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# Empowering Women? Engaging a Technology Grant for Social Change

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# Empowering Women? Engaging a Technology Grant for Social Change

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## Abstract

This paper examines and exposes the writing and implementation of a project, funded by a federal government grant that worked to increase the technological literacy levels of women at an urban working-class university in the Midwest. This three-year study/intervention clearly reveals that disrupting the 'digital divide' for working-class women at our university, particularly women of color, requires engagements with the material and practical realities of their everyday lives. In addition to findings in relation to gender, race, low-income communities and technology, participation in this study/intervention illuminated for the authors--anti-racist, feminist academics and organizers--the consequences and costs of moving epistemological frameworks to acquire the needed resources to fuel our project. Shaping this project to pass in an ideologically 'neutral' landscape rendered us proficient in, and subsequently shaped by, this landscape. In exploring this research path, we name and expose conflicts over institutional 'turf,' the consequences of taking federal resources to pursue our agenda, the failures of the project, alongside the more data-driven findings of the project that relate to gender and technology. We analyze the most 'successful' and unimagined component of this project: the importance of creating spaces where students can participate as legitimate community members (for our population this means in part as paid workers) to learn technological skills without the notable presence of a teacher, a class or curriculum.

*Key Words:* women and technology, social change, grants

## Introduction

This paper discusses what became possible—conceptually, politically, and practically—during the design and the implementation of a project, funded by a US government agency[3], that worked to increase the technological literacy levels of women at an urban working-class university in the Midwest. This three-year project suggests that disrupting the 'digital divide' for working class women at our university, particularly women of color, requires engagements with the material realities of their everyday lives— not merely 'technological infusion' or 'curriculum transformation.' The women at our university with whom we engaged throughout this project needed meaningful employment to sustain academic study. Non-formal educational contexts (no classrooms, no teachers, and no students) became generative sites for them to begin to acquire computer skills and computer expertise (Lave and Wenger 1991; Resnick 1998; Jensen and de Castell 2002).

In addition, participation in this project illuminated the consequences and costs of moving epistemological frameworks to acquire needed resources. Developing and implementing this project shifted us, feminist academics and organizers, from our relatively comfortable epistemological terrain populated by anti-racist feminist theories and praxis, and queer theories and communities, to a landscape inhabited by frameworks of liberal multiculturalism, positivism, a 'politically and ideologically neutral' language of educational reform, and more. Acquiring the needed resources entailed establishing ourselves in this landscape that was seemingly devoid of

familiar intellectual markers or signposts: an analysis of "oppositional theory and practice"[4] and an analysis of "interlocking systems of oppression."[5]

As feminist educators—Erica, Assistant Professor of Education and Women's Studies, and Laurie, Assistant Professor and Coordinator of Women's Studies—our teaching and research focuses on centering marginalized knowledges and practices, and we critique and challenge the dominant social, political and historical production of knowledge. Conceptualizing, writing and working to successfully engage this project pushed us into new terrain and new questions: What are the consequences of a 'take the money and run' strategy for those committed to progressive (often radical) social reform in and outside the academy? How does participation in mainstream discursive and epistemological paradigms shift and constrain us in politically untenable positions? How can we learn from each other to access the resources to fuel progressive social change, yet resist the recuperative power of dominant, multi-faceted institutions and discourses? What subversions are possible given Audre Lorde's powerful pronouncement about power? "*The master's tools will never dismantle the master's house.* They may allow us temporarily to beat him at his own game, but they will never enable us to bring about genuine change" (1984, 112). These questions also exemplify a Women's Studies dilemma; how to work within a system one is trying to change. Women's Studies scholarship and activism encounters these tensions in the academy and beyond, and this theme of feminist change is central in this article and our work.

This paper offers a partial response to the above questions by recounting the intertwined narratives from this project. The first section of this paper offers an initial interpretation: how a gendered (and racialized) problem of technological literacy was identified in a particular context and how two feminist academics worked to acquire resources to shape an intervention. The second section queries this tale by analyzing the consequences of the paradigm shifts encountered to acquire a federal grant. The third section offers a discussion of the findings and observations from this project focused on the technological needs of women in our community and the importance of creating spaces where students can participate as legitimate community members (for our population this means in part as paid workers) to learn without the notable presence of a teacher, a class or a formal curriculum.

The goal of these layered representations is to offer other feminist anti-racist activists within the academy an analysis of the impact, often unanticipated, of the *master's tools* on varied components of a project for social change. In our self-reflexive writing we aim to avoid losing sight of the project itself and becoming "hyperreflexive about epistemology and the politics of knowledge" (Stacey 1999, 689), engaging in what Van Maanen has termed "vanity ethnography." We write as activist-scholars, immodest witnesses (Haraway 1997), committed to radical praxis, who struggle to be careful storytellers.[6]

**Part 1: *Show me the money!***

In 1998, we wrote a grant to support our desires for progressive change at our institution. The diverse student body at this working-class urban university includes many students of color, returning adult students, and people who are the first in their families to attend college. The mission—Excellence and Access— is taken very seriously and there are numerous financial and academic programs to aid students who would not otherwise have been able to attend college. For the last six years a national magazine has ranked our university as the most diverse university in the mid-west. In addition, the university is a federally designated Hispanic Serving Institution. In 2002, the enrollment was 10,898 and the undergraduate population (8,101) was composed of 14% African American, 13% Asian, and 28% Hispanic students and 64% women.

