Get Smarts: Exploring the Benefits of Online Learning Communities to Cultivate Digital Literacy among College Students

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ABSTRACT

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Get Smarts: Exploring the Benefits of Online Learning Communities to Cultivate Digital Literacy among College Students

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As the new generation of students is entering college, they are frequently assumed to be digitally savvy with information and communication technologies. However, these assumptions are rarely supported in empirical research and substantial inequalities in the capacity to use digital skills remain, even among the highly-connected. Although students arrive to college with basic digital skills, a majority of students hold crucial deficiencies. Inequalities result from the differentiated use and access of technology, affecting students' skills and self-efficacy. These inequalities have implications for differentiated use on the individual and collective society. The capacity to participate online, or digital citizenship, emphasizes the importance of the Internet in daily life and underlies the perpetuation of social inequalities and exclusion as a result of participation online. This study examines the inequalities in digital citizenship among college students at a midsized Midwestern university and explores ways to reduce the inequalities through a collective orientation rather than individual capital accumulation. Additionally, the study aims to advance students' digital literacy skills in ways that help students become better contributors to society as students and as citizens. This study has three objectives—first, I examine differences in the students' self-reported digital skills; second, I analyze the role and benefits of an online learning community, developed as part of the study; lastly, I

examine the differences in students' self-reported skills in the specific domains of digital literacy, from their first semester to current semester and compare the differences in participants and non-participants of the online learning community. Results suggest that younger students with more access to technology perceive their prior digital skills as more advanced, although older students with greater social support tend to perceive a greater change in their digital skills; active participants in the online learning community were positively affected by the support of the community; and participation in the online learning community resulted in greater improvements in perceived skills in the specific domains of digital literacy. The social implications of these findings are discussed and policy suggestions are addressed.

DEDICATION

For my love, Jason

I can now focus on planning our wedding, as graduate school has put our wedding on hold for much too long.

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CHAPTER 1: INTRODUCTION

Digital literacy is the crucial foundation of successful digital citizenship in this modern digital age. Digital systems like email, text messages, and social networks are social tools that are more central to everyday life in this contemporary, information-based society. Literacies related to these and other systems of the information age are increasingly important necessities for fully involved citizens, productive workers, and successful students. Digital proficiency increases individuals' success in academia, the workplace, and in the digital realm. However, research has found that digital literacy is unequally distributed among the population, especially college students who have previously been assumed to be digitally-savvy (Hargittai, 2008). Although students arrive to college with basic digital skills, a majority of students hold many crucial deficiencies. According to a typical graduate student at Ohio University:

> I grew up with the only access to the internet being through Dial-Up or highly restrictive public library networks. I come here and I am all of a sudden supposed to know how to navigate this completely new system. This causes what I can only refer to as 'digital culture shock' on my part. Not having my skill set walking in left me behind on my first semester.

However through the involvement in an online learning community, students have been able to improve their digital literacy skills and self-efficacy. Increasing students' experience with the Internet and digital systems allows for the advancement of digital skills that enables them to become more proficient and better contributors to society. According to students who participated in the online learning community:

> It [OLC] has made me more aware of the significance of being tech savvy. It opened my eyes to the different types of digital skills that I did not previously have, and what I could do to then increase those skills.

> [OLC] has made me more aware of the importance of establishing a positive digital self. Also, it is important to not be ignorant in the topic. Our world is gravitating towards a more technologically sound environment and it only benefits everyone if we all become more aware and active with online sources and establishing a digital self.

The growth of information and communication technologies has been described as a revolution (Collins & Halverson, 2010). The revolution has the potential to be more profound than the industrial revolution due to the fact that these digital tools are reshaping not only the workplace and the economy, but social life, education, and people's potential for collective action. The advancement in information and communication technologies (ICTs) can be linked to the rise of instantaneous connectivity and the increase of accessible information. Information and communication technologies have many aspects of what economists call positive externalities. These externalities are the social benefits reaped beyond the common individuals who use the technologies (Mossberger, Tolbert, & McNeal, 2007). If available online information aids an individual in becoming more knowledgeable, then that individual is more inclined to increase their online presence. This increase of online activities benefits society as a whole, leading to broader and more deliberative civic engagement (Hargittai, 2008; Mossberger et al., 2007).

The workplace, like social life, is becoming increasingly embedded in social tools, and success in that realm is increasingly dependent on the digital literacies that workers bring to the table. Overcoming existing inequalities in access and competency becomes an issue of social justice. Otherwise, digital systems will simply reinforce and exaggerate the divide between the Internet users and non-users or the 'haves' and the

'have-nots' (DiMaggio, Hargittai, Celeste, & Shafer, 2004). The Internet began spreading in the mid-1990s, allowing access to the general population. However, the majority of individuals with increased access were in the upper and middle-class population. This sparked debate about how the Internet and ICTs have implication for social inequality. In particular, the Internet can increase opportunities for the privileged, while it also can create barriers that exclude those who lack technological access, knowledge, skills, and social support (Hargittai, 2008).

The facilitating power of information and communication technologies has the ability to increase individuals' social mobility and civic engagement. However, concerns have generated over the unequal distribution of technological access and disconnect across the American population. Internet usage and abilities is often associated with beneficial outcomes, while lack of Internet use often has negative consequences—resulting in a digital divide. The term 'digital divide' has been used to describe the disparities in access to computers and the Internet, while other scholars describe the differentiated use of Internet and digital skills (Mossberger et al., 2007; van Deursen & van Dijk, 2010). Disparities in access and connectivity will remain a significant role in the digital divide as a portion of the population, approximately 15 percent of Americans, continues to remain offline (Hargittai, 2010; Zickuhr, 2013). A popular assumption of the digital divide is that once we cross this divide, issues of inequality and exclusion will diminish due to the belief that everyone will have the opportunity to advance their digital skills through online participation. Although the percentage of Americans without Internet access is decreasing annually and the original divide seems to be withering away,

many scholars still see a substantial minority lagging behind in a society that is largely online (Mossberger et al., 2007).

Scholars are concerned that the digital divide will reinforce existing patterns of inequality in society (DiMaggio, et al., 2004). Increased reliance on digital tools could make marginalized groups to become increasingly isolated. The potential decrease in social inequality is dependent upon the resources and knowledge that an individual can gain from ICTs. Individuals who substantially increase their knowledge, through the Internet and ICTs, will subsequently affect the broader public. The abilities and skills that individuals gain from ICTs will improve their human, financial, political, social, and cultural capital (Hargittai & Hinnant, 2008). As the broader public has access to information, government resources, and a medium to participate in civic life (Mossberger et al., 2007), the potential for enhanced civic engagement and social equality increases. This in turn facilitates broader trust, the overall well-being, and functionality of society.

A proactive digital literacy program can help people develop their individual skills and can also create the potential for grassroots collective action to address existing inequalities and conflict. According to Shirky (2008):

> Collaborative production, where people have to coordinate with one another to get anything done, is considerably harder than simple sharing, but the results can be more profound. New tools allow large groups to collaborate, by taking advantage of nonfinancial motivations and by allowing for wildly differing levels of contribution. (p.109)

An example of this collective action includes Wikipedia and the bombings in London's transit systems in 2005. Wikipedia is a world-class encyclopedia created entirely by volunteers and open for editing by anyone, and has transcended the traditional functions

of an encyclopedia. Within minutes of the bombs going off in the London transit system in 2005, someone created a Wikipedia page titled "7 July 2005 London bombings." The article's first incarnation was five sentences long but the page received more than a thousand edits in its first four hours of existence, as additional news came in. Wikipedia users added numerous links to traditional news sources and a list of contact numbers for people trying to track loved ones or simply figure out how to get home. What was conceived in 2001 as an open encyclopedia had now become a general purpose tool for gathering and distributing information quickly (Shirky, 2008:116-7). With the rise of new technologies and the evolution of social networking, successful groups are being created and doing new things in innovative ways.

In much of the same way that universal education has promoted democracy and economic growth, the Internet has the potential to benefit society as a whole and facilitate membership and participation of individuals within society (Mossberger et al., 2007). The meaning of citizenship has traditionally been associated with the power of individuals in the process of social decision-making. Throughout history, effective citizenship has required functional literacy skills as the fundamental factor for attending societal life; however the Internet and new ICTs have changed the nature and scope of citizenship (Simsek & Simsek 2013). In this modern digital age, it is a vital requisite to be digitally literate, or be able to fully understand and utilize new information and communication technologies. Glister (1997) defined basic skills for digital literacies as assembling knowledge, evaluating information, searching, and navigating in non-linear routes. Hobbes (2008) underlined the importance of ethical responsibilities and self-confidence

for digital literacies. In addition to skills and ethics, digital literacy also covers knowledge and creative products in the digital environments (Calvani, Cartelli, Fini, & Ranieri, 2008). Hobbes and Jensen (2009) defined both digital citizenship and digital literacies as:

> The skills and knowledge needed to be effective in the increasingly social media environment, where the distinctions between producer and consumer have evaporated and the blurring between public and private worlds create new ethical challenges and opportunities for children, young people, and adults. (p.5)

Hacker and van Dijk (2000) focused on the term digital democracy defining "the use of information and communication technology (ICT) and computer-mediated communication (CMC) in all kinds of media (e.g. the Internet, interactive broadcasting and digital telephony) for purposes of enhancing political democracy or the participation of citizenships in democratic communication" (p.1). Therefore, it could be inferred that digital citizenship and digital literacy are not easily separated, connecting on the point of new skills (Simsek & Simsek, 2013). For this research, digital citizenship will be referred to as the ability for individuals to participate online and a digitally literate citizen is one who uses the Internet frequently, collectively, and efficiently.

As literacy was a prerequisite for participation in the industrial society, Internet skills are prerequisites for participation in this contemporary, information-based society. The digital knowledge necessary to utilize technology efficiently and effectively is crucial for success in academia, the workplace, and beyond. However, the advancement of digital skills and knowledge is not a standard component of the current educational curriculum (van Deursen, 2010). If students were given the opportunity to learn while effectively utilizing technology, they would have a sense of empowerment to learn

beyond what they are taught. This would contribute to a more meaningful experience in college, both socially and academically.

Many students arrive to college with basic digital skills; however a majority of students hold many crucial deficiencies. Increasing students' experiences with the Internet and ICTs allows for the advancement in digital skills that enables them to become better contributors to society as students and as citizens. Universities and higher education can aid in the improvement of their students' digital literacy to advance their academic research, writing and critical thinking skills, and the support of vocational and professional development (Beetham, McGill, & Littlejohn, 2009). Additionally, fostering an online community of teaching and learning among college students for digital and other life skills could become a self-sustaining solution to their digital learning needs.

In popular media and elsewhere, assumptions prevail about young people's inherent savvy with ICTs due to the idea that they have been exposed to digital media throughout their lives (Hargittai, 2010; Prensky, 2001a). However, these assumptions have not been supported as prior research has found differences in young adults' digital skills and use, even among the highly connected. As differences remain among individuals even after they integrate ICTs into their daily lives, scholars continually emphasize the importance of the causes and impacts of inequalities in digital skills, knowledge, and use (DiMaggio et al., 2004). Differential knowledge, skills, and practices hold the ability to create inequalities among users; however the advancement of knowledge and skills through online community building can weaken digital inequalities.

This thesis contributes to the existing understanding of digital inequality by showing that promoting knowledge through online community-building and networking has the potential to benefit individual students by improving their digital self-esteem and self-efficacy. This study provides important insights into whether an online learning community intervention has positive influences on students' use of the Internet for the advancement of their digital literacy, and potentially for the larger community through increased civic engagement. The study also provides insight into some of the ways that students differ in their digital skills and use while in college and the inequalities that can result. This information can be used to guide future development of online learning communities and programs at the institutional level that meet the demands of specific student populations and larger communities.

This thesis begins with a discussion of communication and information technologies and the influences of digital technologies on education in American society. The background literature on digital technologies provides context for the following section on social inequality, which serves as the theoretical framework for this study. Literature on digital inequality, domains of digital literacy, and university policy changes will then be discussed, which guides the study's research questions. Subsequently, the methodology, data analysis, results and discussions, and limitations are discussed. The research concludes by exploring the implications of our findings towards social inequality.

CHAPTER 2: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Background

Information and Communication Technologies

Technology developments, along with social and cultural changes, are crucial determining forces behind historical transformations. Specifically, communication technologies have served an important role in the transition from nomadic to agricultural, to industrial, and to the current information-based society. Although it can be argued whether changes in modes of communication have been decisive for the majority of shifts in these societal transformations, they do function as important components in these shifts (van Deursen, 2010). In particular, Boomershine's investigation from the transition from oral communication to writing found that changes in modes of communication consistently involves a transformation of patterns in community organization, communication styles, and ways of thinking (1987).

This literature review highlights the social and political goals that have developed in conjunction with developments in information and communication technologies (ICTs). These transformations are often associated with higher demands being placed on the individual members of society, by increasing the focus on 'private goods' and individual social mobility. These goals are important, although attention is being diverted from discussions of democratic equality and civic engagement that result in broader 'public goods.' In this modern digital age, technology and the Internet translates to access of information, which has thus become a primary good, or a basic necessity in life (van Deursen, 2010). This is particularly true as traditional forms of communication and

information—such as newspapers, television, and radio—are being replaced with digital versions. These digital versions, through social and digital media, have appealing images to the public sphere—as these tools are not only reshaping the workforce and economy, but social life, academia, and individuals' potential for collective action as well. Furthermore, the Internet and ICTs have revolutionized the spread of information and their impact on society is comparable to the birth of writing or the development of the printing press (van Deursen, 2010). ICTs can support individuals in their everyday activities through social, political, and cultural activities. Berners-Lee and Fishchetti (2000) suggest:

> The fundamental principle behind the Internet was that once someone somewhere made available a document, database, graphic, sound, video, or screen at some stage in an interactive dialogue, it should be accessible by anyone, with any type of computer, in any country. (p.37)

The Internet enables a remarkable decentralization of information and has made it easier than ever for individuals and organizations to publish information to larger audiences. In 1993 after the appearance of the graphical browsers, the diffusion of the Internet occurred with speeds no other media ever reached before (van Deursen, 2010). Furthermore, Mossberger et al. (2007) state:

> If information available online helps citizens to be more informed about politics and more inclined to participate, then society as a whole profits from broader and possibly more deliberative participation in democratic processes. If modern communication technologies offer new channels for contacting officials, discussing issues, and mobilizing, then the network externalities or the benefits of bringing people together online exceed the satisfaction gained by the individual participants. (p.3)

If we view information as a primary good, then unequal access, literacies, and skills are likely to result in social and digital inequalities. Internet skills are prerequisites for full participation in our contemporary, information-based society (van Deursen, 2010), and a lack of these skills can lead to disadvantages or exclusion from global literacy communities (Sutherland-Smith, 2002). Unfortunately, academia has not yet embraced the developments in these new literacies for students. While compulsory education obliged all children to go to school and learn to read and write, learning to use the Internet is not a standard component of the current curriculum (van Deursen, 2010). This issue can easily be resolved through the implementation of digital systems and communication technologies into the classrooms, ideally beginning with younger children in grade school.

Individuals who have grown up in this modern digital age are often assumed to be universally savvy with information and communication technologies (Hargittai, 2010); however, young adults and university students have different online abilities and digital skills. Some students have skills that would classify them as 'tech-savvy,' although most students arrive to college without the necessary skills required to succeed in this modern digital age. Even if students do possess the skills to operate these types of technologies, they are often led astray by inaccurate or misleading information found on the Internet. Therefore, current university students are urged to develop digital skills and abilities, and in order to do so, they need to be given the opportunity to openly participate, collaborate, and network online with others. To address students' digital literacy and use of technology, both peers and faculty will be encouraged to not only become digitally

literate citizens, but to use their new literacy to succeed now and in the future. As digital technology empowers learning, the following section addresses the influence of digital technologies and advancements in academia.

The Influence of Digital Technologies on Education

Technology is one of the most significant mechanisms currently transforming the learning process. The university is an excellent setting for students to learn about digital, information, and communication technologies and the Internet. An overview of the influence of digital technologies on education and the impact on teachers, students, and teaching methods will be examined to illustrate the advancements of technology and education. Different tools teachers have used in the learning process over the last decade range from chalkboards and slide/overhead projectors to video projectors, electronic/smart whiteboards, and network resources. These tools have affected the teacher, who has evolved from writing on a whiteboard to projection onto a screen; the student, who has evolved from taking handwritten notes to downloading information and searching the Internet; and the educational process, which has evolved from the lecture to a collaborative and project-based learning environment (del Campo, Negro, & Nunez, 2012).

Today's students represent the first generation to grow up with this new technology and they think and process information fundamentally different than their predecessors (Prensky, 2001a). A new term has been used to describe these 'native speakers' of the digital language of computers, video games, and the Internet—'digital natives' (Prensky, 2001a). However, teachers have not always been so willing to change

their methods of teaching to adapt to the new digitally-based student. Teachers who speak an outdated language (that of the pre-digital age) or 'digital immigrants' are struggling to teach a population that speaks an entirely new language. Previous digital immigrant teachers have made education not worth paying attention to for the student, as everything that students experience is networked, multitasked, and paralleled. Teachers need to teach both legacy and future content in the language of the current students or digital natives. Legacy content is reading, writing, arithmetic, logic thinking, and understanding the writings and ideas of the past—all which are part of the traditional curriculum; future content is digital and technological, including software, hardware, robotics, nanotechnology, genomics, in addition to ethics, politics, sociology, and languages that go together with them (Prensky, 2001a). Therefore, teachers need to stay current with technology in order to offer students adequate technical content, while providing the proper motivation through the use of new technologies (del Campo et al., 2012).

Science has proven that the brain reorganizes itself throughout the adult life, a phenomenon technically defined as neuroplasticity. Our brain maintains plasticity for life (Caine & Caine, 1991), meaning that teachers have the ability to change their ways of thinking *and* teaching to accommodate the needs of their students. Furthermore, the field of social psychology has provided strong evidence that individuals' thinking patterns change depending on life experiences (Prensky, 2001b). Therefore, the brain is able to reorganize itself when an individual practices and able to keep their attention focused. Teachers must be willing to utilize practices that relate to their students—collaboration,

networking, and game-based learning—all which allow students to reflect, collaborate, and critically think during the learning process.

The revolution of the learning process came with the video projector, followed by the electronic and smart whiteboard, and most recently, network resources. From the standpoint of the teacher, these supporting tools provide excellent aides to teaching in the classroom. Students are able to display the latest projects available online and find answers instantaneously, as the inquiry of information occurs online (del Campo et al., 2012). Students can concentrate on the explanations and actively participate in their classes, as they no longer need to focus on taking handwritten notes. In addition, technological advancements have allowed students to see the professional world in a clearer and simpler manner—through videos, links and the Internet, presentations by the professors, and collaborations with other students.

The learning process has transformed from a passive learning environment, where students are consumers of information, to an active learning environment, where students can collaborate with others and become creators of content. Education has moved from a master class to a collaborative learning environment, and currently to a project-based learning environment. A master class was largely dependent on the professor, and the method of subject material presentation was cumbersome for this generation of students. Collaborative learning brought about greater interaction between the professor and students (del Campo et al., 2012). Currently, the project-based learning attempts to place the student in a situation similar to the one they would face in the workplace, allowing

students to learn through individual and group work (del Campo et al., 2012), significantly impacting the active learning process.

Some aspects of social media and technology have been detrimental to the learning process, as many distractions arise from technology use in the classroom, for both teachers and students. At times, professors rely too much on their presentations and simply read from slides rather than focusing on providing students the material. Professors need to expand concepts and include real-world examples and explanations, while effectively utilizing technology, as this is how students learn most efficiently. Researchers have claimed that today's students are creative, interactive, and media-oriented with daily technology use (DeGennaro, 2008), and more use in the university leads to increased preparation and engagement in the classroom. Therefore, it is necessary to find a balance to teaching in this modern digital age—using enough tools to engage and expand the students' knowledge without overwhelming them with too much information. The following section provides an overview of the education system and the opportunities of social mobility and social capital, mediating current digital inequalities.

The Role of Education in Overcoming Digital Inequality

One of the main issues with the current state of the education system is that the primary goal centers on individual social mobility and capital accumulation rather than the collective benefits that can result from promoting democratic equality and citizenship (Labaree, 1997). Labaree defines three distinguishable goals for the education system that has implications for how we can seek to overcome digital inequality—democratic equality, social efficacy, and social mobility (1997). The first goal, 'democratic equality'

argues that a democratic society cannot persist unless it prepares all of its youth with equal care to take on full responsibilities of citizens; therefore schools must promote both effective citizenship and relative equality (Labaree, 1997). 'Social efficacy' argues that our economic well-being depends on our ability to prepare the youth to carry out useful economic roles (Labaree, 1997). Thus, education is designed to prepare workers to fill structurally necessary market goals. The final goal, 'social mobility' argues that education is a commodity and its sole purpose is to provide individual students with a competitive advantage for the future (Labaree, 1997). Education is viewed to prepare individuals for the most desirable roles in society, and schools should provide students with the educational credentials they need to get ahead in society. Labaree (1997) argues that social mobility has become the dominant approach to education, followed by social efficacy, resulting in a focus on the needs of the market rather than society. This perspective views education as a necessity to meet the needs of the individual rather than that of the collective. Although social mobility should not be ignored as individual accumulation of capital is still important, more attention must be given to pursue 'citizenship training' (Labaree, 1997). Citizenship training is a historically significant goal in the American liberal arts education and contemporary society, and it must involve the development of a more digitally literate and skilled population. This is particularly true as individuals engage in online activities daily. Therefore, the liberal arts education needs a digital update. This update includes working towards the development of new digital skills that can enhance economic and cultural capital, while maintaining a more equal, effective democratic population.

Promoting digital skills and knowledge through an online learning community will provide benefits useful to the individual participants and to the larger community, while enabling students to use a variety of information technology tools and resources. The newly acquired digital literacy skills can balance the development of other antecedent skills and preconditions, such as civic/political knowledge gathering and access to information. As literature on digital literacy, inequality, and identity often focuses on the individual accumulation of digital knowledge, skills, and capital—this community will focus on the individual students *and* the benefits to the community as a whole. The following section explores the concept of digital citizenship as individual's digital knowledge, skills, and social capital all affect the way an individual views their digital identity and citizenship.

Digital Citizenship: The New Form of Citizenship

In order to define digital citizenship it is necessary to determine what citizenship entails more broadly. According the T.H. Marshall (1950), "Citizenship is a status bestowed on those who are full members of a community. All who possess the status are equal with respect to the rights and duties with which the status is endowed" (p.150). Citizenship can be based on a set of ideals, beliefs, and values. Furthermore, Gordon and Lenhardt (2008) define citizenship including both formal and informal notions of belonging or "the realization by individuals and groups of genuine participation in the larger political, social, economic and cultural community" (p.1187-8). Citizenship includes online participation in society, from positive externalities or social benefits

beyond those reaped by the individuals, to equality of opportunity (Mossberger et al., 2007).

Due to ICTs and the Internet's ability to benefit society and facilitate membership among individuals within society, scholars have suggested a new form of citizenship that has emerged—digital citizenship. According to Mossberger et al. (2007), digital citizenship is "the ability to participate in society online" (p.1), and digital citizens can be defined by those who use the Internet regularly and effectively, on a daily basis. Citron and Norton (2011) provide a more precise definition, suggesting that digital citizenship requires users the "capability to partake freely in the internet's diverse political, social, economic, and cultural opportunities, which informs and facilitates their civic engagement" (p.1440). Overall, digital citizenship "aims to secure robust *and* responsible participation in online life" (Citron & Norton, 2011:1440).

Conceptually, the use of the term digital citizenship in this research is a combination of definitions by Citron and Norton (2011) and Mossberger et al. (2007). In order to operationalize the term for the purposes of this study, I claim that digital citizenship can be measured and examined through differences in *immersive* engagement in online activities, suggesting that users engage in both a variety and depth of online activities. Additionally, the capacity to engage in immersive online activities must take on more nuanced measures. Based on prior studies on differentiated Web-use, this capacity requires technology access (Mossberger et al., 2007), social support (Hargittai, 2002), experiences and autonomy of use (Hargittai, 2003; Hassani, 2006), and the skills

necessary to use it effectively (Hargittai & Hinnant, 2008; van Deursen, 2010; van Dijk, 2005).[1]

Digital citizenship varies through economic, social, political, educational, and cultural activities online. These activities often complement the forms of social capital, however, other activities move beyond these forms of capital as well. Digital citizenship, through advanced online participation, can contribute to the public good, including the creation and sharing of content, online collaboration, participating in discussions, and expanding social networks. Democracy works best when social networks and communities are built around social interactions, norms of reciprocity, and trustworthiness (Putnam, 2000). Thus, online community-building could serve as a catalyst for developing more literate and engaged digital citizens. Howard Rheingold (2012) states, "people who think of themselves as capable of creating as well as consuming are different kinds of citizens, and our collective actions add up to a different kind of society" (p.249). If the above conditions of digital citizenship are met, the growth and expansion of the Internet can serve to enhance civic engagement and in turn facilitate democratic functions that benefit this 'different kind' of society.

Previous studies have found positive associations between Internet use and participation. For example, evidence has shown that access to politics and government online has important social and participatory benefits. Mossberger, Tolbert, and Stansbury (2003) state "the interactivity, low-cost, flexibility, and information capacity available on the Internet have the potential to allow the public to become more

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[1] These predictors of differentiated Web-use were analyzed as part of this research, and thus will be included in the later analyses of the data.

knowledgeable about politics as a first step towards greater participation" (p.89). Additionally, Tolbert and McNeal (2003) found that that the Internet may enhance information about candidacy and elections, and in turn stimulate increased political participation. Many scholars view information and communication technologies as the most important factor in fueling a participatory revolution (Mossberger et al., 2003).

