

## **Deconstructing Definitions: Repositioning Technological Access & Literacy within Agent Ability**

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## **Abstract**

Our society cannot have concerns about access without literacy because they are congruous; neither is distinct nor complete without the other in technological contexts. The United States Department of Education repeatedly calls for more, better, and increased access and literacy to technologies. Our elected officials make national speeches imparting similar rhetoric and ideas. A problem with this particular information dissemination by inherently powerful entities or persons is they make assumptions of what access and literacy are, with minimal definition, and virtually no context of agent ability with technology. These ambiguous terms and deficient definitions have subsequently proliferated in academic scholarship, pedagogy, and even across the globe. The purpose of this paper is to theoretically reposition access with literacy and place them in context of agent ability in order to provide a framework for future conversation.

"We know, purely and simply, that every single child must have access to a computer, must understand it, must have access to good software and good teachers and to the Internet, so that every person will have the opportunity to make the most of his or her own life." --- President Clinton

"I will recruit new teachers and make new investments in rural schools, we'll connect all of America to 21st century technology and telecommunications." --- President Obama

In 1996, the United States Department of Education published a report to the nation regarding technological literacy titled, "Getting America's Students Ready for the 21<sup>st</sup> Century." President Clinton himself lobbied for nationwide technology access and literacy during this time. Fourteen years later and after articles and books by notable scholars like Cynthia Selfe, Adam Banks, and Langdon Winner, both the US Department of Education and President Obama have refreshed the fervor for increased access for all with recent speeches and the publication of the 2010-2015 technology plan titled, "Transforming American Education Learning Powered by Technology." Over the span of fourteen years, our nation's leaders have been discussing access in the same redundant context, a build it and they will be able to use it model. The Elementary and Secondary Education Act of 1965 is the law that requires the Secretary of Education to publish technology plans like "Getting America's Students Ready for the 21<sup>st</sup> Century" and "Transforming American Education Learning Powered by Technology". Part D Subpart 2 Section 2422 of this law states that the publication must include how the secretary will promote "increased access to technology for teaching and learning for schools with a high number of or percentage of children from families with incomes below the poverty line" ("Elementary and Secondary Education Act"(1965))<sup>1</sup>. Implicitly, this law assumes that by simply putting the technologies in place, access is granted, but "access" is not defined nor is "access" constructively connected to

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<sup>1</sup> The Elementary and Secondary Education Act is a federal statute that was first enacted in 1965. However, it has been reauthorized (adapted, edited, and updated) by the government every five years since.

pedagogy of technology literacy necessary to facilitate access. In fact, neither definition nor discussion of technological literacy is explicitly included in the law itself or in the most recent government publication that are a result of the law. The problem is a lack of clear definition and meaning of ideas by entities or persons of power which is then left up to interpretation, re-interpretation and even blatant misuse by our educational institutions, or society at large.

Because of the inherent power that governmental organizations like the U.S. Department of Education possess, it is crucial to create a current framework for technological access and literacy that better represents and explicitly identifies the relationship between access and literacy. For clarity, the use of the words technology and technological in this paper refer to digital hardware and software (computers, programs, and other types of electronic devices used to send and receive information, for example cell phones and video game devices). In order to clearly define the relationship between access and literacy, human agency (also referred to as *agent ability* in this text) will also be explored and defined. The purpose of this paper is to theoretically reposition technological access with literacy and place them in context of agent ability in order to provide a framework for future conversation. The conversation should be a global one. The United States government's decisions directly affect our educational systems, but the students within these systems are not all US citizens. Furthermore, because of the inherent power our government possesses, we need to consider its potential ability to influence other governments.

### **Ability as Access**

Access to technologies is assumed to be widespread. It would seem safe to say that over the last fourteen years greater access has been provided to schools and communities; however, attaining access requires much more than a computer and an internet connection.

