

Introduction: Assumptions

In 1991, as Apple and Microsoft were continuing their strides with technological development (Mac Quandra 900 with a super floppy drive, Microsoft Windows was released the year before), and the release of the follow-up James Cameron film of organic machines, *Terminator 2*, the concept of the *cyborg* entered academic discussions. Largely due to feminist scholar Donna Haraway's 1991 publication on the "Cyborg Manifesto," the academic discussion encouraged researchers of language and rhetoric to seriously consider how technology influenced not only teaching and learning, but the identity of teachers and students who used technology in academic settings. Haraway described the cyborg as "... a cybernetic organism, a hybrid of machine and organism, a creature of social reality as well as a creature of fiction. Social reality is lived social relations, our most important political construction, a world-changing fiction" (Haraway, p. 149). Haraway explained that we are all cyborgs—part human, part machine. When we—the authors—were first introduced to this concept, we thought not only of Arnold Schwarzenegger in Ray-Bans, but also of our use of cars, pens, pencils, typewriters, computers, radios, and credit cards. We thought of relatives in wheelchairs. We thought of war veterans with artificial limbs. We accepted Haraway's theory as pointing out the obvious. She gave language back in the early nineties to what it meant to be a feminist who is also interested in technology, and she contributed to our own beliefs and research that dualistic thinking, the "difference between natural and artificial, mind and body, self-developing and externally designed" (p. 152) was mostly simplistic and naïve.

Now, fifteen years later, we revisited Donna Haraway's work for the purpose of historical hindsight and contemporary discussions. As we observe our own students' use of technology,

technologies and bodies have become even more connected. Most of our students are “connected” with iPod armbands, Bluetooth headsets, cell phones, digital cameras, and laptops with wireless internet access. At our institution, we find that this materialistic technological trend cuts across ethnic and economic differences although iPods might not be as new or powerful, and cell phones might be 2 years old if students come from economically disadvantaged backgrounds. Our students’ disciplines also have become and continue to develop their body of knowledge because of technological developments. For our pre-medical students, uses of new technologies to find cures for cancer and AIDS created new possibilities for medical study. AIDS patients, our students tell us, now commonly have medical cocktails that offer hope and a chance for survival. Our mechanical engineering students learn about electric and hybrid cars as part of their curriculum while the environmental science majors learn that the very same technologies might help decrease greenhouse gas emissions.

On a less uplifting note, our environmental science students show us in their presentations that we have used technologies to pollute the planet in almost irreversible ways. Paired with economic prosperity in some countries, and the desire to become major players in the world-economic arena, political science majors argue that increased technology use has also increased exploitation. We usually don’t examine in our everyday lives—although we claim we are sensitive to these issues—in what ways our economic positions, our gender, our race, our nationality, and our age impact our uses of technologies in our lives.

Although our research, surveys, and informal observations tell us that many of our students use computers and other technologies in their daily lives, we have found that we often pay little attention to what technological skills our students bring to the classroom. In fact, it is ordinary to see students on their cell phones when they walk from one class to another class. It is

ordinary to see them with their iPods and MP3 players. It is ordinary to see them sending a text message to a friend or playing a computer game. We see our students' technological literacy behaviors as ordinary when in many cases they are extraordinary and complex; yet we often lack wonder, as Iris Marion Young (1997) reminds us, and we hardly ask why and for what purposes our technology-enhanced students (cyborgs) use their cell phones, iPods, or computers. At the same time, while we agree that our students seem technologically savvy, we also often notice that they do not exhibit critical and analytical technological literacy skills. We argue that while our students may be able to play computer games with players from other countries, they seem to research another country's political and social situation only superfluously, taking the easy route of Wikipedia and trusting all websites that come up on a google search. Students talk to their friends on their cell phones and seem to manage many activities between classes, but their reasons for late papers are similar to our own undergraduate excuses when we left hand-written notes on windshields. Every time we decided to take on our students, we realized that our understanding of student behaviors did not allow us to move beyond commonly held assumptions about what students know and what they don't know.

In this paper, we provide a starting point for moving beyond assumptions about our students' technological and critical literacy skills, and beyond assumptions of dualistic thinking that we find is still prevalent in many classrooms. We use examples from two hybrid classes—taught partially online and partially face-to-face—to explore the impact of technologies on student learning and student literacy and identity development. We show that students in our classrooms are comfortable with embracing the functionality of computer technologies, a functionality that is often defined differently by teachers and students. We show that our students are, however, uncertain about transferring their technological literacy skills to a new

environment, especially if this environment is considerably different from the environment in which they explore and experiment with technology on a daily basis. Our student-cyborgs seem much more adept with the latest technologies than the teacher-cyborgs, but like the generations before them, they too become largely creatures of habit. Our discussion includes a preliminary model for articulating cyborg behaviors in the 21st century loosely based on Stuart Selber's (2004) technological literacy concept in *Multiliteracies for a Digital Age*, and Beverly Tatum's (1992) discussion of racial identity development in *Why Are All the Black Kids Sitting Together in the Cafeteria?* Our purpose is to move away from looking at technological literacy development as a linear and well-defined process so often implied in current literature and also experienced in our own courses (students start as functionally literate users and then move on to become critically literate users, ending up as rhetorical users of technology). We add, by showing the dilemma we faced in our courses, and by outlining our understanding of the stages of digital identity and literacy development, that acquiring technological literacy is a complex process that often repeats itself, moves in circles or spirals, with technology users often defying easy categorization and instead becoming cyborgs of their own making.