Other examples of the positive forces resulting from mass Internet use include social movements and participation (e.g. recent movements in the Middle East and the effective use of ICTs to help enact social change), use for collaborative knowledge building (e.g. free and open information provided by sites like Wikipedia), and the spread of news and information to the public (e.g. through sites such as Facebook, Twitter, Reddit, blogs, and news sites). A recent example of the spread of information and support include a community that was formed in hopes of finding a missing student from the University of Cincinnati in May 2014. In the first week that the student went missing, the Facebook group had reached over 20,000 members and #HelpFind[…] was trending on Twitter. The use of social media, community, and support can be very powerful if used correctly, as Facebook and Twitter played an essential role in the search for the missing college student.

Digital citizenship contributes to issues of social inequality, and issues of inequality are apparent through the already digitally advanced individuals, who were the first to gain access to new technologies and social media. Thus, they are the first to dictate the culturally accepted standards of ICTs and Internet use. This further marginalizes the underprivileged. Those who lack the means to gain access to these

technologies have fallen behind in terms of the skills necessary to productively engage in and use technologies. Social exclusion began with the digital divide and is rooted in a comparative perspective of relative inequality. The digital divide holds the assumption that Internet usage is associated with beneficial outcomes while non-usage negatively results in social inequalities between users and non-users. However, just as universal education in America didn't eradicate inequalities stemming from lack of access, neither will universal Internet access, at least not solely. As the defining goals of education in America has focused on increasing opportunities and social mobility (a private good), less attention has been paid to improving democratic equality and civic engagement. In this modern digital age, digital citizenship may rival formal education in its importance for economic opportunity (Mossberger et al., 2007). Improving social mobility, earning a college degree, and career advancement has been the core of education rather than deepening civic engagement online.

Digital citizenship provides a conceptual framework to understand the ways in which people engage in various activities online and how differences in digital skills and Internet use can serve to create, reinforce, and perpetuate inequalities. Digital citizenship requires educational competencies as well as technology access and skills (Mossberger et al., 2007). If more focus isn't given to promoting a more widespread digital citizenship, society risks constructing even greater social, economic, and political inequality.

The Digital Divide and the Impact on Digital Skills

Current research on the digital divide has found differences in Internet use and skills by factors such as gender, race, age, socioeconomic status, and urbanicity (Goldfarb

& Prince, 2008; Hargittai, 2010). For example, participatory Web-use among young adults is differentiated by gender, as females tend to be more avid bloggers, although less likely to share creative content, and males are more likely to upload videos (Hargittai & Walejko, 2008; Lenhart, Madden, Rankin-Macgill, & Smith, 2007). Previous research suggests that refined measures of digital media use and online abilities are essential for uncovering the nuanced ways in which differentiated Internet use has implications for social inequality.

Web skills, an important factor of human capital, can be broadly defined as an individual's ability to identify, access, and use online information effectively and efficiently (DiMaggio et al., 2004; Hargittai, 2002; Hargittai 2010; Livingstone & Helsper, 2007; van Dijk, 2005). Livingstone and Helsper (2007) claim that Web-use skills (based on self-reported abilities) have significant impacts on the number and types of activities individuals engage in online; however, skills are not evenly distributed among the population. Research has found little significance between gender and Web-use skills, although females perceive themselves as less competent, which may affect the types of activities they engage in online (Hargittai & Shafer, 2006). Thus, highly skilled users are in positions to significantly benefit from Internet use and participation (Hargittai & Shafer, 2006), particularly with the increasing number of opportunities provided on the Internet. More information is accessible on the Internet than ever before, available to inform individuals of politics, economics, and current issues. Society as a whole can profit from the expansion and availability of information online. Current communication technologies offer new ways to contact officials, discuss current and former issues, and

create and share content—all which result as people collaborate with others online, exceeding benefits gained by the individual. In order for individuals to gain knowledge, experience, and support from others, they must possess digital literacies, skills, and access necessary to engage in such activities.

Other research has found that psychological variables such as self-efficacy and motivation are important predictors of technology adoption and usage behavior. Self-efficacy is a term developed by Bandura (1986), defined as an individual's perception of their computer skills. Self-efficacy is a form of self-evaluation that influences people's decisions on what they can do with their given skills (Bandura, 1986). Specifically, Internet self-efficacy is an individual's belief in their capacity to perform certain activities online in order to produce a specified goal (Eastin & LaRose, 2000). Studies have found self-efficacy to be a strong predictor of frequency of Internet usage, particularly among male teenagers and the number of activities they engage in online (Livingstone & Helsper, 2007). User's perceived self-efficacy in using computer technologies, relative anxiety toward computers, and lesser familiarity with the underlying technology have all been causally implicated in Internet use (Hargittai & Shafer, 2006). The following section presents the overview of the theoretical framework used throughout this research and its major implications on users' digital access, Web-use and skills, and digital citizenship.

Theoretical Framework

Social Inequality

To analyze the differences in digital citizenship or digital skills among college students, an understanding of social inequality is necessary to address the implications of such differentiation in digital skills and use. Social inequality refers to differences in resources in demand within society, which are systematically unequally distributed among the population through societal processes (Hoffman, 2008). When this systematically unequal distribution occurs regularly between the same social groups, it then becomes a social problem. According to Hradil (2001), "The determinants of social inequality denote social positions of individuals in networks of social relations (…); these positions do not represent advantages or disadvantages as such but very likely produce them" (p.34, as cited in Hoffman, 2008).

In order to determine the structure and dynamics in social relations, a classifications of such phenomena and characteristics must be addressed (Hoffman, 2008). Karl Marx, Max Weber, and Pierre Bourdieu each worked towards such ends as they explored the origins and functions of social inequality; Marx and Weber did so in the industrial world. Karl Marx (1978) distinguished societal classes by their position in the economic system—whereas the capitalists, or bourgeoisie, owned the means of production and the labor/working class, or proletariats, sold their labor to the capitalists. The proletariats were opposed with hostility to the capitalists in a historically determined process. According to Marx, technology and economic activity primarily determine the structure of human relationships, yet he discussed other attributes to societal development

(Sabel & Zeitlin, 1985). Max Weber both critiqued and developed the ideas of Marx, claiming that the economic sphere was not the sole determinant of the class structure of society (Weber, Gerth, & Mills, 1946). Weber's class theory emphasized more cultural phenomena such as lifestyle, and distinguished societal classes by life chances and opportunity or wealth and prestige (Weber et al., 1946). Weber viewed human society as highly stratified, with individuals attempting to expand their control over various social resources (van Deursen, 2010). Resources can be anything that is socially desirable and limited in supply, including not only material resources such as the means of production and economic capital, but less tangible resources like social respect and intellectual knowledge (Hoffman, 2008).

Pierre Bourdieu (1984) elaborated on the ideas of Marx and Weber, developing a systematic classification of resources that play a role in social inequality (Hoffman, 2008). The unequal distribution of capital forms the basis of inequality, namely making profits and establishing rules favorable to capital reproduction; capital can reproduce itself and make profit through growth (Hoffman, 2008). Bourdieu (1984) reintegrates both Marx's and Weber's ideas, claiming that society cannot be analyzed by economic classes alone; however, Bourdieu does not limit the term capital to purely economic definition (Hoffman, 2008) Instead, Bourdieu broadens its application to include the social exchange of goods, and he identified and defined three types of capital that highlight differences between groups, including economic, cultural, and social capital (Hoffman, 2008). Reflecting on Marx's ideas, economic capital is materialistic and includes monetary and property assets, as well as other economic possessions that may

increase one's capital (Hoffman, 2008; Marx, 1978). Hoffman (2008) states "Economic capital constitutes a unit that penetrates all other forms of capital" (p.32). Furthermore, according to Marx (1978):

> The division of labour (…) manifests itself also in the ruling class as the division of mental and material labour, so that inside this class one part appears as the thinkers of the class (its active, conceptive ideologists, who make the perfecting of the illusion of the class about itself their chief source of livelihood), while the others' attitudes to these ideas and illusions is more passive and receptive, because they are in reality the active members of this class and have less time to make up illusions and ideas about themselves." (p.173)

The thinkers' ideas are the ruling ideas of the epoch and the separation of powers proves to be the dominant idea and is expressed as an 'eternal law' (Marx, 1978:173). Therefore, economic inequality can have serious consequences for the lower- class members of society. This is particularly true as the ruling class creates conditions to maintain their power and order in society, while claiming that it is beneficial for *all* classes in society.

Cultural capital incorporates both material and non-material resources. There are three distinct forms of cultural capital formed by the knowledge, skills, education, and advantages that allow higher prestige and status within society (van Deursen, 2010). The first type, 'incorporated cultural capital' requires a process of internalization such as education (Bourdieu, 1984; Hoffman, 2008), requiring the investment of time and motivation. Examples include the utilization of the Internet and ICTs through one's digital skills and knowledge acquired. However, education isn't enough to equalize cultural capital between classes; the individual's upbringing and environment will influence the ways in which one uses the Internet and ICTs. This leads to gaps in skills or cultural understanding among students that the education system may not address

(Hoffman, 2008). The second type, 'objectified cultural capital' includes works of art or machines, which are material carriers of cultural capital (Hoffman, 2008); this may include the types of technology individuals' own (e.g. the latest version of Apple's iPhone). However, incorporated cultural capital is needed to make use of these objects or machines, and then individuals are able to benefit from them (Hoffman, 2008). Lastly, 'institutionalized cultural capital' consists of titles or academic degrees that officially confirm an individual's cultural capital, marginalizing those with limited skills or knowledge (Hoffman, 2008). The title or degree certifies an individual's cultural competence and guarantees a conventional value, acknowledgement, and certain level of power (Hoffman, 2008). An investment in education requires economic capital which can be reconverted into economic capital, and such capital must be relatively rare (e.g. by academic degree); titles and degrees are important in transforming one form of capital into another (Hoffman, 2008).

Lastly, social capital consists of non-material resources embedded in group membership, relationships, networks, and support that can be leveraged for resources ranging from emotional support to new information and/or opportunities (Bourdieu & Passeron, 1990). Social capital is a resource based on group affiliation and can become a facilitator of both human and economic capital.

Overall, the unequal distribution of economic, cultural, and social capital works to reproduce the existing power relations between the ruling and the working classes, perpetuating various forms of inequality. Since all forms of capital can stimulate inequality, the question arises how the Internet and ICTs can be used to mitigate or add to

social, political, and economic inequality. Each form of capital influences the access that one has to the Internet and ICTs. For example, economic capital is necessary to support the means (through owning a digital device and acquiring the access through a service provider); social capital is necessary to learn to connect to and use the Internet (and their support usually comes from an individual's social networks); and cultural capital is necessary to cope with the diverse amount of available content to people with different backgrounds (van Deursen, 2010).

Once social, economic, and cultural capital are met and access is achieved, the capital(s) can be used to reinforce and further develop each form of capital through efficient and effective use. For example, economic capital can be increased by having digital skills that are valued by the market, opening one up to a higher status and/or a more prestigious job (DiMaggio & Bonibowski, 2008). Social capital can be increased by expanding one's connections through social networks like Facebook and LinkedIn, while increasing their civic engagement and sense of community (Katz & Rice, 2002). Lastly, cultural capital can by increased by using the Internet for research and independent learning purposes. However, some individuals use the Internet in capital-enhancing ways while others utilize the Internet in less effective or profitable ways, or simply for their pleasure (Hargittai & Shafer, 2006; Zillien & Hargittai, 2009). Thus, social, economic, and cultural capital are affected by Internet use in such a way that those with a higher status are advantaged by using online information to increase their already advanced capital (van Deursen, 2010). For example, research has showed that people with higher statuses and skills are better digitally equipped, thus possessing more advanced Internet

skills (Hargittai, 2002; Mossberger et al., 2003). Additionally, socioeconomic status is significant in predicting how individuals incorporate the Internet into their daily lives (Hargittai, 2010). Therefore, there are clear predictors the process in which inequalities are created, reinforced, and perpetuated in today's society.

The digital divide in access, skills, and use perpetuates social inequalities in the accumulation of capital, while excluding large portions of the population from participation in democratic and civil engagement online. Witte and Mannon (2009) reiterate that Internet access should be understood as an asset to maintain class privilege. The Internet has historically been a longstanding series of information and communications technologies—from speech, to printing, movable type, telegraphy, telephony, radio, and television—all having influenced patterns of social inequality by creating the need for new competencies and literacies (van Deursen, 2010). New competencies, abilities, and skills, as well as motivation, education, and media use, can lead to digital advancements *and* usage or knowledge gaps (Hargittai et al., 2008). As the old saying goes, the rich get richer and the poor stay poor, or in this case, the [digitally] literate gain more skills and the [digitally] illiterate fall behind (Zillien & Hargittai, 2009). The Internet is the newest form in the long line of technology and requires greater competencies than prior technologies, thus leading to more serious consequences for those who lack the access or digital skills necessary to use and benefit from it (DiMaggio et al., 2004; van Deursen, 2010). The following section expands the scope of social inequality and incorporates inequalities resulting from digital advancements.

Beyond Social Inequality: The Digital Realm

For nearly a decade, researchers have argued that differentiated use of the Internet has the potential to contribute to social inequality beyond the access divide (DiMaggio et al., 2004). There has been a surge in research seeking to distinguish the types of online activities in which people engage in, how they may differ, and what factors are predictive of such differences. Although some people have integrated information and communication technologies into their everyday lives in ways that they continually benefit from the opportunities allowed by their use, others only turn to ICTs occasionally for information. Even so, many people contribute to society in the form of free and widely accessible information, resources, and knowledge through sites such as Wikipedia, online political forums, and communities of support (e.g. online forums for individuals struggling with eating disorders, etc.).

Previous research on digital inequality among young adults focuses on differences in digital use, skills, and social support, finding that positive outcomes and benefits are not randomly distributed among those with different backgrounds (Hargittai, 2010; Hargittai & Hinnant, 2008; Jung, Kim, Lin, & Cheong, 2005). Research in this area has also focused on differences in the ways that young people engage with each other through the use of ICTs (Hargittai & Hinnant, 2008); however more research needs to be invested in users' creating and sharing content, collaborating, participating, and expanding their networks online. Recent studies continue to provide valuable insight, although a lack of research remains with a focus on inequalities among users engaged in such activities and the consequences of such inequalities for the larger society.

Researchers have recently argued that more attention needs to be directed towards social, psychological, and cultural backgrounds and their effects on differentiated Internet skills and usage. Previous research has focused on differences in access, resulting in multiple conceptualizations of the digital divide. DiMaggio et al. (2004) suggest five forms of digital inequality that exist including: 'technical means' (hardware, software, and connections by which people access the Internet); 'autonomy of use' (personal ownership of technology that allows one to use the Internet for desired activities); 'skill' (an individual's ability to use the Internet and technologies effectively); 'social support networks' (availability of others in an individual's social network to turn to for assistance with use and whom encourage effective use); and 'variation in use' (types and purposes in which one engages in online activities). Each type of digital inequality likely shapes the experiences that users have online, the satisfaction users draw from Internet use, and the benefits individuals gain (DiMaggio et al., 2004).

Mossberger et al. (2003) introduces two concepts of the current digital divide: the economic opportunity and democratic divide. The economic opportunity divide emphasizes using the Internet and ICTs to find new jobs, to use at work or in education, and to find new products and resources online; the democratic divide emphasizes using the Internet and ICTs in democratic processes such as civic engagement (Mossberger et al., 2003). Recent scholars have argued that additional factors need to be considered in the evaluation of differentiated Web-use skills and ICT usage including language, content, literacy, educational level, and institutional structure (Warschauer, 2003). Van Dijk proposes factors including *motivational* access (social relations to people who do not

have interest in or feel hostile towards ICTs), *physical* access, *digital* skills (ability to use ICTs), and *usage* access (the opportunity and practice of using ICTs) also play a role in ICT usage (2005). These factors of digital inequalities need to be accounted for when examining individuals' digital skills and knowledge.

Previous research has addressed the cultural, educational, political, and socioeconomic aspects of the digital divide. Scholars have argued that while gaps in access to technologies and the Internet are being addressed, other gaps seem to be widening (van Deursen, 2010). Attention in literature on the digital divide has shifted from unequal access to other types of inequality. These include inequalities of skills and use, among others previously mentioned, and their implications for individual social mobility and the broader societal benefits through online engagement. The following section reviews the literature on the specific domains of digital literacy that will be analyzed throughout this thesis.

Domains of Digital Literacy

Literature on digital literacy conceptualizes the different types of skills required for a digital citizen. In this research, I identify six domains of digital literacy skills that individuals apply to the improvement of their digital self and identity. Figure 1 below displayed the six domains of digital literacy explored.

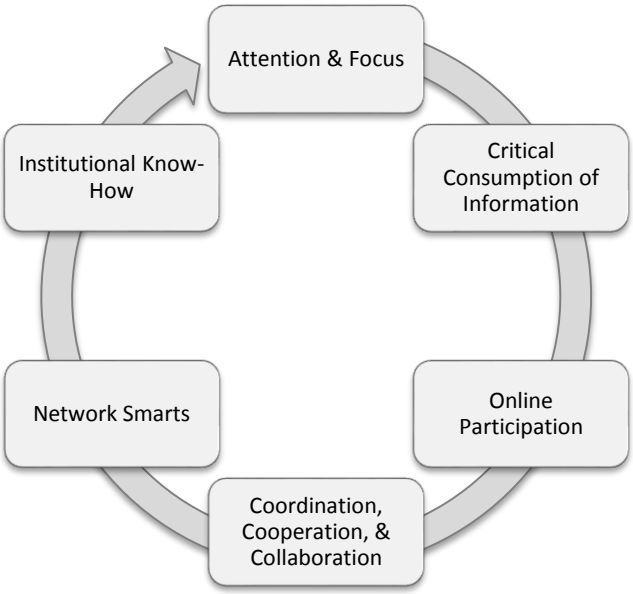

Figure 1. Six Domains of Digital Literacy

The domains of digital literacy analyzed derive from Howard Rheingold's *Net Smart* which explores the mindful use of digital technologies (2012). Rheingold claims that a bigger social issue is at work in digital literacy, one that goes beyond personal empowerment (2012). If people combine their individual efforts more wisely online, a more thoughtful society would emerge—a public good that enriches everyone.

Attention

Attention is the fundamental building block for how individuals think, how humans create tools and teach each other to use them, how groups socialize, and how people transform civilizations (Rheingold, 2012). Attention can be trained and people have the ability to re-learn to concentrate and control their attention in an information-overloaded environment. According to Foerde, Knowlton, and Poldrack (2006), people have a harder time learning new things when their brains are distracted by another activity; the human mind is not built for processing multiple streams of information,

(Ophir, 2009). Multitasking, or continuous partial attention, may cause people to lose effectiveness in individual tasks; yet it is not necessarily a negative alternative to focused attention either. Previous research has indicated that non-classroom use of digital devices by college students cause learning distractions in classrooms (Froese, Carpenter, Inman, Schooley, Barnes, Brecht, & Chacon, 2012; Wei & Wang, 2010), as many students attempt to multitask during class time.

Mindfulness and metacognition are two approaches that keep people's attention focused, by allowing people to become more aware of how they are deploying their attention. According to Kabat-Zinn (2003), mindfulness is "the awareness that emerges through paying attention on purpose" (p.145). Mindfulness is the tool that all other [digital] literacies depend on; it is what connects your attention to other digital skills and needs to be deliberately exercised, continually strengthened, and judicious applied (Rheingold, 2012). Attention and mindfulness are the first steps in a more intuitive analysis of our online experiences.

Critical Consumption

The critical consumption of information emphasizes information management as students have become less mindful of the information they find online. The decline in the quality of writing and originality of thought expressed by college students is thought to be attributed from the Internet. According to McBride and Dickstein (1998):

> What has really changed with the advent of the web is that students no longer get most of their information for class assignments from reputable print sources from the library. On the web, scholarly resources, unfounded claims, and advertising are all mixed up together, and librarians have not assessed the information's reliability before students use it for assignments. (p.6)

Techniques such as source triangulation—getting three independent sources to confirm a fact for news stories or articles, and thinking like a detective—verifying information for yourself, can help students eliminate false information they may find online (Rheingold, 2012). The utilization of detective-like skills demonstrates the active curation skills that individuals need to make use of resources online. Infotention is a combination of brain-powered attention skills and computer-powered information filters, or simply, "synchronizing your attentional habits with your information tools" (Rheingold, 2012:101). Infotention is used to turn information overload into knowledge navigation. Previous research has examined students' online inquiry and processes and found that students have difficulty in finding information online and discerning the truth or reliability of the information they found (Greenhow, Robelia, & Hughes, 2009). Therefore, mastering such skills as critical consumption of information and infotention are essential for mindful participation online.

Participation

As the Internet has served as a social medium for interpersonal communication and organization, online participation has emerged as an avenue for social activity. Assumptions about young people's inherent savvy with information and communication technologies result from their exposure of digital media, education, and access to new technologies, all which have placed them in this privileged position in the digital world (Hargittai & Hinnant, 2008; van Dijk, 2005). According to the National Telecommunication and Information Administration (2011), college students aged 18-24 years old are the most highly connection group of individuals among Internet users at 92

percent.[2] The Internet and technologies that we have daily access to are powerful engines for participation and "in the world of networked publics, online participation—if you know how to do it—can translate into real power" (Rheingold, 2012:112). Although frequency of participation varies, all forms of participation are beneficial to the participant and other users. Yet a divide in the breadth and frequency of participation may lead to the emergence of a society dominated by contributors while the remainder are mere consumers of content (Hargittai & Walejko, 2008). Most individuals participate online primary for their own benefit. However, if we utilize the architecture of participation—the nature of systems that are designed for user contribution (O'Reilly, 2004), then millions of individual acts of participation will add up to a participatory culture. A participatory culture has relatively low barriers to artistic expression and civic engagement, strong support for creating and sharing one's creations, and some type of information mentorship whereby what is known by the most experienced is passed along to novices (Jenkins, Puroshotma, Clinton, Weigel, & Robinson, 2005). Students participate online, however they may not understand the rhetoric of participation, a concept that is very important for mindful online participation. Curation is a form of participation for people who may not want to actively blog, tweet, or post updates. A curator is identified as an information finder and evaluator—one whom bookmarks, tags, and likes other people's creation(s). Curation is viewed as the fundamental building block of an entirely new way of aggregating and organizing knowledge (Rheingold, 2012). Participation and curation allow people to inform, persuade, and influence the beliefs of

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[2] Includes persons aged 18-24 that use the Internet anywhere (including inside and outside of the home).

others, allowing students to become active citizens rather than simply consumers of information online.

Collaboration

Collaboration among college students is essential as technology has been integrated into all facets of the college experience, with nearly all students (96 percent) utilizing some form of technology in their courses (National Survey of Student Engagement, 2013). Using the techniques of attention, critical consumption of information, and participation allows students to collaborate in ways that were too difficult before the advent of social media. Collaboration can be the most purposeful form of collective action, which highlights the potential of networks to effectively solve problems; it allows people to work together and thus, have more power than doing things individually. Collaboration uses networking, coordination, and cooperation as building blocks, while increasing the exchange of information and modification of activities. Collaboration enhances the capacity of another for mutual benefit and to achieve a common purpose by sharing risks, resources, responsibilities, and rewards (Himmelman, 2002). In 2013, one of the most frequently utilized technologies by college students included collaborative editing software such as Wikis and Google Docs (NSSE). Currently, students are collaborating using social media to consume and create content; traditional forms of sharing in network technologies are being used in ways we previously could not.

Network Smarts

Network smarts is an essential literacy as networks have the structures that influence the way individuals and groups behave. Network smarts, awareness, or savvy is the ability to know how information, power, and social relations flow in a networked world. Social networks are an essential part of being human. Current technological networks range from the telephone to the Internet, expanding the number and variety of ways people can stay connected. Additionally, these networks multiply our innate human capacity for social networking while lowering the threshold for organization with others, allowing the connection of people across the world in a matter of seconds (Rheingold, 2012). Research has found that individuals with larger and more diverse network of contacts have more social capital than individuals with small, less diverse networks (Valenzuela, Park, & Kee, 2009). As social capital is a main component of network smarts, the networks of trust and norms of reciprocity are highlighted as these enable groups of individuals to get things done together that they might not have been able to do otherwise (Rheingold, 2012). Network smarts is crucial in this modern digital age, as it is the fabric of interconnections between human society and digital media.

Institutional Know-How

Ohio University Know-How is the last form of digital literacy that will be analyzed in this study. This type of digital literacy focuses on ways to improve students' ability to use their practical knowledge when accomplishing things, particularly with Ohio University online resources. It is essential for students to know how to effectively navigate university resources, as the tools and resources provided by the university are

there to help students succeed—socially, financially, and academically. The following section overviews university policy changes through digital literacy programs and/or online learning communities. The benefits and ways such a community can advance students' digital skills and knowledge is also discussed.

Potential Implementation and Changes in University Policy

Universities and higher education institutions need to provide students with a strong foundation of [digital] skills that enable them to thrive in this increasingly information-based society. The mastery of these skills by students is more important than ever particularly with the convergence of communications and information technologies, the rise of user-owned technologies, user-created content, and widespread social networking practices. Unless programs are implemented by universities and higher education institutions, students will continue to struggle to reach their full potential. As the future demands digitally-savvy individuals with the capacity to participate online throughout their educational and future careers, it is essential that students reach their full potentials—digitally, academically, socially, and financially.