Access means more than that. Examining dictionary definitions is a first step to building a new framework. “Access” is defined as “the *ability* (emphasis added), right, or permission to approach, enter, speak with, use, or admittance,” (“access.” def.1). The word ability needs to be examined because right, permission, and admittance imply that access provides power to do or act. With ability, that is not the case. “Ability” is defined as, “the *competence* (emphasis added) in an activity or occupation because of one's skill, *training* (emphasis added), or other qualification” (“ability.” def.2). Ability requires more than power to do or act; the agent must have competence, skill and/or training. According to Samantha Blackmon, every person brings their own experiences with technologies, or lack thereof, to the table. It cannot be implied that every individual will be “competent, comfortable, and confident” with technologies due to having material access alone (154). Examining ability further, I turn to Benjamin Franklin and one of his many commentaries on education. Not only did he contribute to the creation of the nation, but his thoughts on education led to the creation of the institution now known as the University of Pennsylvania. Franklin argued that,

The Idea of what is true Merit, should also be often presented to Youth, explain'd and impress'd on their Minds, as consisting in an Inclination join'd with an Ability to serve Mankind, one's Country, Friends and Family; which Ability is...to be acquir'd or greatly encreas'd by true Learning; and should indeed be the great Aim and End of all Learning. (30)

Ability is learned skills and knowledge, along with broader reasoning and the desire to serve more than one's self. Thus, our current assumptions about ability and technological access need to be redefined in order to expand our notions of ability to encompass individual, community, and even global issues.

When discussing access, we have seen politicians and educators focus on material access – the physical access to technologies. However, Adam Banks has identified multiple levels of access beyond material access. Banks outlines five access levels which include: 1) material access, equality in material conditions; 2) functional access, knowledge and skills to use the tools; 3) experiential access, making the tools relevant; 4) critical access, ability to critique, resist and avoid when necessary; and 5) transformative access, inclusion into the development and decision making (41-45). These five levels are significant because they illustrate that more than hardware (material access) is needed to provide users with the “ability” to achieve technological “access”.

Regardless of “material” access, agents still have to experience and learn to use the technologies they will encounter, making access contextual. As Dennis Baron examined in his article “From Pencils to Pixels: The Stages of Literacy Technology,” even a pencil is a technology. Both computers and pencils required the skill of engineers and designers to create the final useable product. Although the learning curve of a pencil may not be perceived as arduous as it is with today’s choices of technologies, human agents do not inherently know to pick up a pencil and write; we are taught. We are also taught how to use pens, markers, crayons, etc. The basic concepts apply for each of the different writing utensils, yet each one may have a slightly different feel and end result. The same can be said regarding digital technologies such as those used in academic settings.

Kevin Guidry, whose research focuses on technology use by students and faculty, mirrors both Blackmon’s and Banks’ concerns when he hypothesizes that technological access cannot be assumed due to its multi-dimensional implications of use. In the context of educational technologies, he discusses the consequences that technologies have for the student population (Guidry).

Even students who have had access to technology have had different experiences with it and have thus gained different skills, predilections, and comfort levels with different technologies[...]embracing not just mere access but differing types of access. Since the amount of time for and the environment in which one uses technology shapes ones uses and understanding of technology, students who come from backgrounds where they had less access to the Internet use and view it differently compared to those with significant or unlimited access. (Guidry)

It is a false assumption that agents in educational settings have had equal exposure to the myriad of possible technologies. Even if there were such a thing as equal “material access,” agent access as a whole will be variable because the experience of each agent is different. Conversely, access can shrink if the agent does not continue to actively employ the learned skills and knowledge as identified in labor situations where an extended period of job separation leads to particular skill and ability loss pertinent to the separation from the job. For example, 16 years ago I was a radio DJ. I was knowledgeable not only of the operation of the physical technologies, but of my audience, the genre of music, legalities, and other implications that need to be considered when conducting a live radio show. Even if I was given physical access to the microphone and soundboard today; I would neither feel comfortable nor confident in conducting a show without further instruction, research, and forethought. Technologies, whether tangible or intangible, do not all come with identical functionality. A learning curve exists with each technology; we are not all born “able” and our ability is not static or guaranteed in use of the technology.

Since all agents do not have equal experiences and abilities with technologies, a variance exists in how agents potentially interact in the various contexts with different technologies. Yet, assumptions about access run rampant in our education systems, as seen by

the pervasive expectation of technological use by its agents. For example, in my experience at Michigan Technological University, there is an expectation of using the Blackboard Learning System CE (system for learning management) for both faculty and students. As a new graduate student I did not receive any instruction on how to navigate the system, and the assumption was made that I would know to go to the Blackboard system to look for assignments and communications from the instructor. In discussion with a few faculty members, some did and some did not receive instruction on the system, yet it is mandatory to submit grades through the system. If the expectation is for the faculty to use the system for submitting grades, time needs to be spent instructing them on the navigation of the system. If the faculty members are using the system to provide course content and communication to their students, they in turn, should provide navigation instruction to their students on the system.