We chose Selber's and Tatum's theoretical frameworks to show that the development of a multiliterate approach to technology and the development of a complex understanding of race, gender, and class issues are more closely connected than current research has provided. In some ways, we took our cues from Haraway (1990) who, in discussing the concept of "cyborg," compared it to discussions of *women of color*. Both discussions, she points out, mark out "a self-consciously constructed space that cannot affirm the capacity to act on the basis of natural identification, but only on the basis of conscious coalition, of affinity, of political kinship" (p. 156). We wanted to create such affinity and kinship in our discussions by creating a concept for

looking at technological literacy that incorporates theories not necessarily associated with research on digital and visual literacy. Incorporating racial identity theory, and acknowledging unlikely connections, will provide researchers interested in students' technological literacy development with a new perspective that might lead to new developments and new ways of approaching student identity development and technological literacy development.

Contemporary realities show us that neither one exists in isolation, but that identity and technology are closely and inextricably connected. We have seen that students bring with them a multitude of experiences and a multitude of technological literacies that move beyond the often one-dimensional characteristics of the 21st century student defined for us by current research on the new technology-savvy students coming to our classrooms (Mark Taylor, 2006; Diana and James Oblinger, 2006). Our proposed stages of digital identity and literacy development show that we do not have to categorize students as easily defined entities, and we don't have to measure our successes or failures by students' achievement of the lofty and ill-articulated goals—such as getting students ready for the technological challenges of the twenty-first century—that academic institutions often set for themselves; instead, we can provide students with opportunities to develop their technological literacy identities without measuring our own success as teachers, but by measuring students' success in their complex development as users of new technologies.

Technological Literacy in Educational Settings

Much of the research over the past two decades on using computers in the writing classroom has centered on increased student involvement in class discussions, academic improvement, personal growth, collaborative potentials, social ramifications, ethical

implications, and implications for gender, race, and class issues (Selfe, 1987; LeBlanc, 1990; George, 1990; Takayoshi, 1994, 1999; Grigar, 1999; Duffelmeyer, 2000; Gruber, 2007). The conclusions have often been that technology is a helpful tool that provides an opportunity for students to communicate and interact more productively, discuss issues that might not be addressed in face-to-face class meetings, and gain more confidence as social human beings. Students, in other words, can develop and sharpen their critical literacy skills by utilizing computer technologies in productive and non-hierarchical ways.

Although we know that technology itself does not enhance the learning environment for our students, and although we know that technology itself does not provide a more equitable, collaborative, non-authoritarian medium for student-teacher interactions (Todd Taylor, 1998), we often hope that we will be able to use computer technologies—like other pedagogical tools—to provide students with a stimulating and positive educational experience and to make sure that students become critical consumers, viewers, and users of technology. We usually don't acknowledge that they already might be able to think critically and analytically about various aspects of technology, including computer technology. They might have grown up in neighborhoods where computer access was a given, and where computers in schools were used to enhance teaching practices. They might have more negative experiences because computers in their schools were outdated and computer use was restricted to the “smart” or college-bound students, often leading to discriminatory practices based on race, gender, and class. And, they might have experienced the need to look critically at the web to find reliable information on a health issue, or they might have participated in gaming that requires analytical skills (Gee, 2004).

Our interest in exploring how already acquired technological literacy skills can be transferred to an academic setting, and how discussions about technological literacy can be

incorporated successfully into the classroom, encouraged us to explore hybrid course modules for the undergraduate and graduate courses we taught. We considered it important to use technology as a means to help students interact and communicate with each other. We were hopeful that hybridity would allow students to understand how digital literacy influences the content as well as the context of teaching diversity, cultures, and technology. As Peter Sands (2002) argues, “the hybrid model opens the possibility of rigorous and sustained efforts to acknowledge both institutional necessities and to create more equitable, distributed, non-hierarchical interactions.”

Furthermore, our past research and our past experiences in the classroom led us to believe that collaboration during face-to-face meetings, online discussions, and multimedia presentations would increase student awareness of the effects of hybridity on literacy development and identity formation. In other words, with the intersections of real and virtual student meetings, we hoped that students would see technology as a tool that can be used to provide information, manipulate audiences, or question existing social and cultural paradigms. Thus, we projected that students would no longer consider technology “as a force in its own right, one that shapes today’s societies and values from the ground up and has no serious rivals” (Borgmann, 1984, p. 9), but instead as a more ambiguous and more complex tool that can hinder as well as enhance communication. We assumed that students would be able to transfer their analytical and critical skills from discussions of texts to discussions of technology because we fully intended to tell them to do so. With these expectations, based on research we had conducted, we implicitly anticipated that students would move beyond dualistic thinking and would understand their role in participating in a community that embraces multifaceted realities.