Significant ways that universities and higher education institutions can address the preexisting social inequalities that students face can be through the implementation of online learning communities. An online learning community is a group of people who meet online and communicate via communication networks, while sharing common interests and goals, engaging in knowledge-related transactions, and supporting members in their learning agendas (Ma, 2006). Online learning communities are efficient and effective in addressing the educational and digital needs of students in ways that benefit

students now and in the future—through effective teaching and learning approaches, as students have the opportunity to share knowledge and communicate specific needs; incorporate diverse informational resources, such as documents, links to webpages, and videos; and enhance the development of information skills through the use of active and collaborative activities which offers different types of resources to different types of learners. To organize an online learning community (OLC) around those skills would be a potential way to advance students' digital skills and knowledge. Furthermore, implementing OLCs at the university-level allow the university to respond more quickly to changes in techniques and practices, as opposed to changes in the current academic curriculum. Previous research has found that online learning communities are effective in enhancing the acquisition of information and digital skills by undergraduate students (Dominguez-Flores & Wang, 2011). For those reasons, an intervention through an optional OLC was implemented as part of this research study.

The next chapter provides descriptions of the research questions and variables explored in this study, including social and digital inequalities, digital skills, and student involvement in an online learning community.

CHAPTER 3: RESEARCH QUESTIONS

Based on the literature review and theoretical framework overview above, the research questions explored focus on differences in students' digital literacy skills, their implications for inequality, and the potential to improve digital skills by promoting various skills and literacies through online community building.

First Research Question

Research Question 1.1- To what extent do social inequalities impact students' prior digital skills?

First, this study will explore the difference among student demographic characteristics and their digital skills before entering university—referred to as 'prior digital skills.' More specifically, to what extent do social inequalities affect students' prior digital skills before entering Ohio University. Based on findings from previous research, it is expected that white, male students with higher socioeconomic backgrounds and more technology access will have higher levels of self-efficacy or perceived digital skills.

Research Question 1.2- How do students differ in their perceived changes in digital literacy skills?

Next, differences among students will be explored in terms of their perception of improvements in digital literacy skills, comparing their first semester digital skills to their current skills at Ohio University—referred to as 'change in DL skills.'[3] Factors that will be explored include demographics, prior digital citizenship, social support, and digital

[3] It should be noted that this study was not longitudinal; participants were asked to report their perceptions, comparing their digital literacy skills from their first semester to the current spring semester at Ohio University.

capital. Based on findings from previous research, it is expected that white, male students with higher socioeconomic status, more access to ICTs and autonomy of use, and more social support will have higher levels of self-efficacy and engage in more online activities. Furthermore, research has found those who more frequently engage in activities online have more opportunities to learn and advance their digital skills (e.g. Mossberger et al., 2007).

Research Question 1.3- What initiatives can a university take to facilitate the advancement of students' digital literacy skills?

In the last section of the first research question, initiatives and policies are explored in terms of what universities and higher education institutions can do to better equip students with more advanced digital literacies. These skills are necessary for students to thrive in this increasingly information-based society, and without changes at the institutional level, students will continually struggle to reach their full potential.

Second Research Question

Research Question 2.1- To what extent does prior digital citizenship affect student involvement in an online learning community?

Second, this study will determine how students' prior digital citizenship affects involvement in an online learning community—referred to as 'OLC activity.' Prior digital citizenship includes variables that measure the frequency and depth of activities that students engage in online during their first semester at Ohio University. To test whether it was plausible to influence college students' advancement in digital skills and citizenship, an OLC was implemented. Here, students could learn techniques to improve

their digital skills and allowed them to participate, share, and collaborate in a social and academic manner.

Literature on the knowledge-gap has suggested that more advanced digital users will continue to seek improvements above and beyond their less skilled counterparts—more simply, *the rich get richer and the poor stay poor*. This study will explore whether such differences exist, and the implications of continued differences.

Research Question 2.2- Does increased student involvement in an online learning community lead to greater improvements in digital literacy skills?

Furthermore, this study examines the OLC participants' perceived changes in their digital literacy skills since their first semester at Ohio University–referred to as 'change in DL skills.' I hypothesize that students who were more involved in the OLC will experience greater perceptions of improvement in their digital literacy skills than students who were not as involved in the community. Students who were more involved in the OLC would have more experience with participation, collaboration, and networking as those literacies were comprehensively discussed in the community.

Research Question 2.3- Does increased student involvement in an online learning community result in greater benefits in students' lives?

The last part of this research question will analyze the impact of the OLC on the participants' lives—referred to as "impact of OLC." I hypothesize that increased student involvement with the OLC will result in more beneficial outcomes due to increased participation, collaboration, and social support with other members of the online learning community.

Third Research Question

Research Question 3.1- How does increased involvement in an OLC affect students' improvements in digital literacies in comparison to students who did not participate in the OLC?

Third, this study examines students' perception of skills in specific digital literacies during their first semester and their spring semester at Ohio University. I hypothesize that students who participated in the OLC will perceive greater improvements in their digital literacy abilities than students who did not participate in the OLC. Each of the six digital literacies was presented through multiple facets in the online learning community, through information, articles, resources, and tools that aided students' advancement of their digital literacies.

Research Question 3.2- How do OLC and non-OLC participants differ in their level of improvements in certain domains of digital literacy?

The domains of digital literacies that students' most improved in from their first to spring semester will be analyzed to determine which literacies had the greatest improvement rate. As well, student involvement in the OLC will be analyzed to determine the extent that involvement contributed to certain literacy advancements more than others. As previously mentioned, this study is not longitudinal, and students were instead asked to reflect back to their abilities during their first (and current) semester at Ohio University.

CHAPTER 4: METHODOLOGY

Data Collection and Sample Descriptives

A convenience sample was used for both the intervention and comparison groups in this study. The intervention group consists of 26 students in a variety of introductory level Sociology and English classes, upper-level Sociology classes, Ohio University Learning Community students, and student employees or scholars at the Voinovich School of Leadership and Public Affairs. The comparison group consists of 174 students from a variety of the classes listed above. A total of 200 Ohio University (OU) undergraduate, graduate, and PhD students in a variety of courses and majors participated in the research study.

Recruitment for Online Learning Community

The researcher visited and spoke with a total of five classes (four introductory Sociology courses and one introductory English course) to introduce the online learning community (OLC), *OU Get Smarts*. After the five in-class presentation with 210 students, a brief email was sent out with an overview and intent of the OLC and the link to the community page and Facebook group. An additional 308 students were sent email invitations requesting their participation in the OLC; these students were enrolled in OU Learning Communities (LC) during the previous (fall) semester or students at the Voinovich School. The researcher was not able to speak with these students as those from OU LCs were not in the same classes spring semester[4] and students at the Voinovich School may have been student employees, undergraduate scholars, or graduate students—

[4] Participants of OU LCs are typically in cohorts of first year students during their first semester at OU. OU LC students take the same classes together as a cohort during their first semester at OU.

all which are enrolled in different courses. The email invitation to those students had a more detailed description of the research and included the benefits of participation in the OLC. Of the 518 students that were invited to join the OLC, approximately 10 percent (N=48) of those students joined and became members of the Facebook group, OU Get Smarts.[5]

Recruitment for Research Survey

After a period of 6 weeks since the launch of the OLC in February 2014, the 210 students that were previously recruited through in-class presentations were visited a second time in class by the researcher. During the second presentation, the researcher updated students on the progress of the OLC and requested students' participation in the research survey. A brief email was sent out to thank those students for their participation in the OLC, with a link to the online survey. The OLC recruits that were not visited by the researcher (308 students) were also sent a follow-up email requesting their participation in the online survey, with a more detailed description of the survey (as they were already familiar with the research). An additional 184 students who were not recruited for the OLC were sent an email invitation requesting their participation in the online survey, while providing detailed information about the research. These students were from four additional introductory English courses and two upper-level Sociology courses. This email included a more detailed description of the research, information about confidentiality and incentives, a link to the survey, and an opportunity to have any

[5] There may have been more students that read and utilized information provided in the OLC, but did not request to become a member of the group, so those students cannot be accounted for as they were not official members of the group.

questions or concerns addressed. Some professors provided extra credit to their students for participating in the survey—those students also had the option to complete an alternative assignment for extra credit, one with similar difficulty and length of time required. However, no students chose the latter extra credit option. A total of 231 students (four introductory Sociology courses, two introductory English courses, and one 3000-level Sociology course) were offered extra credit opportunities. Seventy percent of those students completed the survey in entirety and were awarded extra credit for their participation in the survey.[6] The research survey was administered in April of 2014 and was hosted through Qualtrics, a private research software company that hosts online surveys and enables many types of data collection and analysis.[7]

A total of 702 students were recruited to participate in the survey—518 who were recruited to the OLC, 184 who were not recruited to the OLC—and nearly 30 percent of those students completed the survey in entirety and thus are included in the analysis. Of the students who participated in the survey, 13 percent identified as members of the OLC—indicating that over half of the OLC members participated in the research survey.

A total of 230 students began the survey; however, only 207 students finished the survey, with a completion rate of 90 percent. Any respondent that failed to complete more than 75 percent of the entire survey has been excluded from our results, yielding a total of 200 complete survey respondents.[8] Information was not collected on students

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[6] Students were offered ***up to*** 2 percentage points towards their final grade in that specific class.
[7] Please note that there was only *one* survey administered; any reference to prior use, skills, and changes in digital ability are based on self-reports from students at a single point in time, with questions that asked respondents to reflect on both past and current digital behaviors and perceptions.
[8] Any remaining missing responses were replaced by the median value, determined by the variables being measured.

who failed to answer at least 75 percent of the survey questions, which minimized error introduced through such respondents. Demographic information about non-respondents was not collected, and therefore the researchers are unsure of whether or not other biases existed in regards to survey participation. Compared to the demographic information on OU Athens population as a whole, our sample is more likely to be female (71 percent in our sample versus 51 percent in the OU population), white (88 percent versus 79 percent), and in their first year of college (58 percent versus 20 percent) (Ohio University, 2014).

Overview of the Online Learning Community

The online learning community (OLC) was hosted on a public website, Blogger,[9] via Google Sites, and a subsequent group was held on Facebook. This dual system of the OLC was used as convenience for the students and members of the OLC. Each time the blog was updated with new information, a link was automatically published to the Facebook group wall, informing all members of a brief description of the new post. This allowed members to stay current with the OLC without continually checking the blog for new information.[10] The classes that were recruited to join the OLC were from a variety of courses and levels and was therefore difficult to determine the level of the members' digital skill and knowledge. However, the community sought to expand any students' existing digital literacy skill set. For those students with limited skills, the OLC sought to

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[9] Blogger is a blog-publishing service that allows Google users to create websites or blogs free of charge. For more information, please visit the Wikipedia page on Blogger at http://en.wikipedia.org/wiki/Blogger_(service), or the OU Get Smarts page, http://ougetsmarts.blogspot.com/.

[10] The OLC contained 48 published blog posts. New information on digital literacy was posted every few days, and there were nearly 1,500 community pages views.

guide those individuals to more substantial digital skills that would enable their success in academia and beyond. Yet participants with more advanced skills were utilized as a tool in the community, in addition to the resources provided through the OLC, to support and assist those students with basic and/or limited skills. Rather than exploring the pedagogical methods used in the implementation of this OLC, this research is meant to determine the potential of online community-building to advance students' digital skills and knowledge, and thus cultivate both individual and collective goods by encouraging online civic engagement.

Previous work has explored the differentiated Internet use of individuals, with a focus on individuals' digital literacy (Hargittai & Hinnant, 2008; Mossberger et al., 2003), arguing that individuals require various levels of expertise to benefit from the numerous opportunities available through Internet use. Similar to previous researchers (Hargittai & Hinnant, 2008), I argue that variations in tech-savvy individuals are likely to be more relevant with relation to advanced digital activities such as collaboration, content creation, online sharing, and group discussions, compared to more basic digital activities. Additionally, I argue that being an active and informed digital citizen must entail mindful participation, including the capacity to pay attention, seek verifiable information, construct content and knowledge, collaborate with others, and network through digital systems. Individuals have the ability to increase their human, social, cultural, and economic capital through successful participation online, supporting the increase of an educated and civically-engaged public.

Intention and Outline of the OLC

This study sought to encourage and guide students to advance their digital literacy and civic engagement in the digital sphere—in ways that were relevant to their academic careers and beyond. During the first few weeks of the OLC, students were shown ways to stay focused and attentive during time spent on computers, mobile devices, and in the classroom. For example, if students became distracted while attempting to complete an assignment, the OLC provided multiple resources that prohibited the access of certain websites (i.e. social networking sites) for a specified amount of time. Advice and tips were featured in the OLC that helped students pay attention and stay focused, allowing them to be more mindful of their surroundings. All of the resources and tools presented in the OLC weren't specifically digitally-related—for example, the posts on organization and critically thinking were more general; however, the information featured in the community prepared students to develop into a more holistic, digitally-aware citizen.

Secondly, the OLC presented students with advice and resources that allowed them to effectively search for information, and thus be more aware of information they were consuming online. Critically thinking about what one reads and shares online expands one's mindfulness—a crucial objective of the OLC. Providing students with advice and techniques on ways to evaluate and consume information found online promotes more digitally-savvy citizens.

Next, the OLC presented students with information on the importance of mindful participation in this modern digital age. Various types of online communities, forums, and blogs were featured in the OLC that may have sparked students' interests. Digital

identity, or an individual's digital footprint, was a featured discussion in the community. Students became more aware of the "footprint" or presence that they are leaving behind on the Internet. The significance of online coordination, cooperation, and collaboration was featured, allowing students to become better contributors, adding to their success and that of others. Techniques to improve their reputation, connect with others, and contribute to a common goal were also featured discussions in the OLC.

Lastly, the awareness of one's support networks was explored through discussions in the OLC. Students were given information that when utilized correctly, could expand their professional networks and social support. Cultivating online relationships was featured and techniques such as paying it forward was discussed, as research has found that people are more willing to assist your needs if you are willing to help out others (Rheingold, 2012). Network resources, links, and advice were featured and students were eager to strengthen their profiles and connections on professional networks such as LinkedIn, which is beneficial to students in their academic and future careers. Additional academic resources, particularly useful to Ohio University students, were provided. Links, tools, and tips were available on the OLC to locate campus services and resources, useful in the support of students' personal and academic successes.

In addition to the information shared in the community, the OLC served as a place for students to share media and resources they found online with other members, as well as examining or exploring specific topics, seeking advice or help, and answering each other's questions. The researchers served as moderators to this advice and support forum. Students sought advice from others on topics ranging from advice in particular classes to

purchasing different types of technology. Many students shared media including articles on current technology trends, advice on Google searching, and tips for staying connected and current on information in this modern digital age. This community was not simply a consumption of information, resources, and advice; instead it served as a medium for students to stay connected to others and expand their digital skills simultaneously.

Measurement of Variables

Recent research has found that as the Internet contains a vast amount of information available to users, some individuals are more inclined to access online materials than others; those with higher-level skills are better positioned to benefit from the Internet (Hargittai & Shafer, 2006). A review of the literature on digital inequality suggests several correlated variables that affect differentiated use and skills with the Internet and ICTs. Many of these factors relate to the forms of social capital as presented by Bourdieu (1984) and due to the significance of their theoretical and empirical relevance, are included in this study. The independent and dependent variables used in this study are discussed in the following two sections, along with their theoretical and empirical significance.

Independent Variables

Independent variables include demographic and socioeconomic attributes, as well as prior digital citizenship, access, social support, and digital capital variables. These variables are used to control factors likely to affect students' perception of their prior and change in digital skills or involvement in an OLC. However, it should be noted that one

variable—*prior digital skills*—is used as an independent *and* dependent variable, although they are used in separate analyses.

Gender, Race, and Ethnicity

Demographic variables are included as prior research has found the effects of gender, race, age, and socioeconomic status as significant factors in relation to technology use (DiMaggio et al., 2004; Hargittai, 2008). If daily activities are being improved through the use of the Internet and social media, then prior inequalities may be reinforced through this relatively new medium of technology. Differences in digital use and skills based on demographic characteristics can often lead to exclusion from participation in society—in both the digital and physical realm, often times leading to unwanted consequences for different segments of the population.

In this study, gender is coded as "Male" = 1 and "Female" = 2. There was a discrepancy in gender, as 71 percent of the respondents identified as female. To measure race, students were asked to identify their race and ethnicity, and select all that apply to nine categories of race, including (1) American Indian or Alaska Native; (2) Middle Eastern; (3) Asian; (4) Black or African American; (5) Indian; (6) Hispanic or Latino; (7) White or Caucasian; (8) Native Hawaiian or Other Pacific Islander; (9) Other—which participants were then asked to specify. One respondent selected "Other" and identified as Celtic American. For the analyses, race/ethnicity was collapsed into a binary variable whereas "White" = 1 and "Non-White" = 0. Non-White may include participants that selected one race and/or ethnicity (not including White or Caucasian), or those participants who selected two or more races and/or ethnicities. In all five cases that

participants selected two or more, White or Caucasian was selected as one of the participants' races. As with gender, there was a discrepancy in race as a majority of respondents were white at 88 percent.

Socioeconomic Status

Socioeconomic status (SES) was measured by asking students about their perceived class status growing up, ranging on a 5-point scale from lower to upper class. Although measures of income would be ideal for examining the relationship between digital skills and SES, this type of information is difficult to obtain due to students' lack of knowledge about their parents' income. Additionally, students' income (if any) is not indicative of their financial resources as many of them are still dependent on parental support (Hargittai, 2010). Also, many students do not receive financial aid from their parents, and therefore their current situation does not reflect the resources in which they grew up with (Correa, 2010).

Other research on digital inequality has also used parental education as a proxy for socioeconomic status (e.g. Correa, 2010; Hargittai, 2010).[11] An issue with measuring perceived socioeconomic status is that people tend to self-identify as middle-class regardless of income or education, and thus perceived socioeconomic status may not accurately reflect the students' actual SES. Future research should examine more socioeconomic factors by including both parental education and income/occupation. Table 1 below displays the demographic characteristics of the sample discussed thus far.

[11] This research included an extensive survey, and unfortunately variables such as these were eliminated to limit the already lengthy survey.

Table 1.

Demographic Characteristics for All Survey Participants

Demographics		**Number**	**Percentage**
Gender	Male	59	29.5%
	Female	141	70.5%
Race/Ethnicity †	White	176	88.0%
	Non-White	24	12.0%
Age	18-19	114	57.0%
	20-21	48	24.0%
	22-23	22	11.0%
	24-26	7	3.5%
	27 or older	9	4.5%
Socioeconomic Status	Lower	9	4.5%
	Lower-Middle	30	15.0%
	Middle	90	45.0%
	Upper-Middle	66	33.0%
	Upper	5	2.5%

† Non-White includes participants that selected one race/ethnicity (not including White or Caucasian) or two or more races/ethnicities.
N=200 students.

Academic Characteristics

Table 2 below displays academic characteristics of the students, including year of study, current GPA, and length of time at Ohio University. Student GPA has been linked with digital use and skills, as previous research has found that students who multitask while studying or conducting research online are more likely to have lower GPAs and retain less information than those who don't multitask with social networking sites and/or texting (Junco & Cotten, 2011). Students' current GPA was measured on a 6-point scale, and a majority of students identified as having a 3.0 to 3.49 GPA at 32 percent. Students' length of time at Ohio University is similar to their year of study; however, there are extenuating circumstances such as transfer, graduate, or PhD students who may have

completed previous coursework at a different university. Therefore, the researchers wanted to determine the length of time at Ohio University, as their change in digital skills is measured by their first and spring semester skills, which may be indicative of the length of time they have spent at Ohio University, the population being analyzed in this thesis.

Table 2.

Academic Characteristics for All Survey Participants

Academics		**Number**	**Percentage**
Year of Study	Undergraduate	184	92.0%
	Freshman	106	57.6%
	Sophomore	27	14.7%
	Junior	26	14.1%
	Senior	17	9.2%
	5th Year or More	8	4.3%
	Graduate	12	6.0%
	PhD	4	2.0%
GPA	Less than 2.0	5	2.5%
	2.0 to 2.49	18	9.0%
	2.5 to 2.99	40	20.0%
	3.0 to 3.49	63	31.5%
	3.5 to 3.79	42	21.0%
	3.8 to 4.0	32	16.0%
Length at OU	One Year	115	57.5%
	Two Years	25	12.5%
	Three Years	26	13.0%
	Four Years	14	7.0%
	Five Years	7	3.5%
	Six or More Years	13	6.5%

Digital Immersion

Researchers such as Livingstone and Helsper (2007) and Wei (2012) have utilized the multimodality of Internet use—a critical indicator of digital inequalities. Internet use will be measured by the number of activities that students are involved with online. Additionally, this research measures the frequency to which students are involved with particular activities, rather than solely measuring if they were involved with such activities. Therefore, digital immersion is a more inclusive term to describe the range and depth of activities students participate in online, integrating concepts of digital citizenship and digital inequality.

Ten questions asked how often students used the Internet for each of the following (see Table 3), including access the Internet for learning/research purposes, email, text, participation in social networking sites (e.g. Facebook, etc.) or online forums and discussion groups, read blogs or news site, listen to music online (e.g. Pandora, etc.), play games online (e.g. Xbox live, WoW, etc.), upload or share images or videos, and watch videos (e.g. YouTube, Netflix, Hulu, etc.). There was an open ended question that students could respond to if there were any other activities that they participate in online. A few students included activities such as weather tracking, video chat, reading on their Kindle, Internet use for homework and fun learning, and taking photographs for the university newspaper, although these were not included in the variable index. The summary variable for students' digital immersion, which reflects aspects of digital literacy and citizenship, was then divided into three distinct indices including school-

related, networking, and personal-use digital immersion. These indices were created by taking the mean score of the sum of these sets of items.

Table 3.

Digital Immersion Indices for All Survey Participants

Digital Immersion Indices *		**M**	**SD**
School-Related	**Cronbach's Alpha**	**α=.420**	
Check Email		4.55	1.02
Access the Internet for Learning/Research Purposes		3.63	1.19
Read Blog or News Site		2.60	1.54
Total		**3.59**	**1.27**
Networking	**Cronbach's Alpha**	**α=.485**	
Text		5.27	1.06
Participate in Social Networking Site(s)		4.39	1.36
Participate in an Online Forum or Discussion Group		1.08	1.35
Total		**3.58**	**1.27**
Personal-Use	**Cronbach's Alpha**	**α=.533**	
Listen to Music Online		3.64	1.43
Watch Videos		3.02	1.35
Upload or Share Images or Videos		2.02	1.34
Play Games		1.10	1.54
Total		**2.44**	**1.42**

Responses were coded on a 7-point scale: 0=Never; 1=Less than Weekly; 2=Weekly; 3=Several Times a Week; 4=Daily; 5=Several Times per Day; 6=Hourly.

* Digital Immersion was calculated as one variable for the third regression analysis (*M*=3.13, *SD*=1.33, Cronbach's α=.636).

Mobile Access and Prior Digital Skills

Table 4 presents summary statistics for students' access to mobile technology and their self-reported prior digital skills. Both theoretical and empirical work on the digital divide suggests that autonomous access to the Internet and ICTs is a powerful predictor of technology use and digital skills (Hargittai, 2008). An index was constructed to measure the amount of mobile technology access that the students brought or purchased

when entering Ohio University. This index includes four of the ten possible technologies including smart phones (e.g. iPhone, Android, Blackberry, etc.), laptop computers, tablets (e.g. iPad, etc.), and e-readers (e.g. Kindle, etc.). The questions were originally coded as dummy variables, but the four were combined into one index and ranged from 0 to 4 (M=2.21, SD=0.75), thus measuring students' mobile technology access. Prior digital skills is also included in Table 4, with students perceiving their prior digital skills as *strong* (M=2.74, SD=0.70). For more information on prior digital skills, see the next section on dependent variables.

Table 4.

Access Index and Prior Digital Skills for All Survey Participants

Access and Prior Digital Skills		**Number**	**Percentage**
Mobile Access Index†	None	1	0.5%
	One	27	13.5%
	Two	111	55.5%
	Three	51	25.5%
	Four	10	5.0%
	Total*	**2.21**	**0.75**
Prior Digital Skills	Excellent	23	11.5%
	Strong	109	54.5%
	Fair	62	31.0%
	Weak	6	3.0%
	Total*	**2.74**	**0.70**

† Participants owned laptops (98 percent), smart phones (84 percent), tablets (27 percent), and e-readers (13 percent).

* Includes mean and standard deviation of each variable.

Social Support

The study examines aspects of students' social support in order to determine the relative influence on digital skills. This variable includes the amount of social support and advice students gave or received during their first semester and current semester at Ohio University. The summary variable for students' social support reflects aspects of digital literacy and citizenship (*M*=1.01; *SD*=1.06; Cronbach's α=.768),[12] and the index was created by taking the mean score of the sum of these two items. This indicates that students' gave or received social support *once or twice* during the first and spring semester at Ohio University.

Table 5.

Advice and Social Support Index for All Survey Participants

Social Support Index	**M**	**SD**
Cronbach's Alpha	**α=.768**	
Prior social support	0.98	1.03
Current social support	1.05	1.08
Total	**1.01**	**1.06**

Responses were coded on a 4-point Likert scale: 0=Never; 1= Once or Twice; 2=Sometimes; 3=Often.