Written instructions on Blackboard navigation are posted to the university website; however, the majority of the content appeared to be written for the faculty. The assumption is made that students do not need much, if any, training or instruction other than what the program itself provides. During a recent technologies survey conducted by Michigan Tech in 2010, this problem was made clearly evident in the results of the survey regarding Blackboard. The average satisfaction of services and support for Blackboard was 2.89 on a 5 point scale (5 being “outstanding”) and was the third lowest score overall. The Blackboard results “were not significantly different between students and faculty” (Milligan 6).

We cannot assume that every agent in our educational system possesses competence, skill, and training in all of the technologies they encounter both in and out of the classroom. If an agent has access, does this mean they will have ability? According to scholar Marc Prensky, today’s students are in fact “digital natives” and have spent their entire lives with

technology. Prensky makes the assumption that they all have equal access and subsequent ability (1). Although it is feasible to agree that today's students possibly "think and process information fundamentally differently" than "digital immigrants" (those that were born before "digital natives"), (1) it is not plausible or possible that all "digital natives" have the same access to technologies, particularly in educational settings. The diversity throughout our country (cultural, financial, ethnic, etc.) provides a potpourri of experience and exposure to/with technologies, and/or lack thereof. Prensky is making dangerous assumptions about user access by basing his theories of access, and subsequently ability, solely on age. Making assumptions about technological access and ability is a mistake we cannot continue to make. Scholars like Stuart Selber do attempt to move the conversation forward by at least considering the differences that increase the gaps in access, unlike Prensky who puts everyone into age defined categories. Selber states that the poor, people of color and women don't and probably won't have equal access to technologies. However, he is still situating access as physical (4). It is important to keep the inequalities in the forefront of our conversations to avoid basing decisions on false assumptions, but we need to advance how access is defined farther than its current state.

### **Ability as Literacy**

Further complicating the assumptions made about access is the direct connection of access to literacy. Both in government and educational systems, there are a myriad of different views on what makes up technological literacy, but there is no definitive understanding or clear definition of what literacy is in the context of technologies. James Paul Gee recognized the political and social underpinnings of the "literacy crisis" in his book "Social Linguistics and Literacies: Ideology in Discourses." He argues that all views of literacy are politically charged and need to be thought of in social and cultural terms (Gee

31); we need to think contextually. Over the past fifteen years our government has been focused on a new literacy crisis, a technological literacy crisis.

In “Getting America 's Students Ready for the 21st Century: Meeting the Technology Literacy Challenge: A Report to the Nation on Technology and Education”, the U.S. Department of Education declared technological literacy as “meaning computer skills and the ability to use computers and other technology to improve learning, productivity and performance” (“Getting America 's Students Ready for the 21st Century: Meeting the Technology Literacy Challenge: A Report to the Nation on Technology and Education ”). This report does not define what it means to be able, and then assumes that one is either able or not able to engage in technologies in a manner that produces a desired result of better performance or production. As such, it does not consider the ramifications of context, agent ability or varied levels of access. Ability, critical thinking, creative solutions, the context of use and the sharing of knowledge are all missing from our government’s definition. The ambiguous laws and definition deficient documentation put out by government agencies are left up to interpretation by our educational system.

Educational systems should not be focused on efficiency and productivity; rather the concern should be with what is informing the pedagogy. Selber argues for the use of a postcritical stance and warns that if scholars do not, the implication will be that the pedagogy will be informed by values and practice that are not compatible or desirable to educating students on technologies in a critical, contextual and historical sense. Ultimately, these initiatives will “perpetuate rather than alleviate existing social inequities” (13). The initial dissemination of the No Child Left Behind Act by the U.S. Department of Education to educational institutions is a solid case to this point.