Definitions

Before we taught our classes, we wanted to make sure that we defined technological literacy not only for us but also for our students. Otherwise, discussions about technological literacy can become a matter of misunderstanding and miscommunication. We wanted to make students aware that technological literacy, in the broadest sense, can be seen as “one’s ability to use, manage, assess, and understand technology.”

[<http://perso.wanadoo.es/losans/n003/arti00304.pdf>]. The International Technology Education Association (ITEA) used this definition as the basis for a 2001 survey in which they found that the public widely accepts the importance of technological literacy in everybody’s life. The study’s major findings were:

- The American public is virtually unanimous in regarding the development of technological literacy as an important goal for people at all levels.
- Many Americans view technology narrowly as mostly being computers and the Internet.
- There is near total consensus in the public sampled that schools should include the study of technology in the curriculum. [<http://perso.wanadoo.es/losans/n003/arti00304.pdf>]

It is not clear from the definition of technological literacy and from the major findings whether an “understanding” of technology refers to the functional skills necessary to improve job performance or whether the definition used by ITEA sees technological literacy also as a “cultural phenomena” (Selfe, 1999). According to Selfe, expanding the definition of technological literacy to include “a complex set of socially and culturally situated values, practices, and skills involved in operating linguistically within the context of electronic environments” (p. 11) moves us toward a better understanding of how technology impacts job

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performance, educational environments, or political actions.

Although we strongly agree with Selfe's definition of technological literacy, and with Selber's concept that students need to be exposed to and understand functional as well as critical and rhetorical technological literacy, we are aware that many schools are almost exclusively interested in providing students with quantifiable, mostly functional, technological literacy skills. For example, our home institution defines technological literacy as being proficient in keyboarding, word processing, course management, hardware and software basics, data management, spreadsheets, web page authoring, electronic communication, and presentations that are properly formatted. Students are also asked to collaborate electronically in a group environment using email services and Internet technologies, and to understand the ethical use of computing, software, and Internet technologies. Although any of the skills addressed in the list of proficiencies could be explored from a critical standpoint, students are not asked or encouraged to look at the "complex sets of cultural beliefs and values" (Selfe, 1999, p. 12) that influence the use of computers in educational or workplace settings. Instead, our institution, one of the largest distance education providers in Arizona (approximately 7,000 students are virtual students), largely focuses on increasing students' functional computer skills. In our hybrid course modules—taught on campus and online—however, we expected students to think beyond their comfort zones and the comfort zone of the institution. We wanted students to transfer the analytical literacy skills they acquired for reading print texts and understand technology not only as functional but also as a culturally, politically, and socially defined entity. We were prepared to move our students along from learning "how to" to "why is," or so we believed.

Preliminary Ideas: When Practices Show Unwanted Realities

When we decided to collaboratively teach an undergraduate capstone seminar and an introductory graduate course in rhetoric and composition studies, we asked ourselves a number of questions: How can we integrate functional, critical, and rhetorical technological literacy into our curriculum? Why do we want to establish a cross-curricular collaboration between undergraduate and graduate students? What modes of communication could encourage our students to learn from each other? What course structure would be appropriate for both sets of students? What assignments could students share? And, what assumptions are we making about our students and their technological literacy skills?

We considered it especially important to discuss digital literacy in the context of rhetorical skills that we expected from our students by the last year of their undergraduate career or their first year of their graduate career. We designed both courses to emphasize issues of class, gender, race, ethnicity, environment, and technological access through readings and online exercises. Specifically, we wanted students to examine the ways rhetoric structures, supports, and sustains particular discourse communities. We wanted for our students to discuss the foundations of literate practices in different communities, and we wanted them to explore the rhetorics of class, gender, race, ethnicity, environment, and technological access in educational institutions, political, socio-economic, and environmental communities. In order to promote a critical understanding of discursive practices in various communities, we wanted them to study the conventions of dominant and marginalized ideologies. We focused on developing an understanding of rhetorical features and their underlying belief systems, an awareness of competing rhetorics and their influences in and outside the academy, and an ability to participate effectively in different discourse communities using different modes of communication. Our

syllabus included Northern Arizona University's archives of the Colorado Plateau. The archival materials incorporated audio, photos, video, scanned handwritten letters, and bins of actual hard-copy letters, journals, photos, and artifacts of historical local individuals and groups. Students were given a tour and knew they needed to set up appointments to have access to the archived information.