Digital Capital

Two indices were constructed to measure what students' contributed to their digital capital. As the focus of this study is digital literacy, skills, and inequality, the contribution of students' digital capital was measured through academics, workshops,

[12] Cronbach's alpha (α) measures the degree of covariance amongst a set of indicators while penalizing the index for variance of individual items that is unrelated to that covariance (Cortina, 1993). The use of Cronbach's alpha in this research should be interpreted as informative of the level of covariance observed, not as a critical test of reliability.

advice and/or self-taught digital growth. Previous research has found that universities have not provided an overview of digital technologies for students' learning, and if available, it is usually course-specific digital technology, limiting the extent of digital capital (Brown & Czerniewicz, 2008). Digital capital may be a predictor of the improvement of students' digital literacy skills.

Five questions asked what contributed to students' digital capital, including (1) class(es) that required or encouraged the use of technology, (2) services or workshops provided through OU, (3) informal advice from faculty or other students, (4) online learning community or support group, and (5) self-taught including resources like YouTube, etc. The summary variables—separated out into two indices, formal instruction *and* peer learning digital capital (M=1.51; SD=0.93; Cronbach's α=.424 and M=1.71; SD=0.91; Cronbach's α=.496, respectively) were created by taking the mean score of the sum of the selected items (see Table 6). This indicates that students' contributed the following to their formal instruction and peer learning digital capital *a little* to *some* while at Ohio University.

Table 6.

Digital Capital Indices for All Survey Participants

Digital Capital Indices		**M**	**SD**
Formal Instruction	**Cronbach's Alpha**	**α=.424**	
Class Requirements/Encouragement		2.02	0.83
OU Services or Workshops		0.99	1.02
Total		**1.51**	**0.93**
Peer Learning	**Cronbach's Alpha**	**α=.496**	
Self-Taught		2.32	0.78
Informal Advice		1.77	0.90
OLC or Support Group		1.04	1.02
Total		**1.71**	**0.91**

Responses were coded on a 4-point Likert scale: 0=None; 1=Little; 2=Some; 3=A Lot.

Impact of the OLC -- OLC Participants

The impact and benefits of participating in the online learning community was asked to all participants of the OLC. Previous research has found that students are able to work together online to create new knowledge collaboratively and support and challenge one another, often leading to effective and relevant knowledge construction (Wenger, McDermott, & Snyder, 2002). Table 7 provides an overview for level of impact that the OLC had on participants' lives (M=1.40, SD=1.10, Cronbach's α=.948). OLC participants claimed that the OLC positively impacted their lives *somewhat* to *a moderate amount*.

Table 7.

Impact of OLC Activity Index for OLC Participants

Impact of OLC Index	**M**	**SD**
Cronbach's Alpha	**α=.948**	
Realized that there is so much more I can learn	1.92	1.09
Learned the importance and value of digital skills	1.69	1.16
Better understanding of digital skills and expertise	1.58	1.06
Expanded awareness of the digital world	1.58	1.03
Found out that I like helping people find answers	1.19	1.13
Changed my future goals based on my abilities that I have learned	1.12	1.21
Developed new friends/contacts	0.69	0.97
Total	**1.40**	**1.10**

Responses were coded on a 4-point Likert scale: 0=Not At All; 1=Somewhat; 2=A Moderate Amount; 3=A Great Deal.

Dependent Variables

This study looks at three main dependent variables which will be analyzed in two parts. The first two dependent variables will be based on *all* survey respondents; the third dependent variable will be based solely on participants of the online learning community (OLC). The first part, students' perception of prior digital skills and change in digital literacy skills encompasses both digital citizenship, social inequality, and forms of literacy analyzed among the respondents. The second part, student involvement in an OLC, can guide literature and future research on the impacts of successful online learning communities. Differences between respondents are examined and their implications for inequality are discussed. The first section of the analyses, 'digital literacy skills' includes prior digital skills and change in digital literacy skills, consisting of a variable measuring students' perceived prior digital skills and a summary variable measuring students' perception of change in digital literacy skills, comparing their first semester skills to their

current skills at Ohio University. The following section, 'OLC activity,' consists of a summary variable pertaining only to participants of the OLC, measuring the frequency of participation in the OLC and the benefits from their level of involvement in the community. Detailed descriptions of each dependent variable and the constructed indices will be further discussed.

Part I: Digital Literacy Skills -- All Participants

Prior Digital Skills

This variable represents the students' self-reported prior digital skills—their digital skill level before entering Ohio University. Social inequalities, including gender, age, race, socioeconomic status, and access affect individuals' perception of their digital skill level (DiMaggio et al., 2004; Hargittai, 2008). Thus, if prior digital skills are not randomly distributed among the population, but are instead determined by other societal factors, then differences can lead to further inequalities between segments of the population. Prior digital skills was measured by asking students to assess their level of digital skills *prior* to attending Ohio University, ranging on a 4-point Likert scale from weak to excellent.[13] Students' self-reported prior digital skills was high (M=2.74, SD=0.70), indicating that students arrived to Ohio University with *strong* digital skills; see Table 4 for more details.

Change in Digital Literacy Skills

This summary variable measures students' self-reported changes in perceived skills, comparing their first semester and the current semester at Ohio University.

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[13] Digital skills was defined in the survey for clarity in students' interpretation.

Lacking digital skills or self-efficacy can discourage individual from experiencing different opportunities and activities online (Hargittai & Shafer, 2006). Therefore a measure of change in digital literacy skills will be analyzed to determine if other societal or demographic factors are affecting students' perception of their skills. Thus, for first year students (nearly 60 percent of all survey respondents), this variable illustrates their perceived changes in digital skills in undertaking certain activities online over the course of approximately six months since entering Ohio University and participating in this survey.

A common way to measure digital skills is by asking respondents to evaluate their general abilities or attitudes towards ICTs or with relation to specific online activities. Hargittai (2005) suggests that self-assessment ratings of specific digital skills may be used as an alternative for actual skill measures. Pask and Saunders (2004) have found that for adult literacy, self-assessment works better if the questions are about specific tasks rather than general abilities.

The recommendations of prior researchers helped in the creation of this survey variable. Nine questions were used to measure students' perception of their change in digital literacy skills, comparing their first semester skills to their current skills at Ohio University. The skills, displayed in Table 8, include keeping attention focused, searching for information online, reviewing and evaluating information online, creating and sharing resources online, participating in groups online, collaborating with others online, cultivating networks, seeking academic help, and utilizing OU resources. Responses were coded on a 5-point Likert scale from strongly decreased to strongly increased. The

summary variable for students' perception of changes in their digital literacy skills, which reflects the six domains of digital literacy being studied (M=3.74; SD=0.79; Cronbach's α=.871), was created by taking the mean score of the sum of all these items. This indicates that students' perception of change in digital literacy skills *increased* from their first semester skills to current skills at Ohio University.

It should be noted that previous research has found that self-assessed digital skills are relatively poor indicators of actual skills, and instruments have been implemented to more accurately address levels of actual digital skills and knowledge (Hargittai, 2005). This type of measurement was not utilized in this current research; instead, measurements were assessed based on self-reported skills. In spite of this, essential information can still be analyzed from these measures as they are indicative of change in digital skills, which has the potential to produce individual and collective results. Thus, the change in digital literacy skills from first to spring semester between people of different backgrounds has significant implications for digital inequality.

Table 8.

Change in Digital Literacy Skills Index for All Survey Participants

Change in Digital Literacy Skills Index	**M**	**SD**
Cronbach's Alpha	**α=.871**	
Searching for Information Online	4.00	0.70
Reviewing and Evaluating Information Online	3.91	0.72
Utilizing OU Resources	3.89	0.81
Seeking Academic Help	3.76	0.83
Creating and Sharing Resources Online	3.71	0.80
Collaborating with Others Online	3.68	0.81
Cultivation of Networks	3.62	0.75
Participating in Groups Online	3.61	0.81
Keeping Attention Focused	3.54	0.90
Total	**3.74**	**0.79**

Responses were coded on a 5-point Likert scale: 1=Strongly Decreased; 2=Decreased; 3=Stayed the Same; 4=Increased; 5=Strongly Increased.

These two dependent variables are significant in answering the first research question for several reasons: (1) to determine what demographic factors benefit students in the forms of their perceptions of prior digital skills *and* change in digital literacy skills; (2) to determine the significance of social support and digital capital in students' perceived digital literacy skills, and finally (3) to outline any inequalities among students in terms of their perception of their prior *and* change in digital literacy since entering college.

Part II: Student Involvement in an Online Learning Community -- OLC Participants

Participation in the online learning community (OLC) was measured by three variables (1) Yes, (2) No, not interested/did not have time, and (3) No, no knowledge of community. The variables were transformed into a binary variable in which "OLC participants" = 1 and "non-OLC participants" = 0 (previously 2 and 3). Participants of the

OLC were asked how often they did each of the following in the community, (1) visit the OU Get Smarts page; (2) post content to the OU Get Smarts page; (3) "Like" posts; (4) comment on posts; and (5) share OU Get Smarts content with other people. Responses were coded on a 4-point Likert scale from never to very often. Table 9 provides an overview for level of involvement in the OLC among participants (*M*=1.25, *SD*=1.04*;* Cronbach's α=.919), indicating that OLC participants participated in the community *once or twice* to *somewhat often*.

Table 9.

OLC Activity Index for OLC Participants

OLC Activity Index	**M**	**SD**
Cronbach's Alpha	**α=.919**	
Visit the OU Get Smarts page	1.73	0.83
"Like" posts	1.38	1.10
Share OU Get Smarts content with other people	1.15	1.01
Comment on posts	1.04	1.11
Post content to the OU Get Smarts page	0.92	1.02
Total	**1.25**	**1.04**

Responses were coded on a 4-point Likert scale: 0=Never; 1=Once or Twice; 2=Somewhat Often; 3=Very Often.

Figure 2 below is a visualization of the OLC activity index as measured by the mean frequency of participation in the OLC, along with the OLC activity index to the far right.

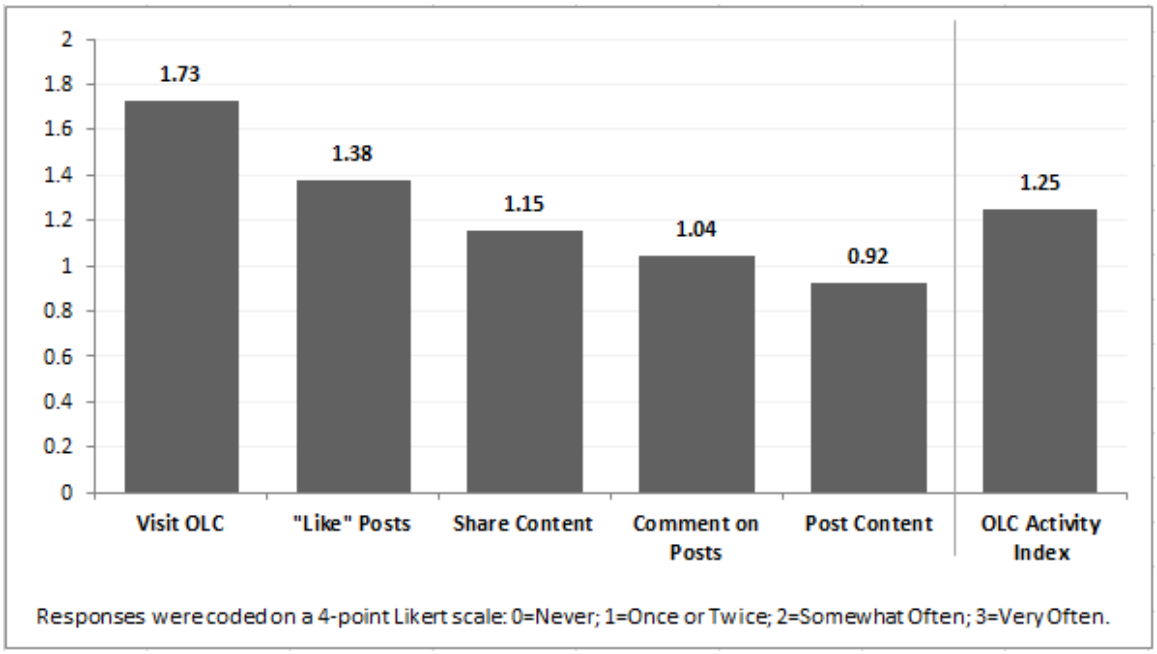

Figure 2. OLC Activity Index for OLC Participants

CHAPTER 5: DATA ANALYSES

In order to answer the first two research questions, nested Ordinary Least Squares (OLS) regressions were performed and analyzed to determine if demographics and social inequalities affect prior digital skills *and* whether demographics, prior digital citizenship, social support, and digital capital predict perception of change in digital literacy skills among college students. Further analyses also examine student involvement in an online learning community (OLC) and determine which demographic or economic factors affect the frequency of OLC activity. The utilization of OLS regression analysis allows the selection of predictors inserted into the models grouped according to theoretical constructs. As this study examines the influence of several theoretical sets of variables, the outcome variables are ordinal level; therefore, this method of analysis is most appropriate. A description of the variables and models used, as well as correlation matrices used in the regression analyses in the first two research questions follows.

Linear regression will also be performed and analyzed to determine if student involvement in the OLC is predictive of perceived changes in digital literacy skills. Additionally, the beneficial outcomes or impacts resulting from involvement in the OLC will be analyzed through a linear regression analysis.

To answer the third research question regarding improvements of certain domains of digital literacy among OLC and non-OLC participants, descriptive statistics and paired-samples t-tests were conducted and then analyzed. Descriptive statistics include the mean and standard deviation of each domain/subdomain of digital literacy, the change in mean from first semester (T1) to spring semester (T2) digital literacy skills, and a

reliability analysis. Paired-samples t-tests were also conducted and eta squared values were compared among OLC and non-OLC participants. For more information on the comparison of the OLC and non-OLC participants and the descriptives of the specific domains of digital literacy analyzed, see Appendix B: Comparison -- OLC and Non-OLC Participants.

Part I: Digital Literacy Skills -- All Participants

Prior Digital Skills and Change in Digital Literacy Skills

Each model is grouped according to theoretical and empirical blocks that previous research has found to be predictive of differentiated digital use and skills. For the first regression analysis, two models are used including demographics—gender, age, and race and economic factors including perceived socioeconomic status and mobile technology access. These variables pertain to the digital divide, which are essential in the analysis of social inequalities and the distribution of digital skills within the student population.

Five models are used in the analysis of students' change in digital literacy skills. Demographics are included in their own model as research has identified the significant effects of gender, race, and socioeconomic status on technology and Internet use (DiMaggio et al., 2004; Hargittai, 2008; Junco & Cotten, 2011). Social inequality develops along lines of gender, race, and socioeconomic status, and differences in Internet use may reflect these broader overall trends in society. Categorical variables were dummy-coded for purposes of the regression analyses, with the reference category for gender being female and race being white.

Prior digital citizenship, such as prior digital skills, digital immersion, and mobile technology access were included in the second model of variables. Previous research has found that the more access an individual has to the Internet, the greater their Internet mastery and usage (Hargittai & Hinnant, 2008). Therefore, an individual's level of immersion into the digital world, their mobile access, and their prior digital skills may be predictors in students' perception of change in digital literacy skills.

Social support is included in its own model as both theory and research have shown that individuals' support and knowledge, and skilled social networks are predictive for more advanced uses of the Internet and digital skills (Jung et al., 2005; Jung, 2008).

Digital capital is included in two separate models; peer learning *and* formal instruction digital capital. Previous research has found that universities and higher education institutions have not provided sufficient programs that provide students with adequate digital technologies for advanced student learning. Therefore, due to previous findings on social support and lack of research on digital capital, these variables are included in the models of the regression analysis. I hypothesize that both social support and digital capital will be predictive factors for students' perceived changes in the digital literacy skills.

Part II: Student Involvement in an Online Learning Community -- OLC Participants

Online Learning Community Activity

In terms of measuring variables in relation to the online learning community (OLC), analysis was only conducted for the students who participated in the OLC, which

was approximately 13 percent of survey respondents. For the first part of the second research question, nested OLS regression was conducted to determine the frequency or level of student involvement in the OLC. The first model of variables in the OLS regression analysis includes demographics, as previous research found that females are more likely to engage in online learning communities and thus get more out of the experience (Johnson, 2011). The second model of variables, prior digital citizenship, includes prior digital skills, immersion, and access. Previous research has found that variables such as digital access and use contribute to individuals' participation and Internet use (DiMaggio et al., 2004; Hargittai, 2010). The last model includes ***social support*** as previous research has found social support to be an important indicator of online participation (Jung et al., 2005).

Please note the sample size is small for proper analysis of the frequency of participation in the OLC, as 15 subjects per predictor variable is recommended for social science research (Stevens, 1996), and there are eight predictors in the first part of the analysis of the second research question. Future research should include similar predictor variables in determining the frequency of participation in an OLC, although a larger sample size is required. Due to the limited number of participants in the OLC utilized in this study, a proper analysis of all predictor variables in OLS regression was not able to be conducted.

Validity of Analyses

Statistical analyses for all three research questions were conducted in the statistical program SPSS, however different procedures were used between the research

questions. For the first two research questions, tests were conducted to determine if the data met the assumptions of OLS regression, including collinearity and heteroscedasticity diagnosis, and an examination of residuals was performed. Normality tests were conducted, including P-P plots, normal probability plots, residual scatterplots, and histograms of the residuals. The plots resulted that the errors are normally distributed for each of the dependent variables and the corresponding models for each of the regression analyses. Collinearity diagnostics did not show high correlation among the independent variables when analyzing the tolerance and variance inflation factors (VIF).[14] To test for heteroscedasticity, or the variance of the residuals of the predicted dependent variable, analyses were conducted with the residual scatterplots and Mahalanobis distance values, verified by Tabachnick and Fidell (1996), which did not yield significant variance problems in a majority of the models.[15] For the latter part of the second research question, linear regression analyses were performed.

For the third research question, descriptive statistics were performed through frequencies, descriptives, and crosstabs, and reliability analysis functions. Paired-samples t-tests were also performed to determine the significant differences between T1 and T2 perceived changes in digital literacies for both OLC and non-OLC participants. The

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[14] The results show that the highest variance inflation factor (VIF) associated with a variable in any of the three regression analyses was 1.9 (tolerance=.52). The condition index, which measures how dependent one predictor variable is on another, is highest at 28.1 (data uncentered). Thus, the figures are all under 30, the threshold suggested by Tabachnick and Fidell (1996) to determine the presence of multicollinearity. However, there are two sets of independent variables with variance decomposition proportions greater than 50 percent, including formal instruction *and* peer learning digital capital (second analysis) which may cause elevated proportions as they are both forms of digital capital. Additionally, age and length at OU are highly correlated, yet they are used in separate analyses.

[15] Indicators of the heteroscedasticiity include a high Chi-square value and low p-value ($p < .05$). The critical Chi-square values were also computed to test of heteroscedasticity. For the first regression analysis, critical Chi-square values ranged from (3) 16.27 to (5) 20.52, (3) 16.27 to (13) 34.53 for the second analysis, and for the third analysis, values ranged from (3) 7.81 to (8) 20.09. Any issues with non-constant variance will be noted in the analyses.

effect size, or eta squared, was conducted after the t-tests were performed by calculating an effect size statistic, which determines the magnitude of participation or non-participation in the OLC on the change in digital literacies from T1 to T2.

The following section provides an overview of the correlation matrices with the dependent and independent variables used in the regression analyses, followed by the descriptive statistics for the third research question.

Correlation Tables

Prior Digital Skills and Change in Digital Literacy Skills -- All Participants

Several strong correlations were identified between the variables, including those previously indicated in literature. Table 10 displays the dependent variables, prior digital skills *and* change in digital literacy skills, and the independent variables including demographics, prior digital citizenship, social support, and digital capital. Variables with significant bivariate associations are highlighted grey in the table below, indicating correlations with significance ($p < .05$).[16] These correlations suggest that students who have more access to mobile technology, higher SES, and are older have higher perceived prior digital skills before entering Ohio University.

[16] Please note that the correlation matrix was combined for prior digital skills and change in digital literacy skills as many of the same variables were used in the first two regression analyses.

Table 10.

Correlation of Variables Used in Regression Model -- Prior and Change in DL Skills

Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
(1) *Change in DL Skills†*														
(2) *Prior Digital Skills*	-.01													
(3) Gender (Female)	.04	-.03												
(4) Age	.38	-.19	-.20											
(5) Length at OU	.44	-.16	-.08	.80										
(6) Race (White)	.01	-.00	.07	-.23	-.04									
(7) SES	-.07	.15	.03	-.23	-.15	.26								
(8) Mobile Tech Access†	-.02	.24	.09	-.02	-.09	-.08	.14							
(9) School-Related Digital Immersion†	-.02	.30	.08	-.04	-.16	-.01	-.02	.16						
(10) Networking Digital Immersion†	.06	.10	.13	-.20	-.18	.17	.14	.13	.43					
(11) Personal-Use Digital Immersion†	.02	.24	-.20	-.04	-.02	-.07	.09	.16	.25	.18				
(12) Social Support†	.26	.09	-.05	.16	.18	-.12	-.16	-.13	.22	.06	.18			
(13) Peer Learning Digital Capital†	.37	.07	-.00	.14	.17	-.05	.04	.04	.06	-.03	-.02	.30		
(14) Formal Instruction Digital Capital†	.29	.05	.01	.02	.05	-.13	.08	.05	-.04	-.00	-.05	.16	.64	

(N=200). Highlighted items indicate correlations with significance of $p < .05$.

† Variable represents an index.

Note that the other dependent variable, perceived change in digital literacy skills, has high (positive/negative) correlations with length at OU, social support, and digital capital. Socioeconomic status has the highest (although low) negative correlation with perceived change in digital literacy skills. As length at OU, peer learning *and* formal instruction digital capital, and social support have the highest positive correlation with change in digital literacy skills ($p < .05$), it will be predicted that those variables will be significant predictors in perceptions of changes in digital literacy skills. Thus, it seems that several variables of interest—particularly variables related to socioeconomic status and life chances, including SES, social support, and digital capital—may be related to students' change in digital literacy skills.

Student Involvement in an Online Learning Community -- OLC Participants

In Table 11 below, the correlation table is displayed of variables used in the regression analysis of student involvement in the OLC, referred to as OLC activity. Predictor variables such as demographic and academic characteristics (gender, length of time at OU, race, and SES), prior digital citizenship, and social support were used to determine the predictability of student involvement in an OLC. Gender and length of time at Ohio University have the strongest correlation to OLC activity ($p < .05$), although gender is negatively correlated. These correlations indicate that those variables may have the most significance in predictability of student involvement in an OLC.

Table 11.

Correlation of Variables Used in Regression Model -- OLC Activity

Variable	1	2	3	4	5	6	7	8	9
(1) *OLC Activity†*									
(2) Gender (Female)	-.52								
(3) Length at OU	.45	-.08							
(4) Race (White)	.20	.07	-.04						
(5) SES	.12	.03	-.15	.26					
(6) Prior Digital Skills	.08	-.03	-.16	-.00	.15				
(7) Mobile Tech Access†	-.09	.09	.09	-.08	.14	.24			
(8) Digital Immersion†	-.15	-.03	-.15	.03	.11	.30	.21		
(9) Social Support†	.31	-.05	.18	-.12	-.16	.09	-.13	.22	

(N=26). Highlighted items indicate correlations with significance ($p < .05$).
Note: Some items have high values but due to the low sample size, the correlations were not found to be significant.
† Variable represents an index.

Descriptive Statistics

Comparison among OLC and Non-OLC Participants

To answer the final research question focusing on how student involvement affects the improvements in certain domains of digital literacy, a comparison using descriptives of the literacies will best answer that question. For more detailed analysis see Appendix B: Comparison -- OLC and Non-OLC Participants, which includes in-depth descriptions of the domains of digital literacy, survey questions and responses, and the descriptives and analysis.

Demographics were similar among OLC and non-OLC participants, as a majority were female (65 and 71 percent), white (85 and 89 percent), and middle class (62 and 43 percent), respectively. Academic characteristics were also comparable between OLC and non-OLC participants, as a majority were Freshmen (58 and 52 percent), had GPAs above 3.0 (73 and 68 percent), and were in a learning community this academic year (69

and 43 percent), respectively. A higher percentage of non-OLC participants perceived their digital skills prior to entering Ohio University as *strong* or *excellent* at 60 percent, while only 39 percent of OLC participants perceived their skills as *strong* or *excellent*. Both the OLC and non-OLC participants had similar numbers of mobile technology devices at two (46 and 57 percent respectively), including smart phones, laptops, tablets, and e-readers.

Below in Table 12, an overview of the six domains of digital literacy is displayed along with their subdomain. In each of the digital literacies, the OLC participants have greater changes from first semester to current semester skills except for [network smarts] connections, in which there is only a 0.01 difference between OLC and non-OLC participants. The domains of digital literacy with the largest difference between OLC and non-OLC participants was participation, with both activity and sites having much larger changes for the OLC participants in comparison to the non-OLC participants (0.53 and 0.44 point difference, respectively). This may be due to the fact that the OLC was a collaborative and participatory environment and these literacies were inherent aspects of the online learning community.

Table 12.

Overview of Descriptives of Digital Literacies -- OLC and Non-OLC Participants

Digital Literacy		OLC Participants			Non-OLC Participants		
		T1-M	T2-M	Change†	T1-M	T2-M	Change†
Attention	Distraction	2.10	2.10	0.00	2.12	1.96	-0.16
	Focus	1.98	2.34	0.36	2.23	2.36	0.13
Critical Consumption of Information	Research	1.42	1.94	0.52	1.49	1.68	0.19
	Evaluation	1.86	2.18	0.32	2.00	2.17	0.17
Participation	Sites	1.58	2.12	0.54	1.59	1.69	0.10
	Activity	2.48	2.86	0.38	2.45	2.30	-0.15
Collaboration	Frequency	1.11	1.57	0.46	0.99	1.18	0.19
	Comfort	1.04	1.37	0.33	1.03	1.16	0.13
Network Smarts	Connections	1.09	1.14	0.05	1.02	1.08	0.06
	Cultivation	1.18	1.63	0.45	1.02	1.15	0.13
Institutional Know-How	Ohio University	1.99	2.62	0.63	2.14	2.56	0.42

† Change in mean from T1 (first semester) to T2 (spring semester); visual representation displayed in Figure 5.