Many students arrive at our university lacking basic computer skills: i.e., knowledge about how to use a computer and how to run basic word-processing, web browsing, and email programs. This preparatory deficiency occurs for a variety of reasons: the shortage of computers in public schools, the inability of teachers to adequately infuse technology in high school curriculum, and lack of access to computers at home.[7] Laurie's introductory Women's Studies courses frequently had first generation female university students, fresh from the urban public school system, who had limited knowledge of the use of computers. Her Women's Studies 100 class was web-enhanced[8] and the learning curve for these women was steep, but they were able to acquire practice and experience using technology. In Erica's graduate educational theory classes, returning adult students, predominantly women, entered the university after years out of educational contexts. Their computer skills were often non-existent, and coupled with anxiety about returning to school, they were worried about all the 'new' technological skills that courses assumed they possessed. These teaching experiences indicated that women at our institution, frequently women of color, needed a different kind of access to developing computer literacy.

Fueled by a problem in our local context, we moved from engaging, teaching, and reading cyber-feminist theories and works by transnational anti-racist feminist theorists that questioned the inherent 'good' of technology, [9] to operate within frameworks that constructed technology as an inherent 'good' (or a 'neutral'). Also, we shifted from our general theoretical positionality of questioning the nation-state to developing a project that supported the nation-state through the creation of technologically savvy workers. Although the cyber-feminist literature (in particular the work of Spender 1995, Stone, 1995, Haraway 1991 & 1997, and others) foregrounds this work and enabled us to have important tools to conceptualize this project, this body of scholarship was not able to provide much assistance with writing grant proposals or coping with the day to day realities of the grant, technology and women's lives. Given our focus on material changes for women at our institution we instead found research on the *problem of women and minorities in the science pipeline* more useful for constructing our praxis-oriented project (for example, Hill 1997; van Opstal 2001).

Literature in this area signified what we observed at our institution: women continue to be underrepresented in technology fields, especially in professions that require computer expertise (Hill 1997). The national association, *Advocates for Women in Science, Engineering and Math*, enumerates the following data on the representation of women and people of color in science, mathematics, engineering and technology fields (http://www.awsem.com/gender.asp). Significantly, the data is often represented in ways that separate 'women' and 'people of color' into two discrete groups, for example:

- Only 19% of the science, engineering and technology workforce is female. (*Congressional Commission on the Advancement of Women and Minorities in Science Engineering and Technology Development* 2000)
- By the eighth grade, twice as many boys as girls show an interest in science, engineering and mathematics careers. (*Congressional Commission on the Advancement of Women and Minorities in Science Engineering and Technology Development* 2000)
- The percentage of women graduating with computer science degrees has decreased 25% since 1985. (*The National Science Foundation* 2000)
- Nine percent of engineers are women. (*The National Science Foundation* 2000)

- Hispanics, African Americans and American Indians comprised 22.1% of the population they comprised only 6.5% of the Science, Engineering and Technology workforce. (*Congressional Commission on the Advancement of Women and Minorities in Science Engineering and Technology Development 2000*, 10)
- In science and engineering, black and Hispanic faculty were less likely than white faculty to be full professors, even after adjusting for differences in age; and blacks and Hispanics earned lower salaries than white and Asian scientists and engineers within fields and within broad age categories. (*The National Science Foundation* 2000)

To support the market economy, employees with critical computer and technology expertise are in demand. The Bureau of Labor Statistics reports that the three occupations with the fastest employment growth between 1996 and 2006 are, (1) database administrators, computer-support specialists, and all other computer scientists, (2) computer engineers, (3) systems analysts. The U.S. Department of Labor projects that "new jobs requiring science, engineering, and technical training will increase 51 percent between 1998 and 2008; a growth rate that is roughly four times higher than average job growth nationally" (van Opstal 2001, 54).

Research that framed the absence of people of color and/or white women in science, math, engineering and technology (SMET) as an economic problem for the nation-state was central to our proposal. Schools play a central role in preparing workers for the economic needs of the state. Apple argued in 1979 that the valuing of curriculum that emphasized math and science over poetry and music was not arbitrary, nor based upon the intrinsic higher value of mathematics over music.[10] Rather math and science, "high status knowledge," contributes to the economic success of the nation in ways that music or poetry does not. The absence of a large portion of the population (people of color and white women) in science and technology fields (and science and technology classrooms) poses a significant potential threat for the state to American economic superiority (which we used as a tool to support our proposal).

> As long as S & E [Science and Engineering] workforce is composed disproportionately of white males, its expansion prospects will remain limited. Women and minorities, the fastest growing segments of the workforce, are underrepresented in technical occupations. White males make up 42 percent of the workforce but 68 percent of the S & E workforce. By contrast, white women make up 35 percent of the workforce but only 15 per cent of the S & E workforce, and Hispanics and blacks make up 20 per cent of the workforce but only 3 per cent of the S & E workforce. Efforts to boost participation by these groups in the S & E workforce are the single greatest opportunity to expand the nations' pool of technical talent. (van Opstal 2001, 55)

This threat to 'our' economic dominance pushed government agencies to fund research to identify strategies to recruit and retain these populations in SMET fields.[11] Working with this research and our knowledge of the academic context, we brainstormed ways of interrupting our students' educational trajectory to give them a different kind of exposure to technology. The research suggested that in the areas of math, science, and technology, women learn better in a single sex environment[12] and where relationships are involved, as in cooperative learning groups (Allen 1999; Streitmatter 1999; Felder, et al. 1995; Koch 1994; Clingingsmith 1993; Matyas and

Skidmore 1992; Tobias 1990). In addition, we realized that the enabling technological experiences needed to occur early in the students' academic career. If, in the first year of college, students opt not to continue in SMET fields, it becomes increasingly difficult to return and graduate with degrees in those fields (Allen 1999; Tobias 1990). We also considered that a component of project might be technology infusion—not to teach technology directly—but to infuse the instruction through other content.