Students in our classes came from a wide variety of ethnic and cultural backgrounds. Many of them were working-class and first-generation college attendees, but all of them were familiar with academic requirements. They had also used computers for academic purposes although some of the graduate students had been away from academia for several years. In other words, students' familiarity with technology was varied, but some students were less comfortable with using technology for classroom interactions and with analyzing digital media. Furthermore, the production skills of students varied widely among the group we taught. Although challenging, we saw our course collaboration as an asset to all students, encouraging them to learn in a variety of environments and from a variety of sources. We thought that the various communication and interaction methods we chose, in connection with the topics addressed and assignments included in the course, would promote student awareness of the various roles of digital media in their own lives as well as in local, state, national, and global communities. Course-specific and cross-course face-to-face discussions and interactions were intended to create a face-to-face community for each class and between classes to ensure that students could get to know each other in the face-to-face classroom. We hoped that cross-class interactions would provide students with different audiences where they would receive and provide feedback on various interpretations of readings, and where they would also be able to work with each other on collaborative projects. Additionally, course-specific and cross-course online discussions

were intended to provide students with an opportunity to interact in an online community which we hoped would be collaborative and conducive to productive interactions. We wanted to create an online environment that would encourage students to participate in non-threatening, non-authoritarian interactions that would complement and expand face-to-face interactions.

To underscore the importance of context and critical analysis in any situation, we asked students to read articles on language and ideology (such as Dicker, Lippi-Green, Anzaldua), representations of Self and Other (such as Hall and Bailey), on racial identity development theory (such as Tatum and Young), and on identity and community activism (such as Chavez, Stanton, King, Kennedy). With this course emphasis, we wanted to encourage students to focus primarily on the texts they read while also thinking about the contexts in which they communicated their understanding of the readings to their classmates. Did they discuss texts more freely in face-to-face meetings or during online discussions? Did the context of the discussion tool change the message? In other words, how did the hybrid course structure problematize their understanding of the texts, their understanding of how to interact with the texts, their understanding of how to interact with each other, and their understanding of themselves as readers, writers, and individuals participating in face-to-face and online communities?

In addition to discussing and analyzing texts, we asked students to discuss their comfort and use of digital media as well as the impact of digital media on identity. This discussion was a continuation of face-to-face introductions in which many students mentioned their ethnic backgrounds, but they also pointed out that they did not consider their background as important identifiers of who they were. One student pointed out that because of his looks, and because his father was Latino, he is often categorized as Latino, but that in reality he is far removed from his

Latino heritage and that he was brought up in a small Southwestern town by his Anglo mother. Another student talked about his Irish roots and only considered it important in connection to his proclivity for drinking. Because both classes focused on culture and identity, and how identity is shaped and formed by digital media, we considered an initial question on identity and digital media as an important starting point in students' digital identity and literacy development. Student responses in this online forum focused largely on the limitations of identifying themselves online and repeatedly addressed the dehumanizing effects of technology, the one-dimensional nature of online interactions, and the limitations of technology on human interactions.

“Online chatter through text on a computer screen is so very difficult. The limitations I feel outweigh the advantages. By typing up my personal business, I subject myself to criticism and biased attitudes by those who read this. Perhaps a person with a similar situation as mine might not feel the same way as I do. Real time conversation is more effective rather than online discussion. Going online prohibits real emotion and feeling in the nature of what the writer is trying to stress. Likewise, you are outting yourself on the spot online, therefore subjecting yourself to criticism and biased opinions.” (Student A)

“The most difficult obstacle of identifying yourself online is that I'm not there to correct an incorrect assumption someone makes about me. If I am not careful with what information I might divulge, someone might take it the wrong way. Who is there to make them understand what I really mean? I can't take back what I write once I click "post." (Student B)

We were surprised that students' concerns centered around a substantivist position (Borgmann, 1984, p. 9) where technology becomes an almost destructive instrument that does not allow us to define ourselves but which defines us despite our best intentions. Students, in response to our first set of questions were certainly critical of technology; however, we are not convinced that their criticism was based on a critical examination of technology's cultural, social, political, or economic influences on human interactions. Instead, their criticism seemed to derive from an I-centered fear that neglects to look at the larger impact of technology use.

When we moved from questions about identity to questions about how they influence technology and how technology influences them and their interactions with others, we were surprised that their answers addressed aspects of technology that seemed to conflict with their previous responses to digital identity. Specifically, although students were dubious about the powers and limitations of technology as it affected their identity, they were largely convinced that technology is an inevitable part of human interactions. As they pointed out, technology is functional, convenient, and it's expected that you know it:

"There is a great deal of pressure on my generation to be very knowledgeable about computers. Essentially, without a working knowledge of technology you won't be able to function in the workplace. I am expecting to have a higher paying and more fulfilling job because of my technological skills." (Student D).

"I am not a revolutionary and I am conservative when it comes to technological use. I use cell phones for phone calls. I use stereos for music. I use computers for typing and printing. However, I do realize that I am incredibly bound to technology and can't live

without it” (Student G).