Overall, the intervention of the OLC seems to have a greater effect on students' increase of digital skills, as displayed by the differences between first and spring semester skills at Ohio University. There may be other factors that affected students increase in digital skills, but given that all literacies were extensively covered in the OLC, there seems to be a relationship between participation in the OLC and improvements in students' digital literacy skills. More detailed results will be discussed in the following chapter.

CHAPTER 6: RESULTS AND DISCUSSION

Part I: Digital Literacy Skills

Research Question 1.1: Explaining Social Inequalities and Prior Digital Skills

To test whether there are differences in prior digital skills as posed in the first research question, nested OLS regression models are analyzed to determine which societal and demographic factors explain differences in students' self-reported prior digital skills. The findings can have important implications for social inequality and digital inequality among Internet users. Based on findings from previous research, I expect that males with greater socioeconomic status and access will possess more advanced prior digital skills before attending Ohio University.

Table 13.

Regression Models for Prior Digital Skills -- All Participants

Variable	Model 1	Model 2
Intercepts	3.15 ***	2.46***
Gender (Female)	-0.07	0.09
Age	-0.21 **	-0.19**
Race (White)	-0.05	-0.05
SES		0.09
Mobile Access†		0.23***
F-Statistic	2.90 *	4.62***
Adjusted R^2	0.03	0.08

*** $p < .001$; ** $p < .01$; * $p < .05$; + $p < .1$.

† Variable represents an index.

(N=200). Unless noted, numbers indicate standardized β coefficients.

The results presented in Model 1 in Table 13 reveal that age is a significant predictor of students' prior digital skills ($p < .01$), suggesting that younger students

perceive their prior digital skills as more advanced than older students. Age, a historically significant factor in growth of skills, may be due to younger students' increased familiarity with technology and social media. Model 2 adds controls for students' self-reported socioeconomic status and mobile technology access, two factors that previous research has claimed significant in the prediction of digital skills (DiMaggio et al., 2004; Hargittai, 2010). The second model increases the adjusted R^2 from 0.03 to 0.08, indicating that economic factors result in five percent of the variance in students' prior digital skills. Specifically, mobile technology access is more significant in the predictability of prior digital skills ($p < .01$) in comparison to perceived SES ($p < 0.2$). The results from this second model are interesting as the bivariate correlation between perceived SES and prior digital skills is strongly correlated $r(199)=.15$, $p < .05$ (see correlation matrix in Table 10), yet the results from the regression analysis (after all models are included) does not illustrate significance at $p < .38$. Thus, mobile technology access may be mediating the effects of SES through students' prior digital skills. The results from this analysis do indicate that age and mobile access are significant factors in the predictability of prior digital skills. Overall, there is little significance between social inequalities and students' perceptions of prior digital skills.

Research Question 1.2: Explaining Factors Affecting Change in Digital Literacy Skills

To test whether there are differences in perceived digital literacy skills as posed in the second part of the first research question, OLS regression analysis was performed to determine which factors explain differences in perceptions of digital literacy skills, comparing students' first semester digital skills to their current skills at Ohio University.

These findings can have important implications for digital citizenship and inequalities among Internet users. Based on findings from previous research, I expect that male, older students with higher socioeconomic backgrounds, greater mobile technology access, more advanced prior digital skills, and higher levels of social support will have the greatest improvements in perceived digital literacy skills.

The results presented in Model 1 (demographics) and Model 2 (prior digital citizenship) in Table 14 suggest that students who have been at OU longer and have greater networking digital immersion are more likely to perceive greater changes in their digital literacy skills, as length at OU and networking digital immersion are both significant predictors ($p < .01$ and $p < .1$ respectively).[17] However, the adjusted R^2 is 0.18 in both Model 1 and Model 2, indicating that there is no additional variation when prior digital citizenship variables are included in the analysis. The results are contrary to previous findings that have found that students' previous relationship with technology was generally reinforced once they entered college (Goode, 2010). However, our results indicate that even people with more advanced prior digital skills are not significantly improving their digital literacy skills since entering Ohio University.

[17] Digital immersion was initially calculated as one index. The two variables, *change in DL skills* and *digital immersion* were not significantly correlated, $r(199)=.023$, $p > .1$, with an adjusted R^2 of -.005. Therefore, digital immersion was divided into three subcategories, allowing for the observation of each type of digital immersion and their effects on other variables in the analysis.

Table 14.

Regression Models for Change in Digital Literacy Skills -- All Participants

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Intercepts	3.34 ***	3.01 ***	2.97 ***	2.71 ***	2.65 ***
Gender (Female)	0.07	0.06	0.06	0.06	0.06
Length at OU	0.44 ***	0.47 ***	0.43 ***	0.39 ***	0.40 ***
Race (White)	0.03	0.01	0.03	0.04	0.06
SES	-0.02	-0.04	-0.02	-0.05	-0.06
Prior Digital Skills		0.07	0.05	0.04	0.04
Mobile Access†		-0.00	0.03	0.01	0.01
School-Related Digital Immersion†		-0.03	-0.07	-0.08	-0.07
Networking Digital Immersion†		0.14 +	0.14 +	0.15 *	0.14 +
Personal-Use Digital Immersion†		0.01	-0.02	0.01	0.02
Social Support†			0.20 **	0.12 +	0.12
Peer Learning Digital Capital†				0.27 ***	0.18 *
Formal Instruction Digital Capital†					0.15 +
F-Statistic	11.91 ***	5.84 ***	6.35 ***	7.90 ***	7.62 ***
Adjusted R^2	0.18	0.18	0.21	0.28	0.29

*** $p < .001$; ** $p < .01$; * $p < .05$; + $p < .1$.
(N=200). Unless noted, numbers indicate standardized β coefficients.
† Variable represents an index.

Model 3 in Table 14 adds controls for social support, increasing the adjusted R^2 to 0.21. The results from Model 3 indicate that students who more frequently give and receive social support perceive a greater change in their digital literacy skills from their first semester to the current semester ($p < .01$). Model 4 adds controls for students' peer learning digital capital, increasing the adjusted R^2 by nearly a third, from 0.21 to 0.28. As Model 4 was added, the significance of networking digital immersion increased ($p < .05$), demonstrating that those with more social support, networking digital immersion, and peer learning digital capital perceive greater improvements in their digital literacy skills.

Aligned with previous research (Jung et al., 2005), our results illustrate that students with increased social support and networks of knowledgeable peers are powerful predictors of digital skills. The final model in Table 14 includes formal instruction digital capital, and increases the adjusted R^2 by 0.01 points, to 0.29. Results from Models 4 and 5 indicate that those with greater digital capital perceived greater changes in their digital literacy skills. The improvement in variance explained by each of the additional models is also significant as indicated by the F-statistics. Social support lost some of its significance as Models 4 and 5 were added, although this is not surprising due to its high correlation with peer learning *and* formal instruction digital capital (see correlation matrix in Table 10). This may be due to the fact that students who have greater social support are engaging in more [digital] capital-enhancing activities.

Contrary to the findings of previous research (Hargittai, 2010), the results in our analysis does not illustrate significant differences in perceptions of change in digital literacy skills based on self-reported socioeconomic status (SES). However, the measure of students' self-reported SES is limited and might not fully document the range of variation in SES in this population. The variation in the population is somewhat constrained, thus limiting our ability to discern the effect. Additionally, this research study is restricted to a largely young, white, college population, which results in significantly different findings, as age, socioeconomic status, and race are significant predictors of technology use and access.

Despite the lack of significance with self-reported SES, the models do suggest that other factors are predictive of change in digital literacy skills, such as length of time

at Ohio University, social support, and digital capital. Future research should examine differences in perceived skills and actual skills between more diverse populations of college students, as the discrepancy in self-perception of digital skills could be a reflection of actual differences in skill. Additionally, future research should control factors such as self-esteem, extracurricular activities, location of residence during high school, high school GPA/extracurricular activities, and parental education when measuring self-efficacy or perceived skills, as those factors have shown significance in previous research (e.g. Dickard, 2012; Hargittai & Walejko, 2008; Zillien & Hargittai, 2009).[18]

Results from this research contribute to prior literature on digital skills/Internet use and social support. Previous research has found significance between Internet use/skills and social support, suggesting that the level of social support students' have affects their perception of digital skills (Hargittai & Shafer, 2006). Demographics such as gender, age, and race, along with social support can have implications for digital citizenship and social inequality, as those with less social support may be excluded from certain activities online as a result of lower skill levels. This research found both social support and extent of formal instruction *and* peer learning digital capital were significant predictors of perceived change in digital literacy skills; however, digital capital has not been extensively studied in the past. Previous scholars have studied the technological identities and opportunities within the higher education institution and found that having

[18] Initially, these predictive factors were to be included in the survey, but due to the survey's length, the researchers reduced the number of questions in the survey to ensure that respondents completed the survey truthfully and in entirety.

an identity and technical knowledge is required for college success and career pathways (Goode, 2010). Future research should explore college students' digital capital more extensively.

Overall these findings reject several assumptions based on prior research, namely that there are no significant differences in perceptions of digital skills and socioeconomic status, gender, race, and technological access. However, the findings from this analysis are important as results suggest that differences in change of digital literacy skills are more nuanced. Future research should continue to examine more nuanced measures of predictive factors of individuals' perceptions of their digital literacy skills.

Research Question 1.3: Exploring Initiatives and Changes in University Policy

Students participating in the research survey were asked what they believed Ohio University could do to improve students' digital literacy skills. Nearly 70 percent of survey respondents provided feedback and some students provided multiple suggestions. There were various categories of feedback, but overall students believed that the university could make more of an effort to help expand their digital knowledge and advance their digital skills. Nearly 25 percent of the students that responded suggested that Ohio University do more in terms of access and resources—making resources easier to obtain and/or locate. Twenty-two percent mentioned that technology and new digital resources should be utilized more in the classroom, and 21 percent suggested that OU should require a digital literacy course for all students. Twelve percent of students offered opinions of workshops or seminars that should be offered *and* better advertised to students. Students mentioned that OU should offer a digital literacy course or workshop

during freshman orientation, or digital literacy should be implemented into the Learning Communities, at 6 percent of student respondents each. Other students said that it was the student's responsibility to advance their digital skills at 3 percent, while four students had no idea on what could help improve students' skills. For more detailed information on student testimonials, see Appendix A: University Policy Changes -- Student Testimonials.

Part II: Student Involvement in an Online Learning Community

Research Question 2.1: Explaining Student Involvement in an OLC

Table 15 presents models examining student involvement in an OLC, referred to as OLC activity. As previously noted, the sample size of the OLC is small for proper analysis of student involvement or frequency of participation in the OLC, as 15 subjects per predictor is recommended for social science research (Stevens, 1996). Certain variables were not included in the analysis to reduce the number of independent variables and to reduce model complexity and mulitcollinearity in the models. Variables that were excluded from the regression analyses in the first research question include peer learning and formal instruction digital capital; digital immersion was collapsed into one summary variable. [19] Additionally, length at OU was substituted for age. As the researchers were interested in predicting student involvement in an OLC and change in digital literacy skills (from first to spring semester), the length of time students have spent at Ohio

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[19] Digital immersion was divided into three indices in the previous regression analysis. To limit the number of predictor variables, digital immersion was combined into one variable (see notes in Table 3 for more information). GPA was also tested in this regression analysis as previous research has found that students who participate in learning communities tend to have higher GPAs (Hotchkiss, Moore, & Pitts, 2005). However, our findings did not produce significance between the variables, $r(25)=.302$, $p > .1$, with an adjusted R^2 of .054, and was therefore omitted from the analysis.

University was a more substantial indicator of the impact of Ohio University rather than students' age.

In Model 1 as displayed in Table 15, gender and length at OU are the only two variables with significance to OLC activity ($p < .01$, each). Contrary to previous research which has found that females have greater presence in online learning communities, perform better, and are generally more satisfied with their online experiences than their male counterparts (Johnson, 2011), the results in our analysis indicate that males participated significantly more than females. Also, students who have been at OU longer were more involved in the OLC. The significance in this variable may be due to students who have been at OU longer (undergraduate seniors, graduate or PhD students) have more time as they are finishing their degree and thus have lighter course schedules, they have greater incentive to learn because they need to ready themselves for the job market, and/or they are dedicated to learning more and providing themselves with more advantages.

Model 2 introduces prior digital citizenship including skills, use, and immersion; the adjusted R^2 decreased by .01 to 0.48. Gender and length at OU were the only two variables with significance in Model 1 ($p < .01$, each); however, after Model 2 was added, socioeconomic status resulted in significance to student involvement in the OLC at $p < .1$.

Table 15.

Regression Models for Student Involvement in OLC -- OLC Participants

Variables	Model 1	Model 2	Model 3
Intercepts	0.38	0.97	-0.37
Gender (Female)	-0.52**	-0.54**	-0.40+
Length at OU	0.57***	0.53**	0.55***
Race (White)	0.09	0.11	0.22
SES	0.24	0.31+	0.38*
Prior Digital Skills		0.05	0.18
Mobile Tech Access†		-0.05	-0.13
Digital Immersion†		-0.24	-0.25
Social Support†			0.37*
F-Statistic	7.01***	4.25**	5.58***
Adjusted R^2	0.49	0.48	0.60

. *** $p < .001$; ** $p < .01$; * $p < .05$; + $p < .1$.
† Variable represents an index.
(N=26). Unless noted, numbers indicate standardized β coefficients.

Model 3 includes controls for social support and results in significance at $p < .05$. After the third model was added, students' self-reported SES resulted in greater significance ($p < .05$), indicating that those with higher SES were more involved in the OLC. The increase in SES significance after additional models are included in the analysis may be due to students who have higher SES, are more likely to have social support, thus increasing their level of participation, particularly in an OLC. Model 3 increases the adjusted R^2 to .60, indicating that 60 percent of the variance in OLC activity is explained by the variables included in Model 1 through 3, displayed in Table 15 above.

The results from this analysis are positive and important for future research and university policy changes. Socioeconomic status is an essential variable used in the analysis of student involvement in the OLC, especially due to the continual increase of

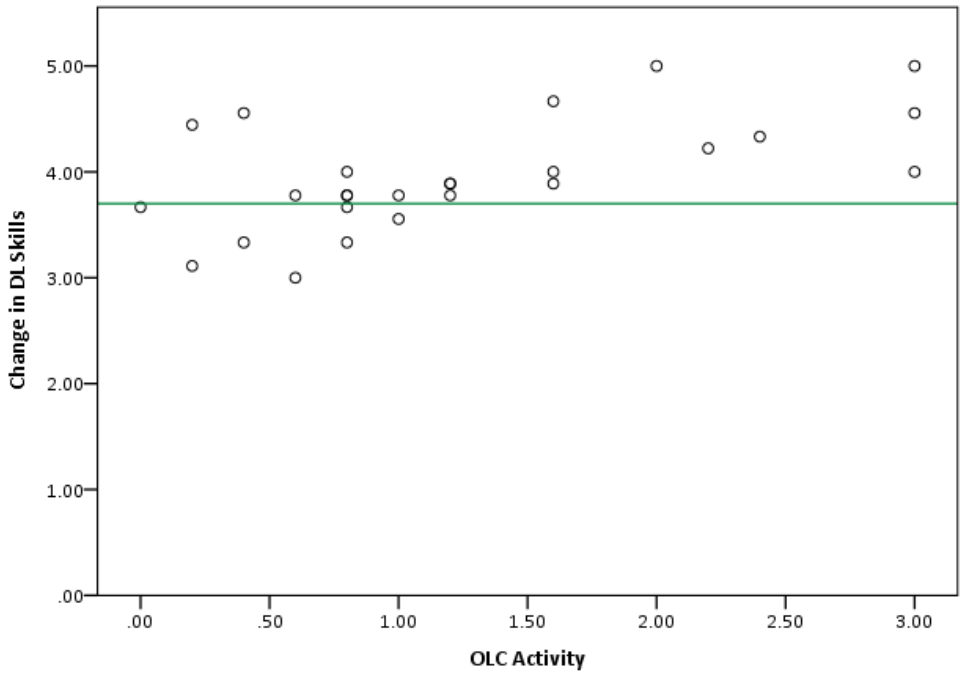
significance as other variables are added. If universities want to address digital inequality, they must implement a mandatory digital literacy program and/or online learning community for all students. The program or community needs to be mandatory due to the discrepancy between OLC participants, as those who were more involved had more social support and higher SES. Furthermore, students who lower self-reported SES and less social support may not see the value of advancement in digital literacy through a program or community. Additionally, the institution must be conscious of the OLC designers, as those who design and manage the community have the ability to cultivate students' digital skills and advancement. The designers need to help students identify which skills would be most beneficial to them, encouraging more participation and student learning. With the contribution of this study, universities and higher education institutions should see the value of supporting a university-wide, mandatory digital literacy program and/or online learning community. Higher education cannot rely on voluntary student involvement in a digital literacy program or community to overcome digital inequality. Therefore, the implementation of a *mandatory digital advancement* program is essential at the university-level.

Research Question 2.2: Explaining Student Involvement in an OLC and Change in Digital Literacy Skills

A linear regression and correlation analysis were performed to determine if student involvement in an OLC affects students' perception of change in digital literacy skills. The linear regression analysis established that frequency of OLC involvement significantly predicted students' perceived change in digital literacy skills, β=.60,

t(24)=20.94, $p < .005$. OLC activity explained a significant proportion of variance in students' perceived change in digital literacy skills, adjusted R^2=.33, *F*(1, 24)=13.32, $p < .005$.[20]

In Figure 3 below, the variables *change in DL skills* and *OLC activity* are displayed in a scatterplot to illustrate the comparison between the two variables as computed in the linear regression described above. It is clear that there is a positive correlation between involvement in the OLC and a higher perceived change in digital literacy skills for OLC participants.



(N=25). Note: Solid green line indicates mean [change in DL skills] in OLC participants.
Change in DL Skills was coded on a 5-point Likert scale, from (1) Strongly Decreased to (5) Strongly Increased.
OLC Activity was coded on a 4-point Likert scale, from (0) Never to (3) Very Often.

Figure 3. Change in Digital Literacy Skills and OLC Activity -- OLC Participants

[20] The two variables, *change in DL skills* and *OLC activity* are strongly correlated, *r*(24)=.597, $p < .001$. In the regression analysis for research question 2.2 and 2.3, VIF was 1.0 and the condition index was 3.2, each.

Research Question 2.3: Explaining the Impact of Student Involvement in an OLC

To determine how student involvement in the OLC affects or impacts participants' lives, a correlation and linear regression analysis was performed. A linear regression analysis established that frequency of OLC involvement significantly predicted the positive impact of the OLC on participants' lives, $\beta=.76$, $t(24)=1.68$, $p < .005$. OLC activity explained a significant proportion of variance in the impact of the OLC on participants' lives, adjusted $R^2=.56$, $F(1, 24)=33.35$, $p < .005$.[21]

In Figure 4 below, the variables *impact of OLC* and *OLC activity* are displayed in a scatterplot to illustrate the comparison between the two variables as computed in the linear regression described above. It is clear that there is a positive correlation between increased involvement in the OLC and positive impact on the lives of the OLC participants.

[21] The two variables, *impact of OLC* and *OLC activity* are strongly correlated, $r(24)=.763$, $p < .001$.

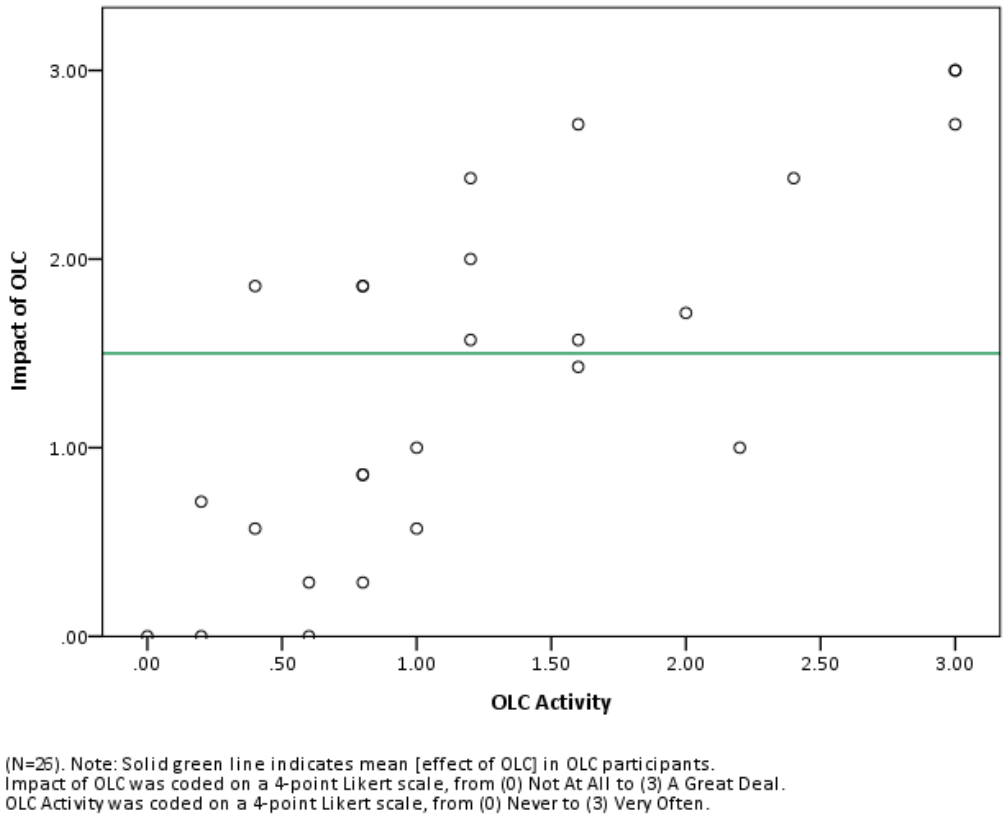


Figure 4. Impact of OLC and OLC Activity -- OLC Participants

Impact of OLC -- Student Testimonials

An open-ended question was presented to the OLC participants which asked, *How has participation in OU Get Smarts helped or changed the way you live?* Nearly 80 percent of OLC participants provided feedback and many students provided multiple ways in which OU Get Smarts has positively affected their life. A majority of participants (70 percent) claimed that the OLC made them more aware of digital literacy, their digital footprint, and the ways in which they use technology. Forty percent of OLC participants mentioned specific programs and/or tools that they now have much more knowledge and experience with, and therefore utilize more frequently. A few of the OLC participants

responded with claims such as, *"I realized that tools are available to me (and everyone) to make daily academic tasks much simpler!"* and *"It has made me more aware of the significance of being tech savvy. It opened my eyes to the different types of digital skills that I did not previously have, and what I could do to then increase those skills."* Overall, with 90 percent of participants providing positive feedback of the OLC, students overwhelmingly claimed that the community had a positive impact on their life. According to an OU Get Smarts participant:

> [OLC] has made me more aware of the importance of establishing a positive digital self. Also, it is important to not be ignorant in the topic. Our world is gravitating towards a more technologically sound environment and it only benefits everyone if we all become more aware and active with online sources and establishing a digital self.

Improvements to OLC -- Student Testimonials

An additional open-ended question was presented to the OLC participants which asked, *In your opinion, what could be done to improve an online learning community like OU Get Smarts?* Again, nearly 80 percent of OLC participants provided feedback. Two of the twenty participants that responded to this question replied that they did not have an opinion on improvements, while two participants reported *"I thought it was perfectly set up"* and *"It was very well run, maybe make more visually appealing."* Thirty-five percent of respondents reported that more people needed to be involved, such as "*get the word out, the more people I see using it, the more I would get on"* and *"more participation among its members could improve this online learning community.*" However, there was one participant who thought that too much information was featured in the community, *"...maybe post less because all of the notifications are kind of*

annoying." Other feedback included "*make workshops that allows for teachers, students and other faculty members to become more aware of how to navigate the web and how it can benefit them"* and "*maybe a bit less informal than a Facebook page and blog. A more professional hub."* Overall, participants gave constructive feedback of what could be done to improve an OLC at the university level, such as expanding to a broader public, more involvement within the participants, and more visually appealing with interactive programs. According to an OU Get Smarts participant:

> I thought it was great! I've never participated in anything like OU Get Smarts. I guess, if I had to choose I would just suggest that it be more widely known/have a longer chance of running… As a permanent sort of resource I think the community could reach many more students.

Part III: Perceived Skills in Digital Literacies

Research Question 3.1: Explaining Patterns of Improvement in Digital Literacies

Previous research has suggested an examination of a wider variety of activities and students' perceived skills was needed in future research, as certain types of Internet and technology use show differences in Web-use abilities (e.g. Hargittai & Shafer, 2006). In this study, an intensive examination of students' perception of domains of digital literacy was researched and analyzed for students' first semester and current (spring) semester at Ohio University. Future research should control for additional factors such as self-esteem when measuring self-efficacy or perceived skills, as self-esteem remains a significant predictor in previous research (e.g. Dickard, 2012; Zillien & Hargittai, 2009).