With an idea in place supported by research data and our observations, funds were needed to support these visions of change. Several governmental agencies that funded educational reform had programs targeting under-representation of 'women and minorities' in SMET fields. We spent months working on our proposal. We sought out and received comments from outside reviewers and editors. We organized a budget and worked with the grants office at our institution to complete the application package. We worked to align ourselves with the discourse of the request for proposals (RFP) and, fortuitously, the American Association of University Women published a report that stated "technology was the new boys club," and we hooked our grant proposal onto their research findings (AAUW 1998). We wrote 15 pages that articulated a seamless vision of an intervention that would facilitate institutional change. "**AN AGENDA FOR EDUCATIONAL CHANGE: EMPOWERING WOMEN FOR LIFE-LONG SUCCESS THROUGH COMPUTER EXPERTISE."**

> The Project Investigator (PI), assisted by an interdisciplinary advisory board, will design and implement an Empowering Women section of an already existing first year course, the University Seminar, a course that introduces students to college and teaches skills and success strategies. ... This Empowering Women section will be for women only and will use cooperative learning groups and life-like problems to develop critical thinking. ... In addition, we will set-up a small open access single-sexed computer lab. This lab will provide peer-mentoring to encourage more women to master technology in a comfortable and supportive environment. The lab will also be available and open for other women in the university community who need computer learning support. Female peer-mentors, to nurture computer expertise, critical thinking, and cooperative learning, will staff this lab.

Our project was funded for four years, and the consequences of passing in this genre surfaced throughout the project. We thought that if the grant was acquired, we would be able to return to our context and work with our familiar feminist toolkit and proceed with our project unscathed.

**Part 2: Passing in a brave new world?**

Based on the language of the official RFP (and the accompanying resource booklet and telephone calls to the program officer) it was clear that successful proposals originated from a positivistic and a (mythic) politically neutral epistemological terrain. Our proposal used language seemingly representative of this paradigm (empowerment, life-long learning, assessment and evaluation, curricular transformation, quantitative data gathering) rather than terms that signified any allegiance to discourses of post-structuralism, feminism, or critical (race) theory. We did not include our ideas about dismantling (or even questioning the neutrality or the assumed inherent good of) the nation-state or educating women to resist white-supremacist capitalist patriarchy, but instead wrote a request for money to help women join in the economy. Shaping our proposal to pass in this ideologically neutral landscape rendered us proficient in,

and subsequently shaped by, this landscape. Passing in this paradigm isolated us and the project from the familiar critiques and comforts of our everyday landscape: languages of justice and anti-racism. The specific language needed for the proposal constrained our thinking, our imaginations, our actions and our responsibility. As a result of the limited discursive and epistemological moves we could make while tethered to this paradigm, tensions unfolded. This section offers examples of the consequences of engaging with positivism, of animating particular epistemological paradigms through the use of signifying words/phrases, and the consequences of circulating in a paradigm that lacks the theoretical tools that had historically enabled us to work against the "legitimacy of the dominant order" in the first place (Lather 1991, xv).

Language is one way participation in particular epistemological paradigms is signified. Language also signifies to audiences 'where' (often ideologically) to place work.[13] Working in a landscape devoid of the tools that typically enabled us to move toward progressive social change was visible in the design of the project. We worked hard to eliminate any language that would be perceived as subjective or postmodern (dialogues, discussions of power imbalances between students/subjects and professor/principal investigator, reciprocity, etc.) or political (the words feminist, white supremacy, and more). This discursive paradigm tightly framed possibilities for intervention and what we could officially document when the program concluded. For example, when the data collection process started, the questions to the participants were shaped by the language of the grant's request for *replicable reform strategies* and *quantifiable results.*

We chose language that would legitimize our project, yet this left us unsatisfied. A word that quickly became a stumbling block was *minorities*, a term that we would not use in our teaching, academic, or activist writing. Our preference, given the connotations of the term *minorities*—less than (whites) in importance and also less than (whites) in numbers—was *people of color* or *women of color*, yet the call for proposals used the term *minorities*. The phrase *women and minorities*, signifies that women cannot be minorities and minorities cannot be women, also appeared in the RFP and in most of the research on the 'problem of women and minorities' in SMET. When we gave a draft our the proposal to a friend, a physicist who had received many grants for educational change, he said "the *of color* has to go. Use *minorities.* They will not know what *of color* means." We thought about using *people of color* but decided that non-conformity with no money wasn't productive.[14] The word 'empower' was chosen because of its perceived appeal to the granting agency. There is significant work in feminist pedagogy and methodology critiquing the notion that researchers can empower subjects/participants (Patai and Gluck 1991) or that teachers can empower students (Ellsworth 1989), given the power dynamics between researcher and subject and between teacher and student in a classroom. We did not know if this critique of and sensitivity to the term *empower* was shared by government funding agencies. We suspected it was not, therefore we chose to use *empower* and *minorities* thinking the use of these terms might make our project more legitimate in their eyes.

What are the consequences of writing in a different genre, with different norms and vocabulary, in order to access institutional resources? Professionals often code-switch or use a variety of social languages many times in one day (Wertsch 1991). Why should the use of terms such as minorities or empower constrain us? Superficially, using the discourse of grants means we must attend conferences and be identified with a project called *empowering women*, a name that makes both of us wince.[15] At a deeper level, our adoption of this discourse also engaged with an epistemological system. Language is not neutral; language shapes ways of thinking about ourselves and the world we inhabit (Bulter 1996; Walker 1998). Using the granting agency's

language validates an epistemological framework of multiculturalism that is, at best, problematic (i.e. McCarthy and Crichlow 1993) and this has the capacity to literally produce subjects and create realities.

The paradigm we languaged ourselves into was not able to support the kinds of radical institutional changes we desired. We envisioned the grant with social change as the goal, not as to increase and diversify the labor market, yet to get the money we wrote and performed the latter. Our idea was that women participants would knowingly use their skills to enter the labor market and support the white supremacist capitalist patriarchy. Somewhere along the way (as we will contextualize in the last section) our steadfast critique of producing labor for the nation-state was reframed.