Students did not seem to make a connection between the first and second set of questions. Instead, technology use became a functional skill devoid of any values beyond a well-paying job. Despite their fears of misrepresentation online, students throughout the course were comfortable using technology. However, they were not yet ready to discuss the impact of technology on language and literacy development or on identity formation. In essence, students were comfortable with seeing technology as a “force in its own right” (Borgmann, 1984), and they were hardly concerned with the implications of technology use on the larger cultural, social, and political realm. Our repeated questions about the impact of ready-to-use software they used repeatedly (MSWord, MSPowerPoint, Netscape Composer, Dreamweaver, InDesign, and others), our discussions on students’ choices for visual and audio materials for their final project, and our general attempts to discuss the implications of technology on identity construction were mostly disregarded.

We could easily assume that students were unfamiliar with discussing the impact of culture and rhetoric on identity. However, students were ready and willing to address issues of identity and diversity in face-to-face discussions. They heatedly discussed the implications of Hall’s comments on the representation of the other; they addressed the impact of consumer culture on farm workers; and they were ready to admit and condemn their contributions to the increase in oil consumption. But, they hardly took a critical stance on the implications of technology, identity issues, and online environments. Technology remained an outside force and was hardly questioned. Instead, students saw computer technology as a tool that needed to be learned because technology skills were expected at the university and in the workforce.

This tendency to “accept the inevitable” became especially apparent in students’ digital media projects which we intended as the final step in students’ digital identity and literacy development. Now they would be able to apply the theories from the readings and discussions to their own work. They would be producers of digital media, and they would be able to apply their critical and analytical skills to projects that would underscore the course theme and address the impact of class, gender, race, ethnicity, environment, and technological access on community interaction and development. Furthermore, this project was intended to help students think critically about the different ways that groups are defined through images, sounds, and language. The projects, from a teacher’s perspective, barely met the minimum technological literacy requirements outlined by Stuart Selber. For example, although students had access to a variety of programs, and although we provided workshops for them to become familiar with new programs, thus increasing their functional technological literacy, most students did not take advantage of learning new programs. They did not want to “confront the complexities associated with computer use” (Selber, p.31), and instead wanted to finish a project by using what they already knew. Furthermore, students did not exhibit much willingness to question technology or “technological regularization” (128), as pointed out by Stuart Selber. Instead, if PowerPoint was readily available, students used the program, even though it limited them in their presentation of the material they incorporated into the project. Additionally, students’ rhetorical literacy skills, which Selber defines as “the thoughtful integration of functional and critical abilities in the design and evaluation of computer interfaces” (145), hardly came into play in the final projects. Only a few students thought carefully about how their use of technology influenced their depiction of the groups they chose to represent.

As teachers, we almost considered the assignment a failure. We were concerned that

students had not become more independent technology users. We weren't even sure whether they had become more functionally literate, or whether they had already come into the classroom with the skills they used for their final projects. We also questioned why we wanted to provide students with analytical and critical use and production skills when job requirements often focus on the functional and discourage discussion of the critical? What we needed to pay more attention to, we realized, is how we define success and failure in our teaching, especially when we know that developing technological literacy skills is a process that is never complete. It is also a process that is not easily categorized but that depends on students' previous experiences and future goals. The responses we received from students, then, allowed us to look to a new approach that would hopefully minimize the experiences we had in our classroom.

The framework we propose in the following section is an initial step to guide us in understanding the many different places that we, and our students, can be in our technological literacy development. Instead of seeing specific student behavior as "failure," our proposed framework is intended to help teachers and students to understand that technological literacy development is a complex process that does not follow a straightforward path but instead needs to be adapted to the goals and purposes of individuals living within specific political, social, historical, and cultural constraints.

Framework: Using Theories to Lead to Wanted Practices

Although our students were happy with acquiring functional skills, we do believe that technological uses have implications beyond the functional. We started to think about "stages of technological literacy development" when we first discussed Albert Borgmann's (1984) ideas of moving from techno-enthusiasm on the one hand and technophobia on the other extreme, to a

more pluralistic approach to technology. Furthermore, Stuart Selber's (2004) well-defined approach to multiliteracies in a digital age showed us the need to address students' multiliteracies from the perspective of teachers who are interested in how students use technologies in their educational and work lives. Selber focuses on the importance of providing students with functional, critical, as well as rhetorical technological literacy skills, emphasizing that rhetorical technological literacy would provide students with the necessary tools to move from consumers of technology to active and critical users of technology as well as producers of digital media who approach technology from a humanistic perspective. According to Selber, such a perspective values "justice, equality, civic action, public service, and social responsibility," which must become part of our thinking as educators in a time of unequal access to civic participation, educational development, and economic advancement (p. 86).

Selber's approach—similar to Donna Haraway's (1991) initial discussion of the intersections of human and machine and her argument against simplifying complex issues—pushed us to think about the implications of technological literacy on students' identity development, and it forced us to think about how intricately connected identity development and technological literacy development often are. Haraway's argument that "no construction is whole" (p. 157), and Selber's emphasis on humanistic values and reflective practices are a first step to move discussions of technological literacies to the complexities, circularities, difficulties, and intricacies of an approach that combines technology and identity into a model of technological identity and literacy development.