Table 16 presents results from paired samples t-tests that were performed for both OLC and non-OLC participants in each domain and subdomain of digital literacy—at T1 (first semester) and T2 (spring semester). For example, both OLC and non-OLC

participants have the greatest increase in mean in institutional know-how (.63 and .42 respectively). For OLC participants, the effect size for institutional know-how was very large at .51, and .35 for non-OLC participants which is still quite large.[22] Thus, with the large effect sizes, we can conclude that there was a substantial difference in institutional know-how skills obtained at T1 and T2 for both groups of participants. The OLC participants have more domains of digital literacy with large effect sizes (5 of the 11 domains at 46 percent) in comparison to non-OLC participants at 9 percent. See Table 12 for more information on T1 and T2 results in each of the domains of digital literacy. For the full analysis of the OLC and non-OLC participants' perception of each domain of digital literacy, see Appendix B: Comparison -- OLC and Non-OLC Participants.

[22] The guidelines (proposed by Cohen, 1988) for interpreting the value/effect size are: .01=small effect; .06=moderate effect; .14=large effect.

Table 16.

Paired Mean Difference in Domains of Digital Literacy from T1 to T2 -- OLC and Non-OLC Participants

Domains of Digital Literacy		OLC Participants		Non-OLC Participants		Change in Difference
		M†	Eta²	*M*†	Eta²	‡
Attention	Distraction	.00	.00	-.16	.06	0.16
	Focus	.36	.12	.13	.06	0.23
Critical Consumption of Information	Research	.52	.22	.19	.06	0.33
	Evaluation	.32	.08	.17	.06	0.15
Participation	Sites	.54	.36	.10	.05	0.44
	Activity	.38	.13	-.15	.06	0.53
Collaboration	Frequency	.46	.27	.19	.13	0.27
	Comfort	.33	.29	.13	.09	0.20
Network Smarts	Connections	.05	.03	.06	.04	-0.01
	Cultivation	.45	.03	.13	.01	0.32
Institutional Know-How	Ohio University	.63	.51	.42	.35	0.21

† Represents the paired mean difference or the change [in means] from T1 to T2; visual representation displayed in Figure 5.
‡ Represents the relative improvement of OLC participants to non-OLC participants; visual representation displayed in Figure 6.
Highlighted values indicate **(Eta²)** large effect sizes (above .14)
OLC participants N=26, *df*=25; Non-OLC participants N=174, *df*=173

Overall, OLC participants have greater improvements in digital literacies as shown by the paired mean differences at T1 to T2 displayed above in Table 16. Even though there were significant differences between the mean values at T1 and T2 for both OLC and non-OLC participants, the researchers cannot state that participation or non-participation in the OLC *caused* the improvements in digital literacies. There are other factors that may have influenced the improvement of digital literacy skills, as previously explored in the first research question, such as gender, race, socioeconomic status, social support, and/or digital capital.

Research Question 3.2: Explaining Improvements of Certain Digital Literacies

In terms of the domains of digital literacy that have the greatest improvements for both the OLC and non-OLC participants, the results can be seen in Figure 5 below (or in Table 16, paired mean difference). For OLC and non-OLC participants, the greatest improvement in digital literacy from students' first semester to the spring semester occurred in their institutional know-how (.63 and .42 point increase, respectively). Following institutional know-how for OLC participants, improvements included frequency of participatory sites (.54), researching information found online (.52), frequency of collaboration (.46), cultivation of networks (.45), and active participation at .38 point increase. For non-OLC participants, improvements following institutional know-how included researching information found online (.19), frequency of collaboration (.19), evaluating information found online (.17), and focus, comfort of collaboration, and cultivation of networks at .13 point increase, each.

The OLC participants had greater improvements in all domains of digital literacy except for in connections. The extent of improvements is displayed in Figure 5 and 6. The OLC participants had .01 point difference in connections from non-OLC participants, indicating that non-OLC participants had .01 point increase in improvement in the number of connections from their first to spring semester; however the number of connections that students have is not solely dependent upon that student.

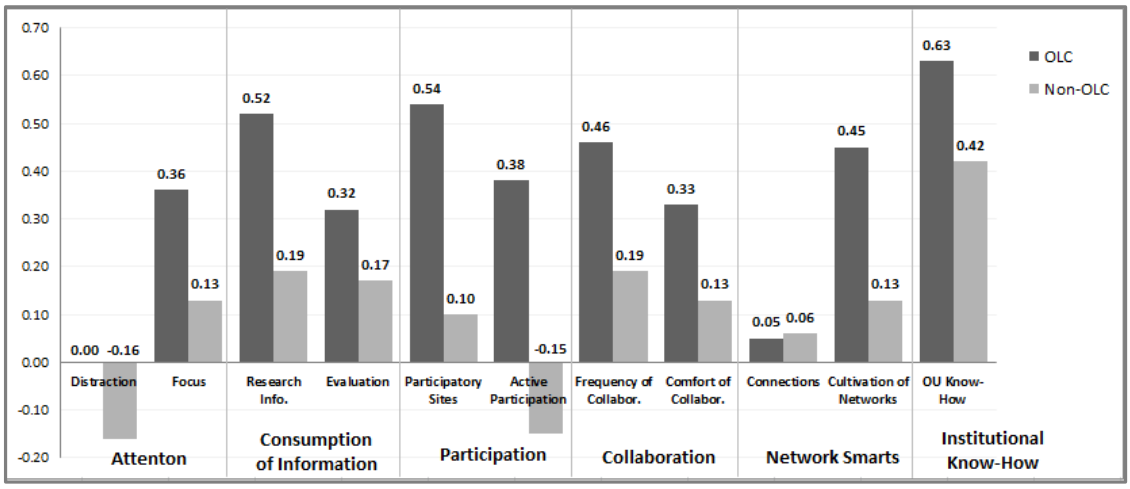


Figure 5. Paired Mean Difference for Digital Literacies -- OLC and Non-OLC Participants

In Figure 6 below, an alternative visualization of the difference between the paired mean difference among OLC and non-OLC participants is displayed. In this visualization, it is easy to see the drastic increase of paired mean difference among OLC and non-OLC participants. Furthermore, OLC participants have an average of .23 points greater increase in their paired mean difference from T1 to T2 digital literacies. From these results, we can conclude that OLC participants had the largest improvement in mean differences from T1 to T2 digital literacies; however, we must note that other factors may have contributed to the improvement of both OLC and non-OLC participants' digital literacy skills.

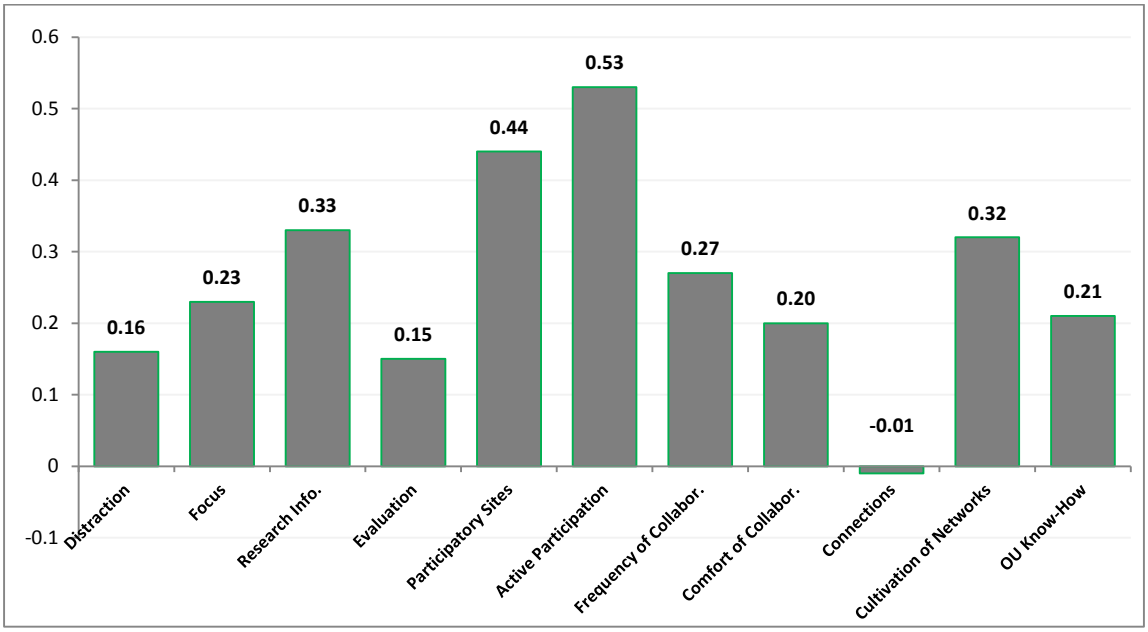


Figure 6. Relative Improvement in Domains of Digital Literacy of OLC Participants to Non-OLC Participants

CHAPTER 7: CONCLUSION AND LIMITATIONS

Conclusion

As more people engage in online activities and connect through information and communication technologies, the ability to leverage these technologies for one's benefit becomes increasingly crucial for maintaining a competitive edge in economic, social, political, and academic life. Promoting the broader public good through civic engagement, more accurate and immediate information available, online collaboration, and political participation are all crucial components of this modern digital age. The ability to participate online is an essential aspect of a digital citizen, and the digital skills and knowledge necessary to engage in such types of participation are crucial components of people's social, economic, and cultural capital. The necessary digital skill set and knowledge has become a critical aspect of society itself, creating new challenges and opportunities for individuals, in the form of digital citizenship.

Although digital citizenship is defined as an individual who participates online, this research has revealed the additional, essential aspects of being a digital citizen. Initially individuals need to learn how to participate responsibly and ethically—meaning individuals are more conscientious of information they read, utilize, and publish online. Additionally, participating in a meaningful and prosocial manner is also necessary, in ways which benefit not only themselves but society as a whole. Lastly, digital citizens need to exhibit a positive attitude towards technology, one that demonstrates determination for lifelong digital achievements.

As advancement in digital skills and effective online participation can lead to positive outcomes, it can also lead to further inequalities among capital-enhancing/diminishing activities among users. Despite the popular assumption that the younger generation of college students are 'digital natives' (Hargittai, 2010; Prensky, 2001a), the findings from this study have illustrated significant differences among this population of young adults. Furthermore, initiatives must be taken at the university level in order to level the 'digital literacy' playing field for college students. These initiatives must focus on community-building, such as online learning communities, workshops, or seminars as a means to cultivating students' digital literacy skills, knowledge, and social support. The benefits of the online learning community are promising, although this study only covers a limited area of what we scholars call 'digital citizenship' and 'digital literacy,' which are necessary to engage in social aspects of life online.

Overall, there are several predictive trends that emerge from the data collected and analyzed throughout this study. For example, age and mobile technology access are both significantly related to students' self-reported *prior* digital skills (before entering Ohio University). Economic factors (i.e. mobile access) are significant, suggesting that students who come from more privileged positions are reaping the benefits of both access and time spent online, more so than students from lower socioeconomic backgrounds. However, based on students' perception of *changes* in their digital literacy skills, socioeconomic status (SES) and mobile technology access have little significance. The lack of significance in access may result from students' presence on a college campus—

as there is nearly universal Wi-Fi access, various ICTs, and a multitude of resources and social support networks students can seek assistance from.

Variables such gender and race were not significantly related to students' self-reported *changes* in digital literacy skills. Previous research has found evidence of digital inequality rooted in differences between gender, age, and race (Hargittai & Shafer, 2006; Hargittai & Walejko, 2008), however this research found significance elsewhere in students' change in digital literacy skills. Overall, the findings from this study revealed that students who were at OU longer, had more social support, and greater digital capital perceived greater *changes* in their digital literacy skills.

Measures of social support and digital capital were significant in the models used in this study. These results provide evidence that individuals' social support and networks are important components of people's lives in relation to how they use technology. Additionally, this study found relationships between social support and other variables such as age and socioeconomic status. This suggests that students from lower socioeconomic backgrounds are still experiencing a lag in their digital skills and technology use.

A significant finding in this study is that students reported an improvement in perceived digital literacy skills and knowledge in online activities. This suggests that there are methods to improving individual student capital accumulation through Internet use and online activities that can also serve to benefit a larger community. Future research and educational initiatives must expand their scope as to incorporate these multimodal, immersive activities included in digital citizenship. Technologies that

students can efficiently and effectively use in their daily lives should be promoted while incorporating societal needs.

Although there were differences in perceived digital skills between participants and non-participants of the online learning community (OLC), the outcome of the OLC offers promising results that can guide future research. Participants of the OLC reported significant improvements in their digital skills regardless of their demographic and socioeconomic characteristics. Since the OLC focused on the six domains of digital literacy including attention, critical consumption of information, participation, collaboration, network smarts, and institutional know-how, the impact on students' perception of change in digital skills isn't surprising. The digital skills variable index measured skills regarding those specific domains of digital literacy. Future research should focus more on institutional changes as a larger student population would allow greater expansion, communication, and participation among students (i.e. all incoming students during the academic year).

Additionally, it seems as though the university environment may be mitigating some of the initial differences associated with social inequalities and economic disparities. If universities and higher education institutions want to address digital inequalities, they need to implement a *mandatory,* university-wide digital literacy program and/or online learning community for all students. Furthermore, student testimonials claim that Ohio University needs to implement a similar program, course, or workshop *and* provide students with more resources that will be of value to their

advancement of digital skills now and in the future. These findings add significance to previous research and opens avenues for future research.

The results from the analysis of student involvement in the OLC are important in guiding future research and university policy changes. Socioeconomic status and social support were important predictors of student involvement and participation in the online learning community. Students with more social support and higher SES were more involved in the OLC, and possibly, students with lower self-reported SES and less social support may not see the value of advancement in digital literacy through a program or community. With the contribution of this research, universities and higher education institutions should see the value of supporting a university-wide, mandatory digital literacy program and/or online learning community. Higher education cannot rely on voluntary student involvement in a digital literacy program or community to overcome digital inequality, as illustrated in our findings. Therefore, the implementation of a *mandatory digital advancement* program is essential at the university-level.

Overall, the gap in access to the Internet may be narrowing, as those that are better off, particularly at a college campus, are better equipped with a multitude of social support and opportunities to expand their networks. To further support this claim, the results indicate that those with lower perceived SES tend to have less access to mobile technology devices. This limits the amount of time one can spend online, stunting the growth of their digital skills. Future research should have a more comprehensive analysis of SES and change in digital skills. Socioeconomic status and access has been thoroughly researched, however SES and *change* in digital skills have not. Additionally, future

research should determine whether there are differences between formal instruction and peer learning digital capital, digital immersion, and changes in digital literacy skills.

Contrary to previous literature on digital inequality and digital skills, this study found that digital immersion was not significantly related to either dependent variable, *change* in digital literacy skills or OLC activity. Previous research has found that those who have increased digital immersion have more opportunities to learn and advance their Internet and digital skills (van Deursen & van Dijk, 2010). However, when digital immersion was divided into subcategories (i.e. school-related, networking, and personal-use), networking digital immersion was significantly related to *change* in digital literacy skills. Future research should continue to explore and develop richer measures of digital immersion to better determine its effects on students' digital literacy and self-efficacy.

The findings in this thesis are similar to Zillien and Hargittai (2009), suggesting that digital inequalities are not only a temporary social phenomenon that will disappear once high-quality equipment and comfort with the Internet becomes readily available. If status inequalities regarding technology equipment and digital experience were to decline, status-based differences in Internet usage would likely persist. This study also serves as a reminder that digital inequality is a complicated and multifaceted phenomenon that we as scholars are just beginning to understand. This research has contributed to the existing literature examining inequalities in perceived digital skills and digital immersion among college students, ranging from academic collaborations to daily participatory activities. Internet use can influence many aspects of an individual's life, and the fact that some students experience a lag in advanced Internet skills and use when

arriving to college is a cause for concern. This may indicate potential exclusion from digital citizenship among portions of the population that don't readily have the Internet available or who lack social support.

This study not only provides considerable contributions to the literature in the areas previously discussed, it also suggests new paths of inquiry for future research. For example, there were no significant differences in students' perceived skill level in focus, evaluation, connections, and Ohio University know-how digital literacies between OLC and non-OLC participants during the spring semester. This may indicate that students learn certain domains of digital literacy regardless of participation in an online learning community. Future research should further explore the possibility of OLC participation and the change in specific digital literacy skills as the results may have differed if the OLC sample size was larger.

Limitations

There are several important limitations to note in this study. The first has to do with the sample. The sample of college students was drawn from a midsized, residential public college in the Midwest. Like a majority of college students from this region, the sample was mostly white and middle-class. As this sample does not represent the full diversity of students in the United States, the findings of this study may not be generalized to students who are markedly different from the sample. Additionally, the research sample is skewed in comparison to the population of university students studied, as there are a higher percentage of students in the research study who identified as female (nearly 20 percent higher than Ohio University's average) and higher socioeconomic

status. Therefore, the findings from this study cannot be generalized to all students at this college campus, as this sample does not represent the Ohio University Athens population as a whole.

One of the shortcomings of this study is that neither an experimental nor quasi-experimental research design is employed for the online learning community (OLC). Rather, the OLC served to introduce variance into the sample by engaging a *portion* of students into advancing their digital literacy skills. Furthermore, data was collected at only one point in time (students were asked about both current and prior Internet use and perceptions of digital literacy skills). This study would have benefited from longitudinal data. Subsequently, this study cannot provide causal evidence based on the findings presented.

Other limitations stem from measurements used (or not used) in this study, including self-reports of perceived digital literacy skills rather than both measures of perceived skill and actual skills. Research by Hargittai (2005) found that self-assessed skills are relatively poor indicators of actual skill level; Hargittai's study developed survey instruments that more accurately address levels of actual Internet use, digital skills, and knowledge. However, there have not been any studies that have developed instruments for the measurement of specific domains of digital literacy skills. Therefore, future research should focus on exploring the development of such instruments and measures. Measurements of access, social support, and digital capital should also be further developed to more accurately capture the nuances of differentiated Internet use and digital skills. Lastly, the measures of beneficial outcomes of participation in the

online learning community were limited, and future research should extensively evaluate the benefits and outcomes of the implementation of online learning communities.

Therefore, future research should develop experimental research designs, more nuanced measures of digital literacy skills, and more beneficial outcomes of specific use of digital literacies and online learning communities. Furthermore, longitudinal data in future research can provide causal evidence of the impact that online learning communities can have on students' digital literacy skills, Internet use, and civic engagement.

Contributions and Future Research

Overall, the findings from this thesis have important contributions to the study of social and digital inequality by showing that promoting knowledge through online community-building benefits individual students in terms of improvements in self-efficacy. As a result, a potentially wider community benefits through increased civic engagement and advanced digital literacy skills and knowledge. Additional, the findings justify universities' and higher education institutions' support of implementing a university-wide digital literacy program, as the university cannot rely on voluntary student participation to overcome digital inequalities. The findings throughout this thesis are promising and future research should further examine ways to implement such programs and communities into various setting for a multitude of purposes and goals.

REFERENCES

Bandura, A. (1986). The explanatory and predictive score of self-efficacy theory. *Journal of Clinical and Social Psychology,* 4*:*359-73.

Beetham, H., L. McGill, & A. Littlejohn. (2009). Thriving in the 21st Century: The Report of the LLiDA Project (Learning Literacies for the Digital Age).

Berners-Lee, T., & Fishchetti, M. (2000). *Weaving the Web: The original design and ultimate destiny of the World Wide Web.* New York, NY: HarperCollins.

Boomershine, T. (1987). Peter's denial as polemic or confession: the implications of media theory for biblical hermeneutics. In L.H. Silberman (Ed.), *Orality, aurality and Biblical narrative* (P.47-68). Decatur, GA: Scholars Press.

Bourdieu, P. (1984*). Distinction: A Social Critique of the Judgement of Taste.* London and New York: Harvard University Press.

Bourdieu, P. & J.C. Passeron. (1990). *Reproduction in education, society and culture.* (2nd Ed.) London: Sage.

Brown, C. & L. Czerniewicz. (2008). Student use of ICTs in higher education in South Africa. In: van Brakel, P.A. (Eds.), Proceedings of the 10th annual conference of world wide web applications, Cape Peninsula University of Technology, Cape Town, South Africa.

Calvani, A., Cartelli, A., Fini, A., & Ranieri, M. (2008). Models and instruments for assessing digital competence at school. *Journal of e-Learning and Knowledge Society,* 4(3):183-93.

Caine, R.N., & G. Caine. (1991). Making Connections: Teaching and the Human Brain. Addison-Wesley, P.31.

Citron, D.K. & H. Norton. (2011). Intermediaries and Hate Speech: Fostering Digital Citizenship for our Information Age. *Boston University Law Review,* 91:1435-94.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences.* Hillsdale, NJ: Erlbaum.

Collins, A., & R. Halverson. (2010). The Second Educational Revolution: Rethinking Education in the Age of Technology. *Journal of Computer Assisted Learning,* 26:18-27.

Correa, T. (2010) The Participation Divide Among "Online Experts": Experience, Skills, and Psychological Factors as Predictors of College Students' Web Content Creation. *Journal of Computer-Mediated Communication,* 16:71-92.

Cortina, J.M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology,* 78:98-104.

DeGennaro, D. (2008). Learning Designs: An Analysis of Youth-Initiated Technology Use. *Journal of Research on Technology in Education,* 41(1):1-20.

del Campo, J. M., Negro, V., & Núñez, M. (2012). The History of Technology in Education. A Comparative Study and Forecast. *Social and Behavioral Sciences*, 69:1086-92.

Dickard, M. (2012). Digital Inequality: Exploring the Potential of Online Learning Communities to Promote Digital Skills and Citizenship among College Students. (Electronic Thesis). Retrieved from https://etd.ohiolink.edu/

DiMaggio, P., E. Hargittai, C. Celeste, & S. Shafer. (2004). Digital Inequality: From Unequal Access to Differentiated Use. In K. Neckerman (Eds.) *Social Inequality* (P.355-400). New York: Russell Sage Foundation.

DiMaggio, P. & B. Bonibowski. (2008). Make Money Surfing the Web? The Impact of Internet Use on the Earnings of U.S. Workers. *American Sociological Review,* 73(2):227-50.

Dominguez-Flores, N. & L. Wang. (2011). Online Learning Communities: Enhancing Undergraduate Students' Acquisition of Information Skills. *The Journal of Academic Librarianship,* 37(6):495-503.

Eastin, M.S. & R. LaRose. (2000). Internet Self-Efficacy and the Psychology of the Digital Divide. *Journal of Computer-Mediated Communication,* 6(1).

Foerde, K., B.J. Knowlton, & R.A. Poldrack. (2006) Modulation of competing memory systems by distraction. *Proceedings of the National Academy of Sciences,* 103:11778-83.

Froese, A.D., C.N. Carpenter, D.A. Inman, J.R. Schooley, R.C. Barnes, P.W. Brecht, & J.D. Chacon. (2012). Effects of Classroom Cell Phone Use on Expected and Actual Learning. *College Student Journal,* 46(2):323-32.

Glister, P. (1997). *Digital Literacy.* New York: Wiley Computer Publication.

Goldfarb, A., & J. Prince. (2008). Internet Adoption and Usage Patterns are Different: Implications for the Digital Divide. *Information Economics and Policy,* 20(1):2-15.

Goode, J. (2010). The Digital Identity Divide: How Technology Knowledge Impacts College Students. *New Media & Society,* 12(3):497-513.

Gordon, J., & R.A. Lenhardt. (2008). Rethinking Work and Citizenship. *UCLA Law Review,* 55:1215.

Greenhow, C., B. Robelia, & J.E. Hughes. (2009). Learning, Teaching, and Scholarship in a Digital Age: Web 2.0 and Classroom Research: What Path Should We Take Now? *American Educational Research Association,* 38:246-56.

Hacker, K.L. & van Dijk, J. (2000). What is Digital Democracy? In K.L. Hacker & J. van Dijk (Eds.) *Digital Democracy: Issues of Theory and Practice* (P.1-9). Thousand Oaks, CA: Sage.

Hargittai, E. (2002). Second-Level Digital Divide: Differences in People's Online Skills. *First Monday,* 7(4).

------. (2005). Survey Measures of Web-Oriented Digital Literacy. *Social Science Computer Review,* 23(3):371-9.

------. (2007). Whose Space? Differences Among Users and Non-Users of Social Network Sites. *Journal of Computer-Mediated Communication,* 13:276-97.

------. (2008). "The Digital Reproduction of Inequality." P.936–44 in Social Stratification, edited by D. Grusky. Boulder, CO: Westview Press.

------. (2010). Digital Na(t)ives? Variation in Internet Skills and Uses among Members of the Net Generation. *Sociological Inquiry,* 80(1):92-113.

Hargitta, E. & A. Hinnant. (2008). Digital Inequality: Differences in Young Adults' Use of the Internet. *Communication Research,* 35(5):602-21.

Hargitta, E. & S. Shafer. (2006). Differences in Actual and Perceived Online Skills: The Role of Gender. *Social Science Quarterly,* 87(2):432-48.

Hargittai, E. & G. Walejko. (2008). The Participation Divide: Content Creation and Sharing in the Digital Age. *Information, Communication & Society,* 11(2):239-56.

Himmelman, A.T. (2002). Collaboration for a Change: Definitions, Decision-making models, Roles, and Collaboration Process Guide. Himmelman Counseling, https://depts.washington.edu/ccph/pdf_files/4achange.pdf

Hobbes, R. (2008). Debates and challenges facing new literacies in the 21st century. In S. Livingstone & K. Drotner (Eds.), *International handbook of children, media and culture* (P.431-447). London: Sage.

Hobbes, R. & Jensen, A. (2009). The past, present, and future of media literacy education. *Journal of Media Literacy Education,* 1:1-11.