The result of leaving interpretations up to educational institutions is that scholars and

educators have taken various approaches to definitions. In the case of defining technological literacy, The National Council of Teachers of English's (NCTE) mission is to *promote the development of literacy at all education levels. Their definition of technological literacy states that* "...technology has increased the intensity and complexity of literate environments, the twenty-first century demands that a literate person possess a wide range of *abilities* (emphasis added) and *competencies* (emphasis added), many literacies..." ("The NCTE Definition of 21st Century Literacies "). The NCTE is trying to go beyond the traditional reading/writing assumption of what it means to be literate. They understand the need to incorporate technologies in the definition; however, the ambiguity of the definition does not provide a firm stance on what it means to have technological literacy. For comparison, the South Dakota Educational Technology Standards Glossary defines literacy as, "the *ability* (emphasis added) to use, manage, assess, and understand technology" ("South Dakota Educational Technology Standards Glossary"). This definition helps to narrow the focus from NCTE's ambiguous "many literacies," but it falls short without further clarification of what it truly means to "assess" and "understand" technologies. Additionally, The Washington Superintendent of Public Instruction Office states: "Technology literacy is the *ability* (emphasis added) to responsibly, creatively, and effectively use appropriate technology to:

- communicate;
- access, collect, manage, integrate, and evaluate information;
- solve problems and create solutions;
- build and share knowledge; and
- improve and enhance learning in all subject areas and experiences."

("Educational Technology: Defining Technology Literacy")

This definition acknowledges the necessity of ability, but only outlines what the ability

should look like in a technologically literate person without offering explicit definition. In review, from these three definitions it can be deduced that technological literacy, in the eyes of educators, is the ability and competency to interact with technologies.

When considering all definitions provided, the use of “ability” immediately stands out as the dominant component of what is necessary to be literate according to the definitions provided by educators and the U.S. government. As previously determined, full access, more than material, cannot be achieved without ability as it has been defined here. The striking similarities between access and literacy necessitate further exploration.

To fully explore access and literacy, we need to go back to Adam Banks’ argument regarding access. He moves the conversation away from a single definition of access and into a five-level definition. He argues that individuals and groups not only need to be able to physically use technological artifacts (material), but need to have knowledge and skill of use (functional). He continues that they must also be free to critique and reject technologies (critical). Being able to design, create and to change technologies and policies in ways that are relevant for groups and individuals is also necessary (experiential), along with inclusion within the systems of power that determine where, how, and why technologies get made and used (transformative) (41-45).

Reconsidering Banks’ argument and my discussion of ability and lining these ideas up against NCTE’s definition of literacy, it is hard to deny the close resemblance between NCTE’s literacies list, and Adam Banks’ levels of access (Table 1).

<b>NCTE – from definition of literacy</b>	<b>Adam Banks – levels of access</b>
Proficiency with the tools of technology	Functional Access – knowledge/skill
Build relationships with others/solve problems collaboratively	Transformative Access – inclusion/decision-making
Design and share	Experiential Access – design/create/change
Critique, analyze, and evaluate	Critical Access – critique/reject

**Table 1: NCTE Literacy vs. Banks Access**

Although not as inclusive to all levels of access, the definition of literacy by WA Superintendent of Public Instruction Office also bears resemblance to some of the five levels of access outlined by Banks as shown in Table 2.

WA Public Instruction Office – definition of literacy	Adam Banks – levels of access
Build and share knowledge	Transformative Access– inclusion/decision-making
Access, collect, manage, integrate, and evaluate	Critical Access – critique/reject
Solve problems and create solutions	Experiential Access – design/create/change
Improve/enhance learning in all subject areas/experiences	Transformative Access– inclusion/decision-making

**Table 2: WA Public Instruction Office Literacy vs. Banks Access**

Thus, if “ability” is the key component to the definitions of literacy and mirrors the components of what makes up access, I propose the following theory:

***IF [Access = Ability] AND [Ability = Literacy] THEN  
 [Access IS Literacy/Literacy IS Access]***

Throughout the rest of this paper, the words “access/literacy” will appear side by side; one cannot assume the word “access” should replace the word “literacy” or vice versa. My theory suggests that the line between access and literacy has become irreparably blurred into one concept and therefore needs to be examined as a whole. It is no longer plausible to believe that they are two separate issues.