We found Beverly Tatum's (1992) discussion of racial identity development (using William Cross's concepts) helpful in providing a basis for our discussion of the stages of digital literacy

and identity development. Tatum shows very convincingly that we move through various stages of racial identity development. She defines them as pre-encounter, encounter, immersion/emersion, internalization, and internalization-commitment. As she points out, many of us don't follow these stages in a linear order; we often move between stages, revisit stages, or stay at one of the stages for a long time. We understand the stages of digital identity and literacy development in a similar fashion, full of twists and turns, and full of movement in many directions. Students move through various stages when they encounter new literacies and new technologies. Instead of easily transferring skills and applying these skills to new environments, students need to process new information, understand how old information can be translated to further new ways of thinking, and realize that identity development is an ongoing process. Once we were able to connect Tatum's discussions with our experiences as teachers who were trying to make sense of students' digital literacy and identity development, we no longer dismissed our students' behaviors. Instead, we were able to locate their responses as part of a process in acquiring technological literacy. We realized that we simply did not ask the kinds of questions that would allow for a complex reflection and response to the experiences exhibited by our students.

When we negotiated the nuances of the stages that we propose here, we realized that we would see ourselves at different stages of technological identity development, and that we would interpret the stages differently. We also realized that we would skip or repeat stages, and we realized that the contexts of our political, social, and cultural environments determine how teachers and students address or move through the proposed stages. Our experiences have shown us that any hierarchically organized stages have a potential to be taken as just that—hierarchically organized. But we encourage readers to experiment, add and subtract, reorganize,

and rename to fit their specific contexts and situations. In other words, we encourage readers to see the stages of digital identity and literacy development as a “spiral staircase” where we might revisit the same stages but where we are not necessarily visiting the same exact spot we already explored (Tatum, p. 83). We might also consider ourselves at several stages at the same time, understanding how we are implicated, but also wanting to continue our explorations and excitement about new technologies and new digital media. Certainly, technology users are more complex than our stages can capture, and we cannot assume that users can and will move from Stage 1 to Stage 6. Similar to Tatum’s argument that our identity is one that is “unraveling and reweaving” constantly (p. 83), we are convinced that technological identity development can never be complete, especially considering that we encounter technological advancements continuously, and that we are learning about the functional aspects of programs on an ongoing basis. The overall purpose becomes one of making sense of what we experience in the classroom.

Stages of Digital Identity and Literacy Development

Stage 1: Pre-encounter, Encounter, and Enthusiasm

Students, in this initial stage, are new to and enthusiastic about technology and digital media, and although they might be intimidated by it, they are ready to learn more about it. In this initial stage, digital media users want to know how to use the technology to play games, download music, upload clips, chat with friends, or create a space on MySpace or FaceBook. Programs such as *Illustrator*, *Final Cut*, or *Photoshop* might be a bit more difficult to learn than *Powerpoint* and *Frontpage*, but they are programs that make it easy to create documents. Technology is fun to use, and technology keeps us in touch with our friends. Much of this stage

is characterized by an emphasis on the functional and technical (Selber, Williams, Selfe), learning new programs, becoming familiar with specific features, and using these features mostly for personal and entertainment reasons. Many students at this stage accept technology and digital media as an inevitable part of their lives, keeping them in touch with their friends and family, and creating fun projects. Imagining new software programs is not so different from imagining a new cell phone with new and ever more complex features. This largely uncritical view is reinforced by overwhelming advertising campaigns that make the use of cell phones with multiple features, specific computer programs, and internet applications a needed component of young people's lives. As Diana Oblinger (2003) points out, many of the "millennial students" (those born after 1982) consider technology "a natural part of the environment" (p. 38). The Pew Internet and American Life Project (2003) showed that 94 percent of students age twelve to seventeen use the internet for research, 70 percent use instant messaging, and 81 percent use email to keep in touch with friends (Oblinger, p. 39). These statistics can be seen as an indicator that many students in our college classrooms are enthusiastic technology users. Furthermore, because technology is "an assumed part of life" (p. 40), many students have not considered any political, social, or economic factors brought about by technology use and abuse.

Stage 2: Immersion, Acceptance, and Internalization

As a result of Stage 1, where technology is considered a natural and inevitable part of students' personal lives, students often immerse themselves in technology and accept its importance in their academic and professional lives. It becomes an all-powerful tool that they need to conquer. They tell their friends that technology is an integral and necessary part of themselves, and that without technology, they wouldn't be able to finish their college career or take a job. However, in many cases, students don't question technology's impact on their education or the job duties

they will perform. They are interested in finding out how to improve their skills to move from individual enjoyment to professional development. But because computers are still seen as an inevitable force in their lives, it is difficult for students to see technology as anything but a mere instrument, a tool that should be used to further ones career and ones status in life. Often, students identify themselves as technology-enthusiasts who ally themselves with others who consider technology and digital media as necessary parts of society. A positive identity, in other words, is dependent on others who share similar viewpoints and ideas about the importance of technology as a functional tool. Criticism about technology is not welcomed nor is it accepted. Instead, group identity is essential in continuing an enthusiastic acceptance of technology. In many ways, this stage can be compared to Brian Street's concept of autonomous literacy which refers to literacy as a cognitive skill, devoid of ideological and societal influences. PowerPoint, for example, is good because they can get a better grade on their assignment and because they can impress less technologically inclined professors and peers.