Months after the award was announced *The Chronicle of Higher Education* had commentary on the recent government agency's awardees (Brainard 1999, A59-60). The article had perspectives from the agency's acting director, from the Deputy Assistant Secretary for Policy, Planning and Innovation, and from a policy institute member on the recent allocation of federal dollars towards educational change. The author argued that many were not satisfied with grantee selections. Abigail Thernstrom, a senior fellow at the Manhattan Institute in New York, took issue with projects that focused on minority groups—or "under-represented" students—which made up 9 of this year's 26 grants (A 60). Her critique was that this agency targeted federal monies specifically to focus on under-represented groups. She stated,

> Obviously, there's a real problem in terms of the racial gap in academic achievement, and I'm very sympathetic to addressing that problem, but I want to address it through race-neutral means."… [E]ven if one accepted the need for such efforts, she said, she took issue with "one such … grant awarded this year. It will finance an effort at [our university] that would focus in part on helping minority women develop computer skills. (Thernstrom, as in Brainard, A 60)

Not only did Thernstrom call for "race neutral" educational change she mentioned our project specifically as problematic since we were focusing on women of color and technology.

"Race neutral" educational change is not feasible, and as research has demonstrated it is not effective. Eisenhardt and Finkel (1998) found that race and gender neutral environments in the sciences are only neutral to the white males that construct that environment. From our point of view "race neutral" is a code word for supporting white supremacy. Those committed to social justice, both inside and outside the academy, need to be able to decode the various ways that language is used to cloak, shape, and frame regressive political initiatives: i.e., the 'new' Racial Privacy Initiative.[16] These dominant oppressive "technologies" of language function to "colonize the consciousness" (Sandoval 2000).[17] In addition, questioning the choice to fund projects focused on people of color and/or women is connected to charges of 'reverse discrimination' and to larger critiques of affirmative action (Guinier 2003, McCarthy and Crichlow 1993).

We were used to organizing against this *dominant order* from within our feminist, post structural paradigm, yet our code switching abilities were seriously hampered and we were unable to access the critiques of power and knowledge in order to name Thernstrom's position ideologically. We found ourselves in the position of defending *our* articulated strategies of change (framed by our funding agency), with a discourse that was wholly inadequate to critique the mythic "race-neutral" educational change and to deconstruct the larger critiques of

affirmative action that Thernstrom animated. She singled out our project (and consequently our university) because our educational intervention was not race neutral and thus problematic to her. Our university is not often mentioned in the *Chronicle* and here our project (and university) was featured negatively. Someone from the university needed to respond, yet our location within the university hierarchy, as untenured faculty, framed our reply. Given this context, in our letter to the editor of the *Chronicle*, we wrote that we ***disagreed*** with Thernstrom's position, because "Race and gender are pivotal aspect of our lives that cannot be rendered invisible. Our project to empower women for life long success is one way of trying to solve the inequities of our educational systems" (*Chronicle of Higher Education*, 10/8/99). Not able to follow Sandoval's (2000) suggestions to embrace mobility and to implement tools across paradigms—the 'we disagree' statement that we wrote in response was not adequate, not enough, to combat the powerfully convincing rhetoric advocating race neutral strategies.

This desire for a "neutral ideology" also impacted our project through the granting agency's request to add language to ensure that the project would not discriminate against anyone. (To note of course is that the requirement for non-discrimination comes from the critical work of earlier paradigm-changers.) The government doesn't fund anything that discriminates against any group. We added special language to our proposal before it was accepted, specifying that this project would not discriminate against any group of people. The 'women only' project could not be advertised as for 'women only,' even though the proposal specifically articulates that the study/intervention was to create a single sex classroom environment for women. The brochures for the program used language like "specifically designed for women," and "targeted for women."[18]

The positivist language of the grant had led us to a very strange place: our project had now required us to defend language and paradigms we previously critiqued, to promise replicable products (when we didn't think curriculum was portable or worked decontextualized), to prepare and promote workforce development for the nation-state, and to advertise "Life Long Success Through Computer Expertise." Finally, we agreed not to discriminate in our discriminatory project.

**Part 3: The real thing: endings, beginnings, and findings**

Our proposal was written to acquire resources to support change on our campus. We focused more on the writing process than on building networks and understanding university politics, as it was relatively inconceivable that our proposal would be funded.[19] Our nascent set of university networks and vague understanding of university politics, factors essential to run a 'successful' project, led to unexpected outcomes. This section addresses what became possible, often unimagined, from the "Empowering Women for Life Long Success Through Computer Expertise Grant."

At the proposal writing stage we consulted briefly with the director of the University Seminar Program and the Dean of Academic Development (his boss) about our project and about future collaborations. In these preliminary discussions, it wasn't entirely clear to us or to the director what our expectations of his department would be. After acquiring funding, we were in the awkward position of 'telling' the faculty and staff who organized and taught the course that we would create a new technology-infused curriculum for them to adopt. However, the director needed time to understand the changes we had proposed. He didn't know what web-enhanced might mean and was justifiably nervous about committing faculty to something they might not be able to do. This was the first lesson we learned about campus organizing: Even though folks

may think something is a useful and interesting project, they don't want changes imposed from outside. Either they need to be a major participant in the writing process or they will legitimately drag their feet during implementation. However, we worked successfully with the director and other faculty and the first section of this course was offered in the fall 2000 with two-more sections taught in fall 2001. Over the summer 2002 technology training seminars were held for faculty who regularly taught this class and a generic course website was created for all faculty and students to utilize by fall 2002.

