically assess their own school contexts. They conduct a *feasibility study* identifying their school's technology resources that are available to teachers, along with the technology policy makers, schools' technology policies and standards, and technology resource staff. They use this information to assess their schools' readiness for implementing the technology projects that they want to develop, and to determine how and how much tech support they may expect as they engage their technology implementation plans. This *feasibility study* is a critical assignment that should be conducted at the beginning of their research and continued throughout the semester.[5]

The second research assignment requires teachers to write a proposal for a technology-facilitated curriculum development project. This project needs to fulfill their schools' technology goals, utilize available technologies for teaching and learning in their classrooms, and engage students in the utilization of available technologies for research and development of student-created technology facilitated artifacts that fulfill these teachers' intended learning goals in their specific subject areas. Projects must also reflect an inquiry-based learning approach. Finally, their utilization of technology needs to be an improvement to teaching the lesson over traditional teaching methods.[6]

[5]This assignment grew out of surveying teachers at the beginning of each semester. The original surveys evolved into the *feasibility study* described here. Whereas the original surveys served my interests (I wanted to get to know the teachers better), the feasibility study was designed to serve their needs and interests.

[6]If the teacher can teach the lesson well without the available computer technologies, there is no need to simply translate preexisting curricular materials into a technology-enriched lesson. The teachers determine what constitutes a significant improvement.

The third assignment is to obtain their building principals' signature on their technology proposal. In the process of fulfilling these three requirements, teachers now engage in more substantive conversations with their technology policy makers and support personnel. Most importantly, these investigations, conversations, and administrator-approved proposals ensure critical on-site support for teachers by their building principals.

It is useful to remember that teachers described in this study were taking a course. Some were reimbursed by their districts for the course fee, and most of them were working on advanced degrees that can result in a $4,000-$8,000 salary increase. Tuition support, an advanced degree, and increased salary are powerful and appropriate incentives for professional development. Although teachers in the visual arts and other subject areas have been integrating technology without similar rewards and financial incentives, it seems relevant that few financial incentives exist within schools for the time and effort required of teachers to learn and meaningfully apply new technologies in the classroom.

Conclusions

In this study of teachers implementing technology in their own settings, their stories reflect dimensions of teachers' professional lives that exist within many schools. Currently, the quality of teachers' technology working conditions varies so greatly from district to district that we can hardly speculate on how these conditions will facilitate kinds of technology innovation written about so optimistically in the art education literature. We may also find that many schools will limit teachers to more predictable, mundane, and easy to implement applications. Zhou et al. (2002) found that the teachers who were the most innovative in their computer-facilitated approaches to teaching had the most difficulty in their schools.

A major issue, not addressed in this article, concerns adapting electronic media to classroom practice in ways that do not merely substitute one didactic presentation method for another, or in ways that add another set of boring, inconsequential skills and performance standards to the already large list of tedious things students and teachers must dredge through in a typical school year. School policy makers must first believe in the value of engaging students in learning experiences that allow time for open-ended explorations, inquiry that encourages students to follow unplanned tangents, and learning that is not likely to be reflected in standardized tests. I see little indication that schools in the U.S. are moving in this direction. Those few schools that are at the forefront in utilizing new technologies in innovative ways merely highlight the disparities that exist between tech-rich districts and tech-poor districts. They prove only what technology rich schools are capable of, given adequate resources, leadership, and community support. These

kinds of disparities require some attention as we tout the latest innovations in technology.

It is my hope that this article will illuminate dimensions of teachers' technology working conditions that have been identified by others as impediments to innovative technology implementation, and that it will deflate some of the hyperbole about the promise of technology in the art room. I must admit that I am guilty of some of this myth making. I love new and emerging electronic technologies, and I can envision many possibilities for how teachers may use them. But I temper my views with insights gathered from my personal experience working with practicing teachers.

Research findings of those who have looked more systematically at these phenomena are pertinent to my inquiry. Research on staff development aimed at educational reform tells us that teachers need content specific models that are reasonably close to their current practices and school cultures (Zhou et al., 2002). The farther teachers' innovations deviate from traditional school practices and cultures, the less likely these attempts are to be successful (Zhou et al., 2002). Research also demonstrates that teachers need ongoing on-site support, guidance, and feedback as they attempt to implement changes in practice (McLaughlin & Thomas, 1985; Joyce & Showers, 1980; Garmston & Eblen, 1988). Most importantly, research warns us that reform initiatives must respect teachers' knowledge about both what works in the classroom and what is right for their students (Clandinin & Connelly, 1995). Perspectives and findings given here translate into common sense recommendations for art education: (1) our discourse about technology integration must take into account the lived realities of art teachers' everyday classroom experiences; (2) any K-12 technology workshops we associate with must be developmentally appropriate to those specific art teachers' prior technology knowledge and skills. Workshops should also provide examples of applications that will work in the art classroom with *relative* ease. Someone must be available to assist teachers in the schools after the workshops end, and (3) our preservice art teacher preparation programs and post-graduate professional degree programs need to explicitly teach how one assesses and works most effectively within their own technology working conditions, including how one networks and negotiates with policy makers and support personnel.

The art room should be a place for a kind of learning about the far reaches of human experience, in a way that is compelling, complex and fluid in nature, and delightfully self-contradictory. Computers have the potential to facilitate this kind of learning environment, but so does a robust conversation about art, face-to-face. Our challenge is not to sell the promise of technology to already overworked art teachers. Enough teachers are capable and willing to engage new technologies, given the

chance. Our challenge is to convincingly demonstrate how to engage new technologies in authentic ways that accommodate teachers' values, work conditions, time constraints, and school cultures. Until these kinds of things happen both in our academic discourse and in our own practice of teaching teachers, many of our claims about the potential of technology will remain an unmet promise.

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