Stage 3: Realization of Dependence

We consider this one of the most difficult stages in technological and digital identity development. Students realize that they have become dependent on technology, but that they have not really considered the effects of such dependence. At this stage, students understand that technology has become an integral part in their lives, and they also understand that such dependence has led to an uncritical perception of technology and consumption of digital media. Many times, they continue to use technology in similar ways they used it in stages 1 and 2 because they cannot conceptualize life without technology since it is still a "natural part" of their lives. However, students no longer accept complete immersion, nor do they isolate themselves from those who question the impact of technology on local and global communities. We consider

this stage a reflective stage that allows students to start questioning their past approach to technology. They begin to question whether they really need the latest iPhone, iPod, PDA, or laptop, and whether the 2.3 GHZ is really faster—and necessary—than the 2.0. model.

Stage 4: Disintegration and Disillusion

Students, in this stage, become aware of technology's impact on their own and others' lives. Instead of being "normal" and a "natural part of the environment," technology and digital media are seen as part of a larger conspiracy by the government, businesses, schools, or workplaces intended to undermine individuality and promoting consumerism and dependence on the big brother. Students are aware of their own status as consumers of technology, and as contributors to an ever-growing technology industry. Outsourcing, global poverty, and global warming are no longer abstract concepts. Since students have seen technology and technological literacy as autonomous and purely functional for much of their lives, they do not see any way of countering technology's progress. Technological identity and literacy development at this stage is characterized by an understanding that power structures are implicitly and explicitly intertwined with technologies and technology uses. Based on this awareness, students realize that not everybody has the same access, that not everybody has the same opportunities, and that uncontrolled technology enthusiasm and misuse can be used to exploit workers, establish class barriers, and create a divided nation. Students succumb to criticism, pessimism, and disapproval of established practices and power structures. It is an attempt to move from being an unconcerned user and consumer of technology to a more critically aware participant in technological innovations. However, before arriving at critical awareness, and before understanding their own involvement and participation in a consumer-oriented society, students criticize and blame others while manifesting their opposition to those in positions of power and

those who make decisions about how technologies will be used. Students might argue that “we shouldn’t use computers in an English class” without questioning why computer use in the humanities could contribute to a better understanding of technology’s impact on a country’s political or economic well-being. They also often argue that there is nothing that individual consumers can do about the proliferation of consumerism, about advertising strategies, or about the part-time and no-benefits hiring practices of big box stores. Their supposed powerlessness, and their belief that they have no options as consumers leads them to distrust communication and scientific technologies without critically analyzing how they can change their own roles in a technology-rich environment.

Stage 5: Detachment and Critical Awareness

Once students understand that technology use has implications beyond the functional and technical, and once they had an opportunity to look at how power structures influence technology use, students distance themselves from seeing technology as integral to their lives. At this stage, they are able to choose when they will use technology, and they are aware of the limitations and benefits of using and not using technology. Instead of blindly accepting or rejecting the effects of digital media and technological advancements, and instead of seeing themselves as outside the existing structure, students are aware of their own role in current practices and events. Stuart Selber and Cynthia Selfe consider this stage as essential components of students’ critical technological literacy development where students become analytical and critical viewers, readers, and contributors to the debate on the impact of technology on its users. Students, for example, can express why they make choices such as using their iPod as their external drive, and why they are not interested in video editing and why they don’t need that much storage or RAM. Furthermore, they can look critically at the underlying purposes of

websites, the reasons for including images in their documents, and for using PowerPoint versus other presentation tools.

Stage 6: Self-Reliance and Ideological Consciousness

Students are committed to be critical and ethical technology users and producers. They know that technology influences their identity. They know that they control technology and that they are controlled by technology. They are no longer “possessed” by the machine, nor do they “possess” the machine. Students no longer simply decipher messages; instead, they consider technology and digital media in the context of their own lives and the context of politics, race, gender, religion, history, and war. They are also aware that technology does not lead to health, nor does it lead to war. However, if technology is abused, those abuses can lead to cuts in funding for medical research, and they can lead to increased funding for war efforts. Students at this stage can decide against participating in such abuses, and they can choose to contribute their technological literacy competency to efforts that promote sustainable business practices, increase environmental consciousness, and decrease poverty and discrimination. They are committed to act and advocate for humanitarian uses of technologies and digital media, and they are willing to learn from local, state, national, and global discussions on technology and digital media. Walter Cronkite, in his foreword to *Architects of Peace: Visions of Hope in Words and Images*, offers a perspective on technological advancements that can help students think about the possibilities of using technology critically and consciously. Cronkite calls on all of us to use scientific and technological tools for the “good of humankind everywhere” (p. 10). He urges us—“the educated, the informed, the wealthy possessors of the [technological and communication] tools—to forgo self-aggrandizement and assume leadership...and channel it in a direction that will ensure freedom’s future” (p. 10). When one of our graduate students decided to create a