While this course was successfully redesigned, many of our visions for curriculum development and student and faculty transformation were unattainable. Not only had we established inadequate groundwork with the faculty who taught the course, but we chose a class to transform (University Seminar) that had enrollment problems. The University Seminar does not count toward general education, nor does it count toward any major or minor. At our university, most students are the first in their families to attend college and they work at least part time to support school. Courses need to ***count*** for something. As our project progressed, we discussed working with university committee structures in order to get the course to count as a general education option. Unfortunately, as the University Seminar focuses on college success skills with no disciplinary content, faculty view the class as remedial.[20] Although this course teaches skills that enable students to succeed in college (reducing degree completion time), it cannot be used towards a major, minor or a general education credit, and therefore it frequently suffers from low enrollment.

Our project's focus on women added to the enrollment problems. Given the research on women's successes learning technology in single-sex environments, coupled with our own background and familiarity in Women's Studies environments, we did not envision that the single-sex aspect of the course would be a problem. The brochure advertising the course had photos of women, used the language—"specifically designed for women"—cited data about the state's need for technology workers, and listed employment opportunities in technology fields.[21] Interviews with women who enrolled in the women-only sections demonstrated that they had selected this class not because it was women only—but because of the technology and the statistics cited on the brochure in relation to job opportunities. Interviews further illustrated that many of the female students in fact thought about NOT taking the class because it was women only and they had to defend to family and friends why they wanted to take a course *for women only*.[22] Enrollment was a continual problem due to the University Seminar status and because it was offered for women only.

Another aspect of our project that we were under-prepared for was faculty/teacher transformation. We expected that faculty, when introduced to different, possibly more effective teaching methods through the integration of technology, would want at least to experiment and (hopefully) work to transform their curriculum. This was not the case. At a working-class institution, while there is a push to incorporate technology into classrooms, there is not adequate support for these initiatives. Faculty, already asked to do state mandated assessment and wary of a fad that will mean more work and no recognition or remuneration, were hesitant to start a new project. Additionally, faculty teaching University Seminar were comfortable with the pedagogical (and for some technological) methods they already used and/or had developed. They were interested in the technology but not completely convinced of its importance or need within the context of the class.

As the project draws to a close, aspects of how women use technology on our campus have changed. The technology-infused curriculum did have an impact on the technological

literacy levels of students. Surveys, interviews, and participant observation demonstrated that first-year students, women (and later men in campus-wide sections in fall 2002) who took a University Seminar course that had been redesigned and had technology infused into the curriculum (as of 2002 more than eighty students and increasing) had little to no technological expertise at the start of the class. For example in our first "Empowering Women" class, fall of 2000, only two out of twelve students had computers at home and only one used the computer daily or had a computer in her room. Three out of twelve had used forms of electronic communication prior to the class. All enrolled in this course because they thought they would need to 'know computers' in order to get a good job. Before they took the course, all the students stated that they would not register for a course that was listed in the university course catalog as web-enhanced or required the use of the World Wide Web to relate to the professor or the curriculum and many students stated that they were "afraid" of technology or "dumb" about it. None of the students could make a webpage. By the end of that first semester, all students could use email, could make webpages (using Netscape Composer and other programs), navigate the web, use Excel, and when interviewed, stated that they would consider taking a web-enhanced class or a distance education class. Clearly, their proficiency and confidence levels increased. This finding was repeated in year two of the project, and in year three the curricular changes we developed were implemented throughout most of the sections of the University Seminar[23]

Our proposal implied that curricular transformation would be the location of change, however empowerment did not come from curricular or faculty transformation, instead it resulted from peer tutoring and informal workshops. The importance of creating spaces where students can participate as legitimate community members (for our population this means in part as paid workers) to learn without the notable presence of a teacher, a class or curriculum was an unanticipated result of this project. The grant funded a computer lab with 5 machines, a phone, a printer and peer mentors/lab assistants to assist and teach students technology. The lab is located next to the Women's Studies department and there are sofas and coffee tables in a small common area outside the lab. The first group of assistants hired in 2000, were three Latinas and one returning adult white woman. They decorated the lab with posters from the Women's Studies Program and named all the computers after famous women scientists. They used the lab as a site for their own work, socializing, and organizing (usually after working hours). Their job was to staff the lab and teach other students—help them learn to email, use spreadsheets, create web pages, etc. They placed signs across the campus, made business cards that they delivered to classes (first to Women's Studies classes/faculty and then expanded to other courses) to let students (and faculty) know that one-on-one help was available.[24] Fifteen women have worked part-time over the four years as lab assistants.[25] Four had limited technical experiences and only needed a small amount of technical training to start work, while the other eleven who had little to no computer experience, were trained on the job by other lab assistants and by us. Students from Women's Studies, Psychology, Education, Business, and other departments utilized the lab.[26] Over the past two years more than twelve students per week came to the small lab for assistance. The huge open labs on campus have roughly 350 computers available and most are in use from 10am-7pm Monday through Thursday. That is approximately 350 students using computers 9 hours a day, 4 days a week, or something like 1260 students. Thus we think that 12 students per week (about 10% of the computer using population) receiving one-on-one assistance is an accomplishment.

The assistants work with a range of technological and often academic problems and a variety of students: the 80 year old woman who audits courses and immediately forgets what she

learned at the last tutoring session; students who are recent immigrants from Mexico who left villages with no electricity; young women who finish college and need help with their resume and job searches to get a first full time job; students who do not have a computer at home and did not use a computer in their high school classes and need help learning the skills to complete a specific assignment. The lab assistants' work also transformed their own ideas about what they can do:

> Lilly, *19 year-old Latina*[27]: Before working in the Empowering Women Computer Lab, I had no experience with technology. In fact I had very strong feelings towards computers. I hated and feared them. Every time I had to use a computer I would try my best to avoid it. ... I know I'm not the only woman that has ever felt that way about technology. ... In [a class that taught technology] I not only overcame my fear towards computers but I became inspired to share this experience with other women. Shortly after my first semester I began working in the Empowering Women Computer lab. I learned how to use "Microsoft Word," "Excel" and other computer programs. I also learned how to make web pages. Now when women come to the lab I can teach them everything I've learned. It is a great feeling to be able to share my story with other women and to know that I have encouraged them to approach computers and many other new territories without fear. At times after doing some work with the women I would have intimate conversations with them. Their stories remind me of the importance of what I do and how much more I can do. (Interview, spring 2002)