Hoffman, R. (2008). *Socioeconomic Differences in Old Age Mortality.* Dordrecht: Springer.

Hotchkiss, J.L., R.E. Moore, & M.M. Pitts. (2005). Freshman Learning Communities, College Performance, and Retention. Federal Reserve Bank of Atlanta. Retrieved July 10, 2014 from: http://files.eric.ed.gov/fulltext/ED505601.pdf

Jenkins, H., R. Puroshotma, K. Clinton, M. Weigel, & A.J. Robinson. (2005). Confronting the Challenges of Participator Culture: Media Education for the 21st Century. Retrieved from July 1, 2014 from: http://www.newmedialiteracies.org/wp-content/uploads/pdfs/NMLWhitePaper.pdf

Johnson, R.D. (2011). Gender Differences in E-Learning: Communication, Social Presence, and Learning Outcomes. *Journal of Organizational and End User Computing,* 23(1):79-94.

Junco, R., & Cotten, S. R. (2011). Perceived academic effects of instant messaging use. *Computers & Education,* 56(2):370-8.

Jung, J.Y. (2008). Internet Connectedness and its Social Origins: An Ecological Approach to Post access Digital Divides. *Communication Studies,* 59(4):322-39.

Jung, J.Y., Y.C. Kim, W.Y. Lin, & P.H. Cheong. (2005). The Influence of Social Environment on Internet Connectedness of Adolescents in Seoul, Singapore and Taipei. *New Media & Society,* 7(1):64-88.

Kabat-Zinn, J. (2003). Mindfulness-based Intervention in Context: Past, Present, and Future. *Clinical Psychology: Science and Practice,* 10(2):145.

Katz, J.E. & R.E. Rice. (2002). *Social consequences of Internet use: Access, involvement and interaction.* Cambridge, MA: MIT Press.

Labaree, D.F. (1997). Public Goods, Private Goods: The American Struggle Over Educational Goals. *American Educational Research Journal,* 34(1):39-81.

Lenhart, A., M. Madden, A. Rankin-Macgill, & A. Smith. (2007). Teens and social media, Pew Internet and American Life Project. Retrieved on June 10, 2014 from: http://www.pewinternet.org/2007/12/19/teens-and-social-media

Livingstone, S. & E. Helsper. (2007). Gradations in digital inclusion: Children, young people and the digital divide. *New Media and Society,* 9(4):671-96.

Ma, G. (2006). Online learning community in the context of distance education. A case study. (Electronic Dissertation). Retrieved from http://gradworks.umi.com/32/43/3243787.html

Marshall, T.H. (1950). Citizenship and Social Class. In J. Manza & M. Sauder (Eds.) *Inequality and Society* (P.148-54). New York: W.W. Norton and Co.

Marx, K., F. Engels, & R. Tucker. (1978). *The Marx-Engels Reader*. 2nd Ed. New York, NY: W. W. Norton & Company, Inc.

McBride, K.B., & R. Dickstein. (1998). The Web Demands Critical Thinking by Students. *Chronicle of Higher Education.* B6.

Mossberger, K., C.J. Tolbert, & R.S. McNeal. (2007). *Digital citizenship: The Internet, society, and participation.* Cambridge, MA: MIT Press.

Mossberger, K., C.J. Tolbert, & M. Stansbury. (2003). *Virtual Inequality: Beyond the Digital Divide*. Washington, DC: Georgetown University Press.

NTIA, National Telecommunication and Information Administration. (2004). A nation online: Entering the broadband age. Washington DC: NTIA.

NSSE, National Survey of Student Engagement. (2013). Annual Results 2013. Carnegie Foundation for the Advancement of Teaching. Retrieved July 10, 2014 from: http://nsse.iub.edu/NSSE_2013_Results/pdf/NSSE_2013_Annual_Results.pdf#page=8

Ophir, E., C. Nass, A.D. Wagner, & M.I. Posner. (2009) Cognitive Control in Media Multitaskers. *Proceedings of the National Academy of Sciences of the United States of America,* 106(37):15583-7.

Ohio University. (2014). Institutional Research - Enrollment Statistics. Retrieved July 21, 2014 from: http://www.ohio.edu/instres/enrollstats/ENSTSP14WEBALL.pdf

O'Reilly, T. (2004). The Architecture of Participation. Retrieved July 1, 2014 from: http://oreilly.com/pub/a/oreilly/tim/articles/architecture_of_participation.html

Pask, J.M., & E.S. Saunders. (2004). Differentiating Information Skills and Computer Skills: A Factor Analytic Approach. *Libraries Research Publications.* Paper 23. Retrieved July 5, 2014 from http://docs.lib.purdue.edu/lib_research/23/

Prensky, M. (2001a) Digital natives, digital immigrants. On the horizon. *NCB University Press,* 9(5).

------. (2001b). Digital natives, digital immigrants part II: Do they really think differently? On the horizon. *NCB University Press,* 9(6).

Putnam, R. (2000) *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon & Schuster.

Rheingold, H. (2012*). Net Smart: How to Thrive Online*. Cambridge: MIT Press.

Sabel, C.F., & Zeitlin, J. (1985). Historical alternatives to mass production: politics, markets, and technology in nineteenth century industrialization. *Past and Present,* 108:133-76.

Shirky, C. (2008) Here Comes Everybody: The Power of Organizing Without Organizations. New York: Penguin Press.

Simsek, E., & A. Simsek. (2013). New Literacies for Digital Citizenship. *Contemporary Educational Technology,* 4(2):126-37.

Stevens, J. (1996). *Applied Multivariate Statistics for the Social Sciences* (3rd Ed.) Mahway, New Jersey: Lawrence Erlbaum.

Sutherland-Smith, W. (2002). Weaving the literacy web: Changes in reading from page to screen. *Reading Teacher,* 55(7):662-9.

Tabachnick, B.G., & L.S. Fidell. (1996). *Using Multivariate Statistics* (3rd Ed.) New York: HarperCollins.

Tolbert, C.J., & R.S. McNeal. (2003). Unraveling the Effects of the Internet on Political Participation? *Political Research Quarterly,* 56(2):175-85.

Valenzuela, S., N. Park, & K. Kee. (2009) Is There Social Capital in a Social Network Site?: Facebook Use and College Students' Life Satisfaction, Trust, and Participation. *Journal of Computer-Mediated Communication,* 14:875-901.

van Deursen, A.J.A.M. (2010). Internet Skills: Vital Assets in an Information Society. Enschede, the Netherlands: University of Twente.

van Deursen, A. & J. van Dijk. (2010). Internet Skills and the Digital Divide. *New Media and Society,* 13(6):893-911.

van Dijk, J. (2005). *The Deepening Divide*. London: Sage

Warschauer, M. (2003) *Technology and social inclusion: Re-thinking the digital divide*. Cambridge, MA: MIT Press.

Weber, Max, Hans H. Gerth, & C. Wright Mills. 1946. From Max Weber: Essays in Sociology. New York, NY: Oxford University Press

Wei, L. (2012). Numbers Matters: The Multimodality of Internet Use as an Indicator of Digital Inequalities. *Journal of Computer-Mediated Communication,* 17:303-18.

Wei, F.F., & Y.K. Wang. (2010). Students' Silent Messages: Can Teacher Verbal and Nonverbal Immediacy Moderate Student Use of Text Messages in Class? *Communication Education,* 59(4):475-96.

Wenger, E., R. McDermott, & W.M. Snyder. (2002). Cultivating Communities of Practice. Boston, MA: Harvard Business School Press.

Witte, J.C., & Mannon, S.E. (2009*). The Internet and social inequalities.* New York: Routledge.

Zickuhr, K. "Who's Not Online and Why." Pew Research Centers Internet American Life Project RSS. 25 Sept. 2013. Web. 19 Mar. 2014. http://www.pewinternet.org/2013/09/25/whos-not-online-and-why/

Zillien, N., & Hargittai, E. (2009). Digital Distinction: Status-Specific Types of Internet Usage. *Social Science Quarterly,* 90(2):274-91.

APPENDIX A: UNIVERSITY POLICY CHANGES -- STUDENT TESTIMONIALS

Student Testimonials

To assess possible university policy changes students were asked, *What do you think are the most important ways that OU could help students like you improve digital skills and prepare for future careers?* Of the 200 survey respondents, nearly 70 percent provided feedback and suggestions of what OU could do to improve students' digital literacy skills; many students provided multiple suggestions.

Resources and Access

Thirty-three students (24 percent) suggested that Ohio University do more in terms of access and resources that students use. For example, *"make the resources easier to obtain and clearer where to find them," "more computer access (more computers),"* and *"make webpages more friendly to use and easier to access without going through multiple pages and multiple login screens."* The following two statements provide an overall picture of OU resources and access, *"There are a lot of resources that are available to students through the library and the internet access here, but I do not know about them. Maybe just letting us know sooner instead of slowly learning on my own, step-by-step"* and *"More technologically advanced resources around campus, as well as have the staff more informed themselves. Lindley Hall for example, very large building, being completed under-utilized."*

These types of statements indicate those students find OU resources and webpages confusing; OU should do more to help students access resources such as Blackboard, DARS, and the student center. Additionally, more resources (including professors and librarians) need to be available to answer students' questions and issues.

Technology in the Classroom

Thirty students (22 percent) mentioned that technology needs to be implemented more into their classes – not a specific class – but rather implement technology and new digital resources into each of their classes.

Professors: Five students mentioned professors specifically, indicating that professors have a large impact on students' expansion of their digital skills and knowledge. Statements include *"Having the professor encourage digital skills and working on them in class would really help students at OU improve their digital skills"* and *"Have teachers teach you to use the digital skills for their classes, and [library] staff that can help answer any students question."* Although some students had more negative comments about professors and the lack of incorporation of technology into the classrooms, one which includes *"Many of my classes do not allow computer use, which is detrimental to our learning when we are at a point where technology is necessary in the workforce. Professors should embrace rather than resist it."*

Classrooms: Students that specifically mentioned incorporating technology into the classroom included comments such as *"Continue to incorporate technology use into class*

lectures" and *"Incorporate technology lessons in classes that require certain types of technology to complete assignments, so everyone can be on the same page"*.

A majority of students emphasized the importance of professors incorporating technologies into *each* of their classes, for a holistic digital skill set. Feedback includes *"Utilizing faculty and classes to educate students is really helpful. I learned a lot in my class this semester, but it would've been useful to have learned this as a freshman or sophomore. I have a lot of skills now that I could have utilized in previous years."*

Majors/Colleges: Two students mentioned specific colleges regarding the types of technology used in the classroom. Both students were from the College of Business, and one mentioned *"I think integrating technology use into more classes would be very beneficial. The College of Business definitely does a good job of this, but some other colleges are lacking in this area…"* Two additional students mentioned requiring specific skills regarding their major, including *"Require the use of major specific digital skills in courses. Need early and repeated exposure to the digital skill expected of us in future careers."*

Software: In addition to professors, classrooms, specific colleges, and/or majors, five students suggested ways to better improve students' skills through the incorporation of software in classrooms such as *"The best way is to teach students in class how to use multiple forms of software. This may be difficult with older professors that are still new to some technology. I feel that students as a whole may have a better understanding of technologies that exist because we use them every day. Most professors may not understand something like Windows 8 because it is so new. I think there should be more workshops that involve both students and professors"* and *"I think that a greater effort could be made to use a variety of software in class as well as an effort to teach students how to use these programs. This is especially important for fields that rely on specific software packages…"*

However, there were other statements made by students that displayed a great deal of disapproval for the lack of commitment by programs such as *"Have actual teaching of how to use the software (what it's for, how to use it, and how to understand the results) for social science data analysis courses (…) Students leaving the MA in Sociology are NOT prepared for PhD or professional level use of statistics software packages or analysis. Stop using the free stuff and teach people what they need to know to get by in life. This is a HUGE problem."*

With the above statements regarding technology in the classroom, students are suggesting that instead of having a program or workshop for the students, which may be costly, professors and the colleges could make more efforts to help advance students' digital skills and knowledge.

Digital Literacy Courses

Twenty-nine students (21 percent) mentioned that OU should have specific classes available for students to learn about the necessary digital skills needed for their course work at OU and beyond. Of the 29 students, nine students suggested requiring a mandatory course including *"Make it a required course, or part of a required course for all students. Learning what resources are available, how to attain them, and how to improve your efforts are all keys to academic success I wish I had years ago"* and *"Require a one credit course that teaches online*

literacy and how to navigate the web. It's essential as you go through your undergraduate years that you will have to conduct research in some way, shape, or form. By requiring students to become more aware of the negative results that can occur from being online, to how to prevent your identity from being corrupted, as well as learning how to properly conduct research are all beneficial."

Other students suggested specific topics that could be required as classes, such as *"Have a class that is specifically for creating resumes, preparing for interviews, helping find internships"* and *"I believe offering a class for students to create an initial resume and cover letter would be very helpful. In my Freshman English class, a resume and cover letter was one of our assignments, and it really helped to have one started to update when I was applying for internships my Junior Year. The classes that the librarian Megan Tomeo hosts are also very helpful in regards to navigating the library resources…"*

A few students mentioned specific programs and colleges, such as "*Institute a department-specific one-hour mandatory "class session", or even a one-pager document, to exposure the students to related digital technology they would need to use…"*

The statements above regarding digital literacy courses indicate that students believe that OU could improve students' digital literacy skills, either through a required or optional digital literacy course for students.

Workshops and Seminars

Sixteen students (12 percent) offered feedback regarding workshops or seminars that students could have the option to participate in. This would allow students (who need the additional help) the opportunity to participate, however, the digitally savvy students would not be required to enroll in a course that they are already familiar with. Students' statements include *"OU could advertise more classes and workshops that would help us improve our digital skills and prepare us for future careers"* and *"Offer free classes and/or seminar. And advertise them. This is important to older/non-traditional students that may have been out of academic for a while"* and *"OU could inform students of workshops to attend. Also, if OU could fund more organizations to have workshops that would be great."* OU does offer a variety of technology workshops and seminars, but it is not advertised as many of the students expressed. Therefore the university needs to make more of an effort to get the word out about the different workshops and seminars. I personally have been to multiple technology workshops and seminars offered through OU, but only once I started working as a graduate research assistant at the Voinovich School. The VS forwards graduate students emails from the Tech Depot (that are usually sent to the faculty and staff members). At each workshop or seminar that I have attended, more than 75 percent of the attendees are faculty or staff members, with only a few student attendees.

Freshman Orientation

Eight students (6 percent) mentioned that OU should provide a course or workshop during freshman orientation and make it a requirement for all incoming freshmen. Students expressed suggestions such as *"OU should offer students a crash course on the student center at*

Bobcat Student Orientation for incoming Freshmen. This will make the process of scheduling classes on their own second semester much easier" and *"introduce technology at orientation, make sure students know about where to ask questions."* This could easily be implemented into OU's mandatory online courses for all first year students—similar to that of AlcoholEdu and Haven courses.[23]

Learning Communities

Eight students (6 percent) suggested implementing digital literacy courses into the existing OU Learning Communities (LC). OU LCs are groups of students that take a common set of courses together and share a common experience around the community.[24] Six of the eight students were in a LC the previous semester, while the other two students were in a LC in a previous academic year. Some of the suggestions included *"Have a section of the learning community course dedicated to digital literacy at OU"* and *"…make the learning communities have a mandatory class that taught basic technology and ways of navigating the OU web pages."* This would be fairly easy to implement into the required LC seminar course for each of the communities, although that may require additional training for the LC instructors to become more digitally literate themselves. In 2011, there were 174 LCs with 2,603 students—which was approximately 27 percent of the Freshmen student population (Ohio University, 2014), however, three-fourths of the Freshmen population at OU would not have been offered that digital literacy service as they were not enrolled in a LC during their fall semester.

Student Responsibility

Only four students indicated that the university should do nothing; rather, it is the students' responsibility to increase their digital skills, through preparation before college and listening to peers. The other two students mentioned *"Nothing. The school cannot force anyone to learn it"* and a bit more of a constructive statement includes *"I feel that it's the student's responsibility to take their own initiative to build the skills they specifically need for future careers. There are a few base core programs and advice that could be taught in workshops at OU, but beyond that it really depends on the individual."* Students that responded in this way self-reported with high prior digital skills and possibly felt that they personally did not need any additional help. Unfortunately, not all students are blessed to have all these skills when entering college and are unable to simply learn by themselves. Therefore it is imperative that the university makes strides in advancing students' digital literacy skills for now and in their future.

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[23] AlcoholEdu/Haven, are online alcohol education and sexual violence harm-reduction courses. For more information see http://www.ohio.edu/involvement/healthpromotion/alcohol/alcohol_edu.cfm

[24] OU Learning Communities are offered to first year students during the Fall Semester. The group of students is enrolled in two to four classes, one which is a learning community seminar. For more information see http://www.ohio.edu/learningcommunities/

Other Policy Suggestions

Four students responded with *"no idea"* while a few other students suggested that OU offer increased exposure to different types of digital medium. Specific suggestions include *"discounted computer lab fee if digital literacy course is taken," "provide instructions for them if need be,"* and *"Make them [students] learn stuff that they will actually and most definitely use in life when they are older. NOT, 'Well it is beneficial for you to know how to use this in case you need it someday.'"*

Overall, students provided fantastic feedback that OU could take into consideration that would improve students' digital literacy skills. Although some students had negative outlooks at the lack of support that OU provides, they still provided constructive comments on what could be done to improve OU services. A majority of students had positive outlooks on OU and improvements, but a few statements were very inclusive and constructive, two which include:

> I think OU has a great program, I think the difficulty comes in the different generations that are present—i.e. many of the professors did not have all the online resources and social media that we now have so they may not understand its influence and are more apt to get angry when a student pulls their phone out in class. So I guess more understanding of the benefits, while students still needing to understand that class time is class time and computers are distracting. Technology has definitely made things a lot easier for our generation but I feel much of the time is wasted on social media and "crap" sites that offer stupid videos that have no educational value. I also think it may be helpful if some of the professors took a tutorial class on how to use some of the technology in class rooms now-a-days because I had one who is still using a projector and it was nearly impossible to follow along.

> There are two things: First and foremost, don't have websites and portals that are not consistent. I never use MyOhio as I can simply bypass it and go to the sis.ohio.edu page, MyOhio provides me with no value. Also, as a graduate student I am still waiting for the DARS reporting system to make the quarters to semesters transition. // The second thing that OU can do is be understanding with non-digital natives. I grew up with the only access to the internet being through Dial-Up or highly restrictive public library networks. I come here and I am all of a sudden supposed to know how to navigate this completely new system. This causes what I can only refer to as 'digital culture shock' on my part. Not having my skill set walking in left me behind on my first semester.

APPENDIX B: COMPARISON -- OLC AND NON-OLC PARTICIPANTS

OLC and Non-OLC Comparison

There are two separate groups in the following analysis, participants of the online learning community (OLC) OU Get Smarts and non-OLC participants. OLC participants consisted of 26 Ohio University (OU) students; non-OLC participants consisted of 174 OU students. The data was analyzed separately, however the questions between the groups were the same and students participated in the survey during the same time period, in the spring semester of the 2013-14 academic year. For each domain of digital literacy, the tables with the data from OLC participants are presented first followed by non-OLC participants. The digital literacy tables are not combined as the demographic and academic characteristics are, as each row within the digital literacy tables are displayed by greatest change in descending order in all tables (and OLC and non-OLC participants did not have the same order of change within each subdomain of digital literacy).

Student Demographics

In Table A-1 below, student demographics are displayed by OLC participants and non-OLC participants. In both sets of groups, OLC and non-OLC participants, most were female (65 and 71 percent), and white (85 and 89 percent), respectively. A majority of both OLC and non-OLC participants identified as middle-class at 62 and 43 percent, while less than 18 percent of all students identified as either low class status (8 and 4 percent) or high class status (4 and 2 percent), respectively. Average age of participants in both groups was similar, but OLC participants tended to be slightly older than non-OLC participants (*M*=1.96, *SD*=1.34 and *M*=1.71, *SD*=1.04), respectively.

Table A- 1. Student Demographics

Demographics		**OLC Participants**		**Non-OLC Participants**	
		N	**%**	**N**	**%**
Gender	Male	9	34.6%	50	28.7%
	Female	17	65.4%	124	71.3%
Race/Ethnicity †	White	22	84.6%	154	88.5%
	Non-White	4	15.4%	20	11.5%
Socioeconomic Status	Lower	2	7.7%	7	4.0%
	Lower-Middle	3	11.5%	27	15.5%
	Middle	16	61.5%	74	42.5%
	Upper-Middle	4	15.4%	62	35.6%
	Upper	1	3.8%	4	2.3%
Age ‡		1.96	1.34	1.71	1.04

† Non-White includes participants that selected one race/ethnicity (not including White or Caucasian) or two or more races/ethnicities.

‡ Includes mean and standard deviation; ages were coded as "18-19"=1; "20-21"=2; "22-23"=3; "24-26"=4; "27 or older"=5.

Academic Characteristics

In Table A-2 below, academic characteristics are displayed by OLC participants and non-OLC participants. A majority of students were Freshmen (58 and 52 percent), and had a GPA of at least 3.0 (73 and 68 percent), respectively. There was a higher percentage of OLC participants with 3.5 or higher GPAs at 46 percent, in comparison to non-OLC participants at 36 percent. All participants were asked when they first attended OU to determine the number of years individuals have been students at OU, as some students may have been transfer, graduate, or PhD students. Responses were recoded as number of years at OU, therefore "Fall '13 or more recent" was coded as "1" to "Fall '08 or earlier" which was coded as "6". OLC participants tended to be at OU slightly longer (in years) than non-OLC participants (M=2.27, SD=1.97 and M=2.03, SD=1.46), respectively (not displayed in Table A-2 below).

Table A- 2. Student Academic Characteristics

Academic Characteristics		**OLC Participants**		**Non-OLC Participants**	
		N	**%**	**N**	**%**
Student Status	Freshman	15	57.7%	91	52.3%
	Sophomore	4	15.4%	23	13.2%
	Junior	0	0.0%	26	14.9%
	Senior	1	3.8%	16	9.2%
	5th Year or More	1	3.8%	7	4.0%
	Graduate or PhD	5	19.2%	11	6.3%
GPA	Less than 2.0	0	0.0%	5	2.9%
	2.0-2.49	1	3.8%	17	9.8%
	2.5-2.99	6	23.1%	34	19.5%
	3.0-3.49	7	26.9%	56	32.2%
	3.5-4.0	12	46.2%	62	35.6%
OU Learning Community	Yes	18	69.2%	74	42.5%
	Yes, Previous Acad. Year	4	15.4%	36	20.7%
	No	4	15.4%	64	36.8%

Prior Digital Citizenship

In order to assess students' perception of their digital skills before entering college, students were asked, *How would you assess your level of digital skills BEFORE attending Ohio University?* Digital skills was defined in the survey to limit the possible misinterpretation of such a broad concept such as digital skills. Responses were coded on a 4-point Likert scale, from weak to excellent. There were a larger percentage of OLC participants who perceived their digital skills as *weak* or *fair* before entering OU at 62 percent, compared to non-OLC participants at 30 percent. Approximately 30 percent of non-OLC participants had knowledge of the existence of the OLC, but chose not to participate; of those 52 people, nearly 70 percent perceived their digital skills as *strong* or *excellent* before entering OU, so they may have not felt a need to participate in an optional OLC. In addition to their digital skill level, students were also asked about what types

of technology they brought or purchased to use at OU. Of the ten types of technology, four were used in the analysis of mobile access, including smart phones, laptops, tablets, and e-readers. The mean for digital skills before entering OU were larger for non-OLC participants in comparison to OLC participants (*M*=2.79, *SD*=0.68, and *M*=2.42, *SD*=0.70), as well as mobile access (*M*=2.22, *SD*=0.74, and *M*=2.15, *SD*=0.88), respectively. Table A-3 displays the breakout of OLC and non-OLC participants' prior digital citizenship.

Table A- 3. Prior Digital Citizenship, by OLC

Prior Digital Citizenship		**OLC Participants**		**Non-OLC Participants**	
		N	**%**	**N**	**%**
Skills	Excellent	2	7.7%	21	12.1%
	Strong	8	30.8%	101	58.0%
	Fair	15	57.7%	47	27.0%
	Weak	1	3.8%	5	2.9%
Prior Digital Skills*		**2.42**	**0.70**	**2.79**	**0.68**
Access	None	1	3.8%	0	0.0%
	One	4	15.4%	23	13.2%
	Two	12	46.2%	99	56.9%
	Three	8	30.8%	43	24.7%
	Four	1	3.8%	9	5.2%
Mobile Access*		**2.15**	**0.88**	**2.22**	**0.74**
Total		**26**	**100.0%**	**174**	**100.0%**

* Includes mean and standard deviation.

Statistical Comparison

An independent-samples t-test was conducted to compare perceived digital skills before entering OU for OLC and non-OLC participants. There was a significant difference in scores between OLC participants (*M*=2.42, *SD*=.703) and non-OLC participants [*M*=2.79, *SD*=.682; t(32.5)=2.51, *p*=.02]. The magnitude of the differences in means was small (eta squared=.0323), indicating that 3.2 percent of the variance in digital skills before OU is explained by OLC and non-OLC participants.