documentary on volunteer opportunities for first-year students enrolled in an introductory writing class, he used his technological skills to address humanitarian efforts and to raise awareness about the need for volunteer work in a large group of undergraduate students. He was able, because of his self-reliance and ideological consciousness, to use his skills not for his own advancement but to address the needs of others. Certainly, this final stage is one that students might only achieve after many years of experiences and explorations. It is a stage that should continually evolve with the evolving needs of a changing society. But, similar to Cronkite, we are optimistic that “the almost unbelievable advancement in communication...has enabled the people of the world to share their experiences and their hopes, their expectations, and, beyond, the possible solutions to our problems” (p. 10).

Why Stages?

We propose these stages as part of gaining new awareness of student needs and as part of asking new research and teaching questions. We know that concerns of accessibility have consumed much of our time. However, we also know that access is only one of many areas that we need to address among ourselves and with our students. We were especially concerned with finding new ways of addressing student attitudes about computers (they are around, we need to learn how to use them, we need a job) and with understanding why it is so difficult to leave behind what we consider an unwarranted dependence and uncritical acceptance of technology and digital media. Paying attention to early stages of technological identity and literacy development, and realizing that many students have lived in a technology-rich environment where technology has become a “natural” part of their environment, provides us with a fuller understanding of students’ attitudes about their uses of technology. In many cases, we do not

have to introduce students to the functional and technical aspects of technology use. Instead, we have to understand why they arrived at their current attitudes, and how these attitudes help or hinder their development as responsible and ethical users of technology. Now that many students come into our classrooms with functional skills, teachers' roles have shifted from introducing students to basic technology skills, and from promoting technology as a positive component of an education, to providing students with skills and tools that let them evaluate the role they are playing in a technology-rich environment.

Beverly Tatum's explicit approach to racial identity development provided teachers with an opportunity to look at the complexities of identity development without dismissing students' attitudes as tribal, racist, or ignorant. It also provided students with a self-reflective approach to their own identities, and it gave language to self- and other-perceptions. Similarly, the stages of digital identity and literacy development we outlined here—and which need to be applied to specific settings and adapted accordingly—show teachers the complexities of technological literacy development, providing an opportunity to approach students' attitudes not as resistance to the critical and rhetorical, but instead as a progression or regression in a long, slow, circular, or spiral way that has to be revised based on new and old perspectives on technology uses. Students who become self-reflective about their own approaches to technological literacy and identity development can also be more pro-active in understanding their own approaches to technology and technological literacy.

From our own experiences in the field, we felt (and still feel) most comfortable when we could use digital media for individual purposes. We remember when computers were introduced into the classroom and into our offices, and when we waited impatiently for a response to our

email that we sent 2 minutes ago. We also remember being impressed by Flash documents, web editors, and iMovies. We went to conferences admiring students' tech-savvy productions, and we went home to figure out how to incorporate digital media into our classrooms. But many times we didn't pay attention to the messages that were sent, the document content, or the implications that the wider distribution of those documents might have. We are now at a stage, however, where we can no longer expect our students to be impressed by technological *flash*. We need to have extensive conversations with the techno-enthusiast (often ourselves) about the purposes of producing specific documents. We can focus on the rhetorical principles of production, and we can underscore that a rhetorical approach necessitates awareness of larger political, social, historical, and economic factors influencing educational and workplace opportunities, gender issues, race relations, international relations, and military funding.

Rhetoric's dependence on carefully evaluating the purpose of a text, its audience and author, and the context in which a text was created does not allow us to remain innocently immersed in technological advances. Instead, we are asked to move from a functionalist perspective to a perspective that incorporates the complexities of technological identity and literacy development. Our initial enthusiasm and immersion into technology-rich environments needs to move to a realization that technology might not be as innocent, neutral, or one-dimensional as we had assumed. Haraway's cyborg already prepared us that we need to look at the complexities of technology, and even the Terminator movies, initially the story of good technology vs. bad technology, introduced a plot that showed cyborgs as complex and conflicted technological creations.

This awareness of the complexities of technologies needs to lead to a critical awareness of how technology can be used and abused, and it needs to be followed up by an understanding of

our role as technology users, and our responsibilities to become rhetorically aware users of technology who understand that we cannot be passive consumers of digital media without consenting to the messages provided to us by businesses, political entities, or the entertainment industry. How we see technology users must include a reevaluation of how we see ourselves as technology users. Furthermore, we need to redefine how we see “successful” technological transfer in the classroom. We need to explore and understand our students’ digital identities and literacies by allowing them to move through various stages, repeat stages, skip stages, or remain at a specific stage of their development until new concepts and ideas lead to further shifts and movement.

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