> Marg, *55-year old white woman*: When I was asked to work in the lab I was honored that someone else out there knew my passion and focus on empowering women. I thought I really knew everything about computers, boy was I wrong. Not only did I educate women but I also educated myself at the same time ... I love to help people especially women. Not only to bring out their inner knowledge but also share some new ones as well. Also to show them what they do have to offer to the world. Too many women feel that they do not have anything to offer, not enough, scared, intimidated or that no one cares. Unfortunately many times that is still true. The job of the lab and the assistants is to empower these women not to be afraid to explore their knowledge. (Interview, spring 2002)

The assistants' jobs require that they practice the technological skills they acquire and they become innovative technological and academic trouble-shooters. From observations and interviews, it is clear that lab assistants learned from teaching: they increased their own skill levels, became better able to navigate the university and academic context, improved their writing skills, and increased their confidence levels. The majority of the women we hire to be lab assistants are first generation university students that support themselves (and often their families) with loans, scholarships and part-time employment. They are representative of the larger undergraduate population at our university. Typically, the part-time employment these lab assistants had prior to working in our lab was low-wage service industry jobs. For example, Lilly worked as a telemarketer and as a fast food cashier and while this labor enabled her to support herself and her daughter (with some assistance from her family), these jobs did not enhance her resume, nor did they support or coincide with her academic and professional goals (to work in

the law-enforcement field). The paid employment that women did prior to working in the lab (waiter, telemarketing, service sales, child-care and fast-food cashier) was feminized non-union service-sector work. At the lab, the assistants were the experts, they had knowledge and skills that others wanted, and they worked in these "expertise" positions in cross-generational and cross-racial contexts. A part of their job was to engage in professional development and this entailed developing new skills. Thus, the assistants' view of themselves changed.

> Lilly: If someone comes in with a technology question, like how to find a webpage or use a program, I just sit down with them and I show them and then watch them try. I learn new things when they make mistakes too… Sometimes I am worried that I will not know what they need but when this has happened Laurie can come over and I get to see, like the time we were working out the FTP problem… They [lab user] are usually really relieved and happy when something is solved or made clear. I never thought I could do this. I mean I probably could have but I don't know where I would have learned. (Interview 2002)

They articulated feeling *empowered* by their skills and their success. Their boss and the people they assisted took them seriously as skilled human beings. They referred to their work as "teaching", or "working in the lab" and this gave them a meaningful campus and employment identity.

The material contexts these women face in their lives, how to support themselves and/or their family on low-wages, is a critical factor that shapes their academic trajectory. When roles as 'worker' and 'student' conflict, as is the case for many of our students who swell the ranks of the low-wage service industry sector, the material realities—paying rent, supplying food, and even covering tuition—surpass paying attention in classes. The lab assistants managed to avoid some of this role conflict, as their paid employment connected to their education. They worked in the same physical spaces that they studied and their identities as 'worker' overlapped with their identity as 'student.' Additionally, they received above the minimum wage for paid work on campus (and above federal minimum wage)[28]. For the lab assistants their on-campus employment provided a connection to a community that included: the other lab assistants, Laurie as their boss, and the students who counted on them for their expertise. They came to understand their value in a (feminist) community of learners and they possessed a physical space they considered their own, the lab, their office, their location at the university. As Rose, a 22-year old Latina stated: "It was a home for me. It was like my office and my place on campus. I could do work there in the downtime. And there was always someone for me to talk with if I needed it. It made me know if I came to the university there was a place for me" (interview, 2002).

The lab also became a site for student organizing. In 2001-2002 a lab assistant was also the organizer of the Gay Lesbian Bisexual Alliance (GLBA) on campus and another was the organizer of the Feminist Majority Leadership Alliance (FMLA). These student clubs used the lab to create promotional materials for events, to electronically communicate with members of the group, and to do research projects together. [29] The lab space was routinely full of books, posters, notes about campus and community events, pamphlets, left-over food from student events, and assignments that lab participants (or assistants) were working on. FMLA and GLBA members also taught each other technology, especially the various means of electronic communication. The lab assistants created or helped to create posters, websites, bulletin boards and listservs for both groups. "I learned skills because we would be taking about doing

something, like communicate an issue, the vote drive, and the computers were always there. We always know we can ask Laurie for help but we could also figure it out ourselves" (Marg, interview 2002). Because of the proximity to the Women's Studies department and the availability of the sofas outside the lab, it was also a hangout for students. Students would organize meetings or leave messages to connect socially "at the lab". The floor the lab was located on during its first two years also housed the faculty and staff of the international program, the women's services and returning adult program (our campus women's center), the honors program and the non-traditional degree program. The location provided the lab assistants with access to vital information. Most of the lab assistants utilized the resources on the floor. They joined the honors program, went on an international trips, completed their degrees earlier by graduating with non-traditional degrees and used their knowledge to help their on-campus communities (the queers, student of color, feminists, and socialists) do the same. "I always know there will be something happening in the lab. At least one person I know will be there talking about a class or a professor or a good story about somebody. You just get connected" (Lilly, interview 2002). Interestingly, now that the lab has moved from a student services floor to floor comprised of mainly faculty offices and classrooms, the lab attracts more non-targeted, drop-in, students and the space facilitates interactions between students and the faculty.