**Ability as Agency**

Agency, in the context of this paper, refers to “the *capacity* (emphasis added) of individuals to act independently and to make their own free choices”(Barker 448). As humans, we are able to think and make decisions on our own behalf. Looking at the definition of capacity, it is: “actual or potential *ability* (emphasis added) to perform, yield, or withstand” (“capacity.” def.3). Ability is the key component of access/literacy, as well as agency. In the

pursuit of access/literacy, an agent's only limitation is his or her inability to make decisions whether to engage in a technology, how to engage, and when to engage. It is our choice as humans to achieve access/literacy providing we are "able" to believe we are "able" to do so.

Scholars, politicians, educators, and peers can all help to pave the way by providing exposure to technologies, but ultimately the decision to engage in the technologies is left to the individual; however, as discussed previously, educational institutions need to be cautious of what and who is informing the pedagogy. For example, access is represented in the publication "Transforming American Education Learning Powered by Technology" like the very existence of the technologies themselves is what empowers the agent with ability to effectively engage with the technologies. Within this document, statements in reference to technologies like "today's educators should have *access to technology-based resources that inspire them* [emphasis added] to provide more engaging and effective learning opportunities for each and every student" (16), or the statement "students and educators need *adequate broadband bandwidth for accessing the Internet... "adequate"... defined as the ability to use the Internet* [emphasis added] in school, on the surrounding campus, throughout the community, and at home" (17). The most disturbing statement from this document is "*they* [emphasis added] provide the ability to participate in online learning communities"(11). These statements are undeniable examples of the cross talk and inadequate definitions that are put upon educational institutions to muddle through and interpret.

Educational institutions, much like any organization that is for profit or not for profit, follow the norms of business practices to remain in existence. Practices such as strategic planning are vital to the longevity of an organization. Strategic planning helps an institution to define its future. When educational institutions are left to interpret inadequately defined information that they are supposed to follow, the diversity in interpretations is obvious when

universities publish their strategic plans. The plans are a reflection of the role of technologies and the importance of production and growth which are blended along with ill-defined ideas of access and implied ability. These documents contain no explicit or even implicit reference to technological literacy. For example, the University of Missouri-Kansas City's strategic plan states their intent to "empower all students to contribute to a demographically and technologically complex world" ("Strategic Plan 2010-2020: A design for the future of Kansas City's University"). Similarly, Penn State University takes a broad brush in their strategic plan by stating the intent to "use technology to expand access and opportunities" ("Priorities for Excellence: The Penn State Strategic Plan 2009-10 through 2013-14").

A university (administration and faculty) cannot empower its students to be prepared to face the challenges of technologies without focusing on agent ability in the context of access/literacy. Again, Benjamin Franklin identified this struggle. He argues,

Many of the first Settlers of these Provinces, were Men who had received a good Education in Europe, and to their Wisdom and good Management we owe much of our present Prosperity. But their Hands were full, and they could not do all Things. The present Race are not thought to be generally of equal Ability: For though the American Youth are allow'd not to want Capacity; yet the best Capacities require Cultivation, it being truly with them, as with the best Ground, which unless well tilled and sowed with profitable Seed, produces only ranker Weeds (1).

The leaders and educators of our country have the best intentions, but cannot do everything and the importance of capacity gets lost. Greater access cannot be reached with technologies if the agent's access/literacy to the technologies is based on false assumptions and with no clear framework for building up agent ability through instruction molded on all the areas of technological access/literacy. Based on these strategic initiatives, it appears that universities

are actively taking the assumptive direction that our laws and lawmakers have provided and the result is many agents are left behind.

### **Ability as Global Problem**

The challenge of navigating technologies does not occur in every corner of the world. Yet, as technologies are being distributed to more remote regions of the globe, they are proven to have a profound effect as shown in the case I will explore below. Access in an impoverished form is removed from literacy entirely, resulting in consequences that not only affect the agent, but families, communities, and countries at large.