Digital Literacy Skills

Section 1: Attention and Focus

Attention and Distraction

To analyze students' susceptibility to distraction, students were asked during their first and spring semester at Ohio University, *How often did/do you get distracted by the following?* The types of distraction included: (1) checking and updating your email/SNSs; (2) reading news/blogs; (3) listening to music; (4) playing games, watching TV/videos; (5) laying in bed, on the couch; and (6) eating/drinking. Responses were coded on a 5-point Likert scale ranging from never to very often.[25] During the spring semester, OLC participants and non-OLC participants were least distracted while lounging around (0.42 and 0.13 point increase). Following, OLC participants were less distracted while eating/drinking and playing games, watching TV/videos at a 0.39 and 0.24 point increase, respectively, while non-OLC participants were less distracted with playing games, watching TV/videos and laying in bed, on the couch at a 0.13 point increase, each. Table A-4 provides an overview of OLC participants level of distraction at T1 and T2 (M=2.10, SD=1.04, Cronbach's α=.427 and M=2.10, SD=1.24, Cronbach's α=.766) respectively.[26] Distraction for OLC participants did not show any change from T1 to T2, indicating that students were distracted *sometimes* during their first and spring semester at OU.

Table A- 4. Distraction -- OLC Participants

Distraction	**First Semester**		**Spring Semester**		**Change ***
	M	**SD**	**M**	**SD**	
Cronbach's Alpha	**α=.427**		**α=.766**		
Laying in bed, on the couch	1.77	1.07	2.19	1.13	0.42
Eating/drinking	1.92	1.02	2.31	1.19	0.39
Playing games, watching TV/videos	2.38	1.27	2.62	1.47	0.24
Listening to music	2.08	1.06	1.92	1.20	-0.16
Checking and updating your email/SNSs	1.81	0.98	1.42	1.21	-0.39
Reading news/blogs	2.65	0.8	2.15	1.22	-0.50
Total	**2.10**	**1.04**	**2.10**	**1.24**	**0.00**

Responses were on a 5-point scale: 0=Never to 4=Very Often. Please note that scores were reverse coded for the analysis; therefore responses were coded: 4=Never; 3=Rarely; 2=Sometimes; 1=Often; 0=Very Often.
* Change in mean from T1 (first semester) to T2 (spring semester).

Table A-5 provides an overview of non-OLC participants level of distraction at T1 and T2 (M=1.88, SD=1.00, Cronbach's α=.675 and M=2.04, SD=1.19, Cronbach's α=.723)

[25] *Distraction* responses were reverse coded to align with the interpretation of scales for the other digital literacies.
[26] Cronbach's alpha (α) measures the degree of covariance amongst a set of indicators while penalizing the index for variance of individual items that is unrelated to that covariance (Cortina, 1993). The use of Cronbach's alpha in this research should be interpreted as informative of the level of covariance observed, not as a critical test of reliability.

respectively. Non-OLC participants' level of distraction increased 0.16 points from T1 to T2, indicating that they were more distracted during their spring semester at OU.

Table A- 5. Distraction -- Non-OLC Participants

Distraction	First Semester		Spring Semester		Change *
	M	SD	M	SD	
Cronbach's Alpha	**α=.675**		**α=.723**		
Laying in bed, on the couch	1.78	0.95	1.91	1.09	0.13
Playing games, watching TV/videos	2.17	1.06	2.30	1.33	0.13
Eating/drinking	1.93	1.00	1.91	1.06	-0.02
Listening to music	2.08	1.08	1.79	1.23	-0.29
Reading news/blogs	2.78	0.94	2.36	1.22	-0.42
Checking and updating your email/SNSs	1.99	0.97	1.52	1.17	-0.47
Total	**2.12**	**1.00**	**1.96**	**1.19**	**-0.16**

Responses were on a 5-point scale: 0=Never to 4=Very Often. Please note that scores were reverse coded for the analysis; therefore responses were coded: 4=Never; 3=Rarely; 2=Sometimes; 1=Often; 0=Very Often.
* Change in mean from T1 (first semester) to T2 (spring semester).

Overall, when comparing OLC participants to non-OLC participants, OLC participants were less distracted during the spring semester (*M*=2.10, *SD*=1.24), than non-OLC participants (*M*=1.96, *SD*=1.19). In addition, OLC participants did not show any change in frequency of distraction from T1 to T2, while non-OLC participants were more distracted with a 0.16 decrease from T1 to T2.

Focus

To analyze the extent that students were able to focus, they were asked during their first and spring semester at Ohio University, *How often did/do you actively do something to stay focused on specific tasks?* The variables of focus included: (1) use a dedicated tool for browsing; (2) close down distracting programs/applications; (3) turn phone on silent; (4) listen to music that helps you focus; (5) went to the library/quiet place; (6) had a glass of water, coffee, or wine; (7) took regular breaks- stand up and move around. Responses were coded on a 5-point Likert scale ranging from never to very often. The two tables below (A-6 and A-7) display the statistics for each group, OLC participants followed by non-OLC participants. For both OLC and non-OLC participants each of the ways students could focus increased from T1 to T2. For OLC participants the largest change occurred in students closing down distracting programs and applications (0.50 point increase), although students most often listened to music that helped them focus in spring semester (*M*=2.77, *SD*=1.34). The overall mean of all types of focus has increased 0.36 points from OLC participants' first semester to their spring semester (*M*=1.98, *SD*=1.28, Cronbach's α=.656 and *M*=2.34, *SD*=1.32, Cronbach's α=.694 respectively).

Table A- 6. Focus -- OLC Participants

Focus	First Semester		Spring Semester		Change *
	M	SD	M	SD	
Cronbach's Alpha	**α=.656**		**α=.694**		
Close down distracting programs/applications	2.04	1.15	2.54	1.14	0.50
Take regular breaks	2.19	1.27	2.62	1.20	0.43
Turn phone on silent	2.08	1.23	2.50	1.30	0.42
Listen to music that helps focus	2.35	1.44	2.77	1.34	0.42
Go to the library/quiet place	1.65	1.09	1.96	1.51	0.31
Drink glass of water/coffee/wine	2.08	1.29	2.35	1.23	0.27
Use a dedicated tool for browsing	1.46	1.42	1.65	1.47	0.19
Total	**1.98**	**1.28**	**2.34**	**1.32**	**0.36**

Responses were on a 5-point scale: 0=Never; 1=Once or Twice; 2=Occasionally; 3=Often; 4=Very Often.
* Change in mean from T1 (first semester) to T2 (spring semester).

For non-OLC participants the largest change occurred in students using a dedicated tool for browsing (0.35 point increase), although students most often went to the library or a quiet place that helped them focus in spring semester (*M*=2.57, *SD*=1.14). The overall mean of all types of focus has increased 0.13 points from non-OLC participants' first semester to their spring semester (*M*=2.23, *SD*=1.16, Cronbach's α=.640 and *M*=2.36, *SD*=1.21, Cronbach's α=.686 respectively).

Table A- 7. Focus -- Non-OLC Participants

Focus	First Semester		Spring Semester		Change *
	M	SD	M	SD	
Cronbach's Alpha	**α=.640**		**α=.686**		
Use a dedicated tool for browsing	1.44	1.17	1.79	1.32	0.35
Close down distracting programs/applications	2.24	0.98	2.41	1.10	0.17
Go to the library/quiet place	2.45	1.21	2.57	1.14	0.12
Drink glass of water/coffee/wine	2.42	1.23	2.51	1.23	0.09
Take regular breaks	2.32	0.99	2.40	1.08	0.08
Turn phone on silent	2.25	1.25	2.33	1.32	0.08
Listen to music that helps focus	2.48	1.23	2.49	1.23	0.01
Total	**2.23**	**1.16**	**2.36**	**1.21**	**0.13**

Responses were on a 5-point scale: 0=Never; 1=Once or Twice; 2=Occasionally; 3=Often; 4=Very Often.
* Change in mean from T1 (first semester) to T2 (spring semester).

Overall, when comparing OLC and non-OLC participants, both groups had fairly even mean scores during spring semester (*M*=2.34, *SD*=1.32, Cronbach's α=.694 and *M*=2.36,

SD=1.21, Cronbach's α=.686, respectively). However, OLC participants had a greater rate of change from T1 to T2 at .36 points compared to non-OLC participants at .13 point increase.

Section 2: Critical Consumption of Information

Online Research

To analyze the extent that students researched information online during their first and spring semester at Ohio University, students were asked, *When you research(ed) information online, how often did/do you…?* Types of research included: (1) verify information through multiple sources; (2) look to online communities/social systems; (3) search with the word scam, false, etc.; and (4) formulate new search results based on previous searches. Responses were coded on a 5-point Likert scale ranging from never to very often. For both OLC and non-OLC participants, students' responses increased from first semester to spring semester. For OLC participants, students most frequently formulated new search results based on previous searches in their first and spring semester (*M*=1.81, *SD*=1.23, and *M*=2.46, *SD*=1.18 respectively), with a 0.65 point increase. Overall, there was a 0.52 point increase in OLC participants' ability to research information online from their first semester to their spring semester (*M*=1.42, *SD*=1.24, Cronbach's α=.846 and *M*=1.94, *SD*=1.35, Cronbach's α=.858 respectively). Table A-8 and A-9 display the breakout of online research for OLC and non-OLC participants.

Table A- 8. Online Research -- OLC Participants

Online Research	**First Semester**		**Spring Semester**		**Change ***
	M	**SD**	**M**	**SD**	
Cronbach's Alpha	**α=.846**		**α=.858**		
Formulate new search results based on previous searches	1.81	1.23	2.46	1.18	0.65
Search with the word scam/false, etc.	0.96	1.31	1.54	1.45	0.58
Verify information through multiple sources	1.73	1.12	2.23	1.28	0.50
Look to online communities/social systems	1.19	1.30	1.54	1.48	0.35
Total	**1.42**	**1.24**	**1.94**	**1.35**	**0.52**

Responses were on a 5-point scale: 0=Never; 1=Once or Twice; 2=Occasionally; 3=Often; 4=Very Often.
* Change in mean from T1 (first semester) to T2 (spring semester).

For non-OLC participants, students most often verified the information through multiple sources their first and spring semester (*M*=2.06, *SD*=1.07 and *M*=2.29, *SD*=1.15), with an increase of 0.23 points. Overall, there was a 0.19 point increase in non-OLC participants' ability to research information online from their first semester to their spring semester (*M*=1.49, *SD*=1.11, Cronbach's α=.633 and *M*=1.68, *SD*=1.22, Cronbach's α=.757 respectively).

Table A- 9. Online Research -- Non-OLC Participants

Online Research	First Semester		Spring Semester		Change *
	M	SD	M	SD	
Cronbach's Alpha	**α=.633**		**α=.757**		
Search with the word scam/false, etc.	0.75	1.04	1.02	1.25	0.27
Verify information through multiple sources	2.06	1.07	2.29	1.15	0.23
Formulate new search results based on previous searches	1.97	1.17	2.18	1.28	0.21
Look to online communities/social systems	1.16	1.17	1.23	1.20	0.07
Total	**1.49**	**1.11**	**1.68**	**1.22**	**0.19**

Responses were on a 5-point scale: 0=Never; 1=Once or Twice; 2=Occasionally; 3=Often; 4=Very Often.
* Change in mean from T1 (first semester) to T2 (spring semester).

When comparing OLC and non-OLC participants' ability to research information online, non-OLC less thoroughly research information found online. Non-OLC participants' ability to research information online is nearly 0.30 points lower than OLC participants during the spring semester at OU. In addition, OLC participants had a larger change from first to spring semester with a 0.52 point increase, while non-OLC participants only had a 0.19 point increase.

Information Evaluation

To determine how students' perceived their ability to evaluate information they found online during their first and spring semester at Ohio University, students were asked, *When you read a news story online, how often did/do you evaluate the following information?* The categories of evaluation of information included: (1) source you first view it (social media, blogs, etc.); (2) author (reliable; contact information available); (3) site (sponsored by a respectable organization; updated often); (4) motivation/interest of the person who posted the story; and (5) references list or bibliography. Responses were coded on a 5-point Likert scale ranging from never to all of the time. In both OLC and non-OLC participants the largest change was in the evaluation of the author (0.58 and 0.22 point increase, respectively). Also, in spring semester, both OLC and non-OLC participants' most frequently evaluated the site (M=2.65, SD=1.33 and M=2.49, SD=1.17), followed by the source they first viewed it (M=2.50, SD=1.33 and M=2.46, SD=1.09), respectively. Overall, there was a 0.32 point increase in OLC participants' evaluation of information from their first semester to their spring semester (M=1.86, SD=1.14, Cronbach's α=.808 and M=2.18, SD=1.33, Cronbach's α=.935 respectively), indicating OLC participants *sometimes* evaluated the information they found online. Table A-8 and A-9 display the breakout of online research for OLC and non-OLC participants.

Table A- 10. Evaluation of Information -- OLC Participants

Evaluation of Information	First Semester		Spring Semester		Change *
	M	SD	M	SD	
Cronbach's Alpha	**α=.808**		**α=.935**		
Author	1.50	1.11	2.08	1.32	0.58
Source you first view it	2.08	1.26	2.50	1.33	0.42
Site	2.38	1.10	2.65	1.33	0.27
Motivation/Interest	1.62	1.10	1.88	1.21	0.26
Reference List/bibliography	1.73	1.12	1.77	1.42	0.04
Total	**1.86**	**1.14**	**2.18**	**1.33**	**0.32**

Responses were on a 5-point scale: 0=Never; 1=Rarely; 2=Sometimes; 3=Often; 4=All of the Time.
* Change in mean from T1 (first semester) to T2 (spring semester).

For non-OLC participants, there was a 0.17 point increase in evaluation of information from their first semester to their spring semester (*M*=2.00, *SD*=1.15, Cronbach's α=.873 and *M*=2.17, *SD*=1.20, Cronbach's α=.893 respectively), indicating non-OLC participants *sometimes* evaluated the information they found online.

Table A- 11. Evaluation of Information -- Non-OLC Participants

Evaluation of Information	First Semester		Spring Semester		Change *
	M	SD	M	SD	
Cronbach's Alpha	**α=.873**		**α=.893**		
Author	1.84	1.17	2.06	1.20	0.22
Source you first view it	2.25	1.13	2.46	1.09	0.21
Reference List/bibliography	1.57	1.12	1.76	1.26	0.19
Motivation/Interest	1.94	1.17	2.06	1.25	0.12
Site	2.39	1.13	2.49	1.17	0.10
Total	**2.00**	**1.15**	**2.17**	**1.20**	**0.17**

Responses were on a 5-point scale: 0=Never; 1=Rarely; 2=Sometimes; 3=Often; 4=All of the Time.
* Change in mean from T1 (first semester) to T2 (spring semester).

As with previous comparisons between OLC and non-OLC participants, non-participants have a much lower increase of skills at 0.17 points, as OLC participants had a 0.32 point increase. The overall mean for spring semester evaluation of information is fairly even between OLC and non-OLC participants (*M*=2.18, *SD*=1.33 and *M*=2.17, *SD*=1.20 respectively).

Section 3: Participation

Online Participation

The types of social media that OLC and non-OLC participants participated in their first and spring semester at Ohio University are displayed in Table A-12 and Table A-13 below. Students were asked, *How often did/do you read or participate in these?* There were ten types of social media including (1) news aggregator (Google News, etc.); (2) traditional news sites (CNN, NBC, etc.); (3) Twitter; (4) Facebook; (5) LinkedIn; (6) Reddit/online forums/blogs; (7) Wikipedia; (8) YouTube; (9) gaming sites; and (10) Pinterest or Vine. Responses were coded on a 5-point Likert scale ranging from never to very often. For OLC participants, the largest change from first to spring semester was in Traditional news sites (0.88 point increase) followed by news aggregator sites (0.84 point increase). In the spring semester, students most often participated in Facebook (*M*=3.35, *SD*=0.98), followed by Twitter (*M*=3.08, *SD*=1.41), indicating that a majority of students *often* to *very often* participated on Facebook and Twitter their spring semester at OU. Overall, there was a 0.54 point increase in OLC participants' participation in social media sites from their first semester to their spring semester (*M*=1.58, *SD*=1.19, Cronbach's α=.664 and *M*=2.12, *SD*=1.34, Cronbach's α=.743 respectively).

Table A- 12. Online Participation -- OLC Participants

Online Participation	**First Semester**		**Spring Semester**		**Change ***
	M	**SD**	**M**	**SD**	
Cronbach's Alpha	**α=.664**		**α=.743**		
Traditional news site	1.35	0.89	2.23	1.21	0.88
News aggregator	1.31	1.32	2.15	1.35	0.84
Pinterest or Vine	1.46	1.24	2.15	1.38	0.69
Twitter	2.46	1.66	3.08	1.41	0.62
LinkedIn	0.65	1.02	1.27	1.69	0.62
Facebook	2.77	1.14	3.35	0.98	0.58
Reddit/Online forums/Blogs	0.85	1.26	1.42	1.50	0.57
YouTube	2.19	0.94	2.54	0.99	0.35
Wikipedia	2.00	1.17	2.31	1.29	0.31
Gaming Sites	0.77	1.14	0.73	1.40	-0.04
Total	**1.58**	**1.19**	**2.12**	**1.34**	**0.54**

Responses were on a 5-point scale: 0=Never; 1=Once or Twice; 2=Sometimes; 3=Often; 4=Very Often.
* Change in mean from T1 (first semester) to T2 (spring semester).

For non-OLC participants, the largest change from first to spring semester was in LinkedIn (0.26 point increase), followed by Twitter (0.24 point increase). In the spring semester, non-OLC participants most frequently participated in Facebook (*M*=2.83, *SD*=1.17), followed by Twitter (*M*=2.50, *SD*=1.54), indicating that a majority of students *often* participated on Facebook and Twitter their spring semester at OU. Overall, there was a 0.10 point increase in participation in social media sites from non-OLC participants' first semester to their spring semester (*M*=1.59, *SD*=1.23, Cronbach's α=.583 and *M*=1.69, *SD*=1.25, Cronbach's α=.629 respectively).

Table A- 13. Online Participation -- Non-OLC Participants

Online Participation	First Semester		Spring Semester		Change *
	M	SD	M	SD	
Cronbach's Alpha	**α=.583**		**α=.629**		
LinkedIn	0.50	0.97	0.76	1.18	0.26
Twitter	2.26	1.64	2.50	1.54	0.24
Pinterest or Vine	1.49	1.46	1.69	1.45	0.20
Traditional news site	1.77	1.20	1.94	1.22	0.17
Reddit/Online forums/Blogs	0.79	1.28	0.93	1.34	0.14
News aggregator	1.49	1.35	1.61	1.39	0.12
YouTube	2.30	0.95	2.32	1.09	0.02
Wikipedia	1.89	1.16	1.90	1.19	0.01
Gaming Sites	0.49	0.94	0.46	0.85	-0.03
Facebook	2.90	1.16	2.83	1.17	-0.07
Total	**1.59**	**1.23**	**1.69**	**1.25**	**0.10**

Responses were on a 5-point scale: 0=Never; 1=Once or Twice; 2=Sometimes; 3=Often; 4=Very Often.
* Change in mean from T1 (first semester) to T2 (spring semester).

Comparing OLC and non-OLC participants, non-OLC participants had much less change in statistical means from first semester to spring semester at OU, with 0.10 point increase for non-OLC participants and 0.54 point increase for OLC participants.

Active Participation

To fully grasp the extent that students participated in the sites previously described in their first and spring semester at Ohio University, students were asked, *How often did/do you actively participate online using those types of social media?* Types of active participation included: (1) like or tagged something; (2) made a new post; (3) comment; and (4) sent personal/private messages. Responses were coded on a 5-point Likert scale ranging from never to very often. For OLC participants, in both first and spring semester, students most frequently liked or tagged something (M=2.73, SD=1.31 and M=3.08, SD=1.02), with an increase of 0.35 points. The largest increase was through personal/private messages sent, which increased 0.50 points. OLC participants' active participation increased 0.38 points from their first semester to the spring semester (M=2.48, SD=1.16, Cronbach's α=.890 and M=2.86, SD=1.06, Cronbach's α=.824 respectively). Table A-14 and A-15 display the breakout of active participation for OLC and non-OLC participants.

Table A- 14. Active Participation -- OLC Participants

Active Participation	First Semester		Spring Semester		Change *
	M	SD	M	SD	
Cronbach's Alpha	**α=.890**		**α=.824**		
Send personal/private messages	2.12	0.99	2.62	1.13	0.50
Like or tag something	2.73	1.31	3.08	1.02	0.35
Make a new post	2.62	1.17	2.96	1.04	0.34
Comment	2.46	1.14	2.77	1.03	0.31
Total	**2.48**	**1.16**	**2.86**	**1.06**	**0.38**

Responses were on a 5-point scale: 0=Never; 1=Once or Twice; 2=Sometimes; 3=Often; 4=Very Often.
* Change in mean from T1 (first semester) to T2 (spring semester).

For non-OLC participants, in both the first and spring semester, students most often liked or tagged something (*M*=2.71, *SD*=1.13 to *M*=2.61, *SD*=1.15), with a *decrease* of 0.10 points. Non-OLC participants had *no* increases in active participation from first to spring semester. Overall, non-OLC participants' active participation *decreased* 0.15 points from their first semester to the spring semester (*M*=2.45, *SD*=1.11, Cronbach's α=.844 and *M*=2.30, *SD*=1.14, Cronbach's α=837 respectively).

Table A- 15. Active Participation -- Non-OLC Participants

Active Participation	First Semester		Spring Semester		Change *
	M	SD	M	SD	
Cronbach's Alpha	**α=.844**		**α=.837**		
Like or tag something	2.71	1.13	2.61	1.15	-0.10
Send personal/private messages	2.14	1.15	1.99	1.21	-0.15
Comment	2.47	1.07	2.31	1.06	-0.16
Make a new post	2.49	1.10	2.30	1.13	-0.19
Total	**2.45**	**1.11**	**2.30**	**1.14**	**-0.15**

Responses were on a 5-point scale: 0=Never; 1=Once or Twice; 2=Sometimes; 3=Often; 4=Very Often.
* Change in mean from T1 (first semester) to T2 (spring semester).

Comparing OLC and non-OLC participants, there were significant differences between the two groups of students. For OLC participants, students had significant *increases* in all types of active participation, while non-OLC participants had significant *decreases* in all types of active participation. In previous comparisons between OLC and non-OLC participants in different domains of digital literacy, OLC participants had more significant increases in change over time in comparison to non-OLC participants. Although for active participation, the results indicated very significant differences between the overall changes between the two groups of students. OLC and non-OLC participants had similar first semester scores of active participation (*M*=2.48, *SD*=1.16 and *M*=2.45, *SD*=1.11), respectively. Yet, during spring semester, there was over a 0.50 point difference in mean scores between OLC and non-OLC participants (*M*=2.86, *SD*=1.06 and *M*=2.30, *SD*=1.14).

Section 4: Collaboration

Frequency of Collaboration

Collaboration with others online is a large aspect to students' ability to increase their overall digital skills. To assess students' perception of their frequency and comfort of collaboration during first and spring semester at Ohio University, students were asked, *When you had/have to work on something with other people, how often did/do you use the following collaborative tools?*, and *How comfortable/familiar did/do you feel using these tools?* Types of collaborative tools that students were asked about included: (1) compose/use email lists (groups of people); (2) digital calendar or doodle scheduler; (3) Google Drive (docs, spreadsheets, etc.); (4) video call via Skype/Google Hangout, etc.; (5) create groups on SNSs; (6) give advice or help online; and (7) organize a group or mission (video games, etc). For frequency of use, responses were coded on a 4-point Likert scale ranging from never to often, while comfort of use was coded on a 3-point Likert scale ranging from not at all comfortable to very comfortable. For both OLC and non-OLC participants, from their first to spring semester, students' frequency of collaboration on Google Drive increased the most, with an increase of 0.81 and 0.41 points, respectively. For OLC participants, the most frequent collaborative tools included Google Drive (*M*=2.04, *SD*=1.04), followed by email lists (*M*=2.00, *SD*=0.94); during the spring semester, OLC participants used Google Drives and email lists *occasionally*. Overall OLC participants' frequency of collaborative tools increased 0.46 points from their first semester to the spring semester (*M*=1.11, *SD*=1.05, Cronbach's α=.789 and *M*=1.57, *SD*=1.15, Cronbach's α=.853 respectively). Table A-16 and A-17 display the breakout of frequency of collaboration for OLC and non-OLC participants.

Table A- 16. Frequency of Collaborative Tools -- OLC Participants

Frequency of Collaborative Tools	**First Semester**		**First Semester**		**Change ***
	M	**SD**	**M**	**SD**	
Cronbach's Alpha	**α=.789**		**α=.853**		
Google Drive	1.23	1.14	2.04	1.04	0.81
Organize a group or mission	0.38	0.70	0.96	1.22	0.58
Create groups on SNS	0.81	0.94	1.35	1.29	0.54
Give advice or help online	1.04	0.82	1.54	1.14	0.50
Digital calendar or doodle scheduler	1.12	1.24	1.62	1.20	0.50
Video call via Skype/Google Hangout, etc.	1.27	1.19	1.50	1.18	0.23
Compose/use email lists	1.92	1.20	2.00	0.94	0.08
Total	**1.11**	**1.05**	**1.57**	**1.15**	**0.46**

Responses were on a 4-point scale: 0=Never; 1=Once or Twice; 2=Sometimes; 3=Often.
* Change in mean from T1 (first semester) to T2 (spring semester).

In the spring semester, for non-OLC participants, students' most frequently used email lists (*M*=2.01, *SD*=1.00), followed by Google Drive (*M*=1.64, *SD*=1.13), indicating that non-OLC participants used email lists and Google Drive *occasionally*. Overall, non-OLC participants' use

of collaborative tools increased 0.19 points from their first semester to the spring semester (*M*=0.99, *SD*=1.06, Cronbach's α=.717 and *M*=1.18, *SD*=1.08, Cronbach's α=.737 respectively).

Table A- 17. Frequency of Collaborative Tools