The success of the lab component to teach students at our institution, in particular working class women of color, a relationship to technology, is not startling. Meaningful work experience, mentoring, community development, and peer learning facilitate academic growth and the acquisition of technological skills. Learning or legitimate peripheral participation in communities of practice, "is a process that takes place in a participation framework, not in an individual mind" (Hanks, in Lave and Wenger, 1991, 15). There was no formal curriculum, no teacher and no classroom structure, yet the lab assistants, their peers, and the social communities they were a part of learned technology. The two student groups (FMLA and GLBA) used technology as a tool to organize and create relationships; students wanted to work together to make webpages for the FMLA or the GBLA. They used technology as a tool for community building and advancing social and political practices they were invested in. The importance of non-formal educational sites in the acquisition of technological skills/expertise is supported by Michael Resnick, one of the instigators of the "computer clubhouses,' community spaces that are set up to get youth involved in technology (at present there are 50 sites funded by INTEL). Resnick argues that "access [to computers and technology] is not enough, access is just a starting point" (in Marriott 2002) in closing the digital divide, and that fluency with technology is what is needed.[30] The computer clubhouses, informal spaces that use mentors (artists and professionals) not teachers, facilitate not just access but mastery.

**In conclusions**

There is no neat and happy ending to this story. Curriculum transformation did, in our context, enable female students who completed the course to attain a higher level of confidence and technological abilities. The meaningful (and paid) apprenticeship of the lab assistants during the same time period enabled them to acquire a wider range of skills and most importantly, a kind of fluency that was not evident in observations, interviews, and assessments of coursework done by the students who only took the technology infused University Seminar course. Faculty did integrate technology into their classes and all faculty made use of the generic course website we created. Our project helped us create a relationship with the director of the University Seminar and to understand the importance of the academic development community on campus,

both valuable experiences and that might have been inaccessible without this project. While acquiring the resources to support this change was significant, negotiating how language and epistemological frameworks shape and constrain projects and political action also has been a valuable 'finding.'

Our initial overwhelm of being constrained by the language of the grant, the *Chronicle* article, our response, and our conference presentations based on the grant writing began to dissipate as we became immersed in the project. Laurie's teaching of the courses and mentoring of the lab assistants grounded her in the materials aspect of the students' lives, work, school, family, etc. Erica's in-depth interviews with the same population refocused the project on the students' needs and outcomes. This brought us back to our initial goals—social change for women at our institution.

Our project complicates arguments that advocate for women-only learning environments. While our project does not dispute the fact that women's educational choices are constrained by compulsory heteronormativity (i.e. women in Empowering Women University Seminar stated that women-only learning environments were 'unnatural' thus clearly negatively impacting their educational choices), we had a difficult time recruiting women to participate in a women-only course. Low enrollment does not mean that students wouldn't benefit from participating in the course, yet women at our institution expressed reluctance to take a women-only course. This presents a problem. Even if we think this is the best educational environment, if no students enroll, despite creative marketing strategies, it is not an effective educational intervention, nor is it the 'best' environment. In addition, most of the literature that looks at the efficacy of women-only learning environments does not adequately address how race and class impact single-sex learning environments. The multi-racial, working-class population that attends our university calls into question single-sex learning environments that do not take into account race and class.

For us, the structuring environment was not the single-sex classroom, but the constraints of the students' lives and their need for meaningful employment, in addition to their need for the technology skills. Consequently, we tried to create opportunities for employment and skill development. We began to question what it means to work within the discourse of the nation-state that desires the production of "good" workers. We started this grant questioning this goal and viewing our work as 'feminist' educators not to merely assist in the shaping of compliant subjects for this economic order, however, what became clear, quickly, was that the women we wrote the grant for needed employment. Not just any thing that would put money in their pockets but *meaningful* employment, employment that empowered them in their lives. While our academic trajectory to this point had continually positioned us to critique the goals of the nation state and the economic order – participation in this project has illustrated to us the need to be both critical of the nation state, yet work to create employment opportunities that simultaneously "maintain" it. The feminist, activist, and geographer Ruth Gilmore, writing against the mass incarceration movement, also argues against static notions of power and resistance. "One works with what is at hand; the problem is not the "master's tools" (Lorde 1984, 110) but the effective control of those 'tools'" (23).

The feminist work becomes layered – how do we change the paradigm that constructs educational equity as *a good* when it is contextualized within the preparation of a workforce? How do we alter this paradigm when it is the very paradigm that makes *us* (women and technology) visible within the eyes of the nation-state? How can modes of resistance be enacted and conceptualized, from within the master's house? Sandoval, working from Foucault, states:

> Citizen-subjects who are interested in generating effective modes of resistance capable of confronting neocolonial postmodernism must first recognize the fact that much of our perceptual apparatuses and tactics for action are based on past, outmoded yet residual conceptions of power and resistance. (162)

We began the project because we believed (and still do) that it is imperative that students, especially women of color, be given the opportunity to develop computer expertise in their college classes. We end the project with the knowledge that we were naive to hope to be able to 'take the money and run' yet this process enabled us to gain perspective on the importance of implementing (and theorizing) educational and institutional change.

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[3] In order to ensure anonymity for our participants (whose names have been changed in this document) we do not name the funding agency.

[4] Lather (1991) defines oppositional as “those discourses/practices seeking to challenge the legitimacy of the dominant order and break its hold over social life” (xv).

[5] The Combahee River Collective is credited with coining this phrase in 1977.

[6] “We” is an artificial entity constructed for this paper. Throughout this process the two authors, committed to similar desires for progressive social change and inhabiting similar feminist anti-racist epistemological terrains, have held different positions in relation to this project and to the institution. These differences are written out of this version, not to create a sense of seamless unity, rather to create a coherent story.

[7] The 2000 Report “Falling Through the Net: Toward Digital Inclusion” (National Telecommunications and Information Administration) stated that, while gains were being made, there was a significant racial gap in access to personal computers and the Internet at home. The report states that approximately 1/3 of the total US population uses the Internet at home, only 18.9% of African-Americans and 16.1% of Hispanics use the Internet at home.

[8] The class meets ‘face-to-face’ but is also augmented through online components including writing conferences for group work.