Langdon Winner points out that the American assumption of progress is only inclusive of new technologies which inherently requires our lawmakers to position technological development and the human condition in a positive light with the promise “that the next wave of innovations will surely be our salvation”(5). There is always a price for this “progress”. For example, a new technology, vasectomies, were first performed in 1899 for eugenical purposes, at the Indiana State Reformatory. This procedure was conducted on men who had been committed to the institution, (Popenoe 19) making the United States the first country to actively and legally conduct a compulsory sterilization program (Iredale). This technology, and similar sterilization technologies (hysterectomy, tubal ligations, etc.), used for this particular dubious purpose did not stay localized to the United States; they were spread to countries like Canada, Peru, and China. Probably the most well-known country to adopt this practice was Germany. Adolf Hitler, inspired by the United States, passed a law that used modern technologies to legally sterilize hundreds of thousands of individuals during his reign (Kershaw). Despite this history, there are still government agencies that target their poor and uneducated through monetary incentives to “voluntarily” undergo a sterilization procedure typically to the detriment, not the betterment, of their society. In India for example,

men of no means (unemployed, underemployed, alcoholics, gamblers, etc.) frequently make this choice (Nussbaum). This would seem like a great preventative for the overpopulation problem in the country; however, if a couple is childless and a partner chooses sterilization, the risk of spousal abuse increases. Research conducted in northern India determined that there is “the significant relationship between childlessness and both physical and sexual violence, highlighting an additional negative social consequence for Indian women associated with childlessness” (Koenig et al.). Although this current system puts the agency back in the hands of the individual, it is with impoverished access and no literacy that the decision to sterilize is being made. It is impoverished because the level of ability of an uneducated alcohol dependent agent, for instance, is not sufficient and the only access an agent has in this position is material. Offering money to an individual who is desperate is like offering the cornucopia that Winner talks about, he says “the form of technology you adopt does not matter. If you have cornucopia in your grasp, you do not worry about its shape” (45).

What do these examples have to do with education? The connection between educational institutions, United States laws (with a focus on those under the Department of Higher Education), and developing countries can be labeled as internationalization. In an article titled “The Internationalization of Higher Education: Motivations and Realities” Philip Altbach and Jane Knight focus on academic internationalization, the movement of educators and students across borders. United States colleges and universities are not only engaged in student exchange, but exporting education as well. The face of education is changing in these borderlands. Developing countries, particularly India’s higher education sector, “imports and exports programs and services at an unprecedented pace”(297) and it can’t keep up with the demand. According to Nayar, the “500 universities and 26,000 colleges have space for only about 12% of its eligible youth” (24). Unfortunately quality is also a problem and “many of

the students are graduating with abysmal literacy and numeracy skills” (25). Last year President Obama, along with three U.S. university presidents and several other senior university representatives, met with the Indian Prime Minister Manmohan Singh. India’s government is not only counting on financial infusion, but also expertise from foreign academic institutions and the U.S. is happy to step into a new academic market. The meeting between governments and academic institutions resulted in an agreement to “hold a U.S.-India summit on higher education this year to help encourage collaborations”(Nayar 26). The summit occurred on October 13, 2011 with the objective of strengthening higher education collaboration and exchange between U.S and India institutions. The collaboration is backed by ten million dollars for increased university partnership and junior faculty development according to Secretary Hillary Clinton in her opening address at the summit ("U.S. Department of State"). Given the current low reading/writing literacy in India and questionable government practices in the country, the U.S. should tread very lightly as they move forward with this academic collaboration since our own laws pertaining to technologies in educational practices are ambiguous.

### **Conclusion**

Before we dangle the proverbial carrot, implement the latest upgrade, design new technologies, or pass laws and other legislation regarding technologies, we should consider not just how the technologies will fit into our world, but most importantly *if* they should be there in the first place. From a “world making” perspective, Winner suggests that “we pay attention not only to the making of physical instruments and processes...but also to the production of psychological, social, and political conditions as a part of any significant technical change (17). We need to be considerate of not just the physical artifacts that are created, but careful attention needs to be paid to the possible implications (both positive and

negative) that could result in the artifact creation and use. Policies, implementations, and laws are all a part of the possible implications to systems that are currently in-place. Ultimately these implications affect the human agents that must work with and/or within those systems. In order to begin consistent dialog both in and out of the academic field, and particularly across borders, we must define the meaning of access and literacy in the context of technologies. We must do so while being acutely aware of the role that agent ability plays in this context. I hope that the framework of access/literacy in the context of agent ability I have constructed will provide a starting point to the conversation.

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