[9] Transnational feminist scholarship illustrates that the material lives of poor women of color who construct personal computers are not ***progressively*** impacted by technology (Mohanty 1997).

[10] For example science, math, and technology high school teachers typically receive high pay than art and music teachers and the disciplines of science, math, and technology are viewed as the “most important curricular knowledge” and “given large doses of federal support to assist its adoption in schools” (Apple 1991, 37) while art and music education, frequently feminized teaching practices in schools, are often defined as extra-curricular.

[11] For example, the 1991 American Association of University Women (AAUW) report, S*hortchanging Girls, Shortchanging America*, followed the same tenor of *The Nation At Risk* (the educational document issued in 1983 under the Reagan administration). A clear theme in the AAUW report is that since the jobs of the future require math and science, where will our nation be if girls, 50% of the workforce, cannot do math? This is also a theme in the 2000 report: *Congressional Commission on the Advancement of Women and Minorities in Science Engineering and Technology Development:* "Land of Plenty.” Problematically, both of these documents do not focus enough on how the epistemological, disciplinary and professional boundaries and practices of SMET ‘discriminate’ against people of color and/or white women/girls.

[12] In 1998 the AAUW Educational Foundation released an inclusive report, *Separated by Sex: A Critical Look at Single-Sex Education for Girls*, summarizing current research on single-sex education. This report found that single sex education does not have benefits once adjustments were made for differences in students’ socioeconomic status, pre-enrollment ability, selectivity of the school, and other variables.

[13] This may seem trivial, *being able to signify one’s political position*, but if “Language is delimitation, a strategic limitation of possible meanings” (Lather 1991, xix) then certain positions are made possible and others impossible through language. We rendered our most useful tools, our allegiances, and ourselves invisible.

[14] In retrospect, it would have been useful to use the term people of color and to name why this was important in a footnote *(The Land of Plenty* Report does this). We wanted to get the grant and not have our proposal appear to be condescending, be interpreted as a lesson to the reader, or (most problematically) be dismissed as not relevant.

[15] The word empowering is relevant and appropriate in other contexts. For example the grassroots non-profit organization Beyondmedia (http://www.beyondmedia.org) uses the word to describe the workshops they do on media activism with under-served and under-represented women and youth. They give the participants the skills they need to tell their stories, articulate their identities, and organize for social justice through the collaborative creation and distribution of alternative media arts.

[16]The Racial Privacy Initiative would prohibit collecting any ‘racial’ data by public institutions (with a few exemptions) under the guise of ‘privacy.’ Of course unstated in this initiative is that this data often illuminates the

"undisputed racial and ethnic disparities in every realm of American life" as Williams writes. Who will the 'non-collection' of this data benefit (Williams 2002)?

[17] One example of the ways this "neutral" language has been used to create movements against affirmative action in the United States is California's proposition 209 that passed in 1996. *"The state shall not discriminate against, or grant preferential treatment to, any individual or group on the basis of race, sex, color, ethnicity, or national origin in the operation of public employment, public education, or public contracting"* (California Secretary of State 2002).

[18] The brochures also used statistics from the Bureau of Labor highlighting the growth in technology related fields of employment. We advertised to the desire for jobs and lucrative employment.

[19] Given the number of proposals the granting agency received the odds of getting funded were 5%.

[20] A significant question that arose from this process was what counts as "real" academic course work at a university focused on open access? Students can attend our university through a variety of special programs that assist those not able to access the university in more traditional ways. It is troubling how some colleagues focus on rigor or the inherent quality and standards of a discipline thus disparaging the unique opportunities of teaching at our university. Simultaneously not creating an environment where all students are enabled to be successful in college.

[21] Although critical of those calls for more technology savvy students, we recognized many students attend college in order to learn skills and attain "good" jobs. Our brochure appealed to those aspirations.

[22] From the interviews it is clear that these women (and their family and friends) were troubled by the idea that they were doing something un-natural by taking a single sex class. The students had to convince their friends and family that a women-only environment was 'okay' because it was about becoming better prepared for the job market. The conception of the all women environment as 'un-natural' or 'not normal' 'not regular' arose in the interviews, an example of the ways interlocking forms of oppression manifest. There was a gap between 'our' (lesbian, feminist, academic) understandings of the utility of a single sex environment and how we can meaningfully translate this to students in our context. Misogyny and more centrally homophobia (Pharr 1997) function as discrete but powerful barriers to discourage women from taking a women only class and we were limited in our ability to address these issues, partially due to the subject matter of the seminar.

[23]The project involved collecting pre/post data (surveys and interviews) from our Empowering Women University Seminar classes and collecting pre/post data (surveys and interviews) from university seminar courses that ran concurrently and were not technology infused. Our project coincided with the university's move to support and promote the use of Blackboard.

[24] The general open access student computer labs on campus are not staffed with assistants to help students learn. If staff are not busy or required to stay at a central desk they might assist students in a dire emergency, but their job is not to facilitate learning or to teach.

[25] At the end of 2003, the institution will absorb the lab. The lab will continue to exist but will be funded by the university, not through an external grant. We are negotiating to retain the ability to hire the assistants and to oversee the lab, but the name will be changed to be more inclusive; it will be the "Empowering Students Computer Lab."

[26] By the end of year three we had at least 20 faculty members who regularly directed students to seek assistance at our lab (data generated by referral information and online survey filled out when entering the lab).

[27] The names have been changed to protect students' anonymity.

[28] This higher wage was achieved because we argued that those working in technology fields 'merited' higher wages because of market competition.

[29] The proximity of the lab to the Women's Studies Office perhaps provided a sense safety and legitimacy to these projects

[30]All the photos in this *New York Times* article—4 large color pictures— are all of young men (of color) engaging with technology and the article does not cite any young women that participate in the project. The article does cite a female staff member of the project (Marriott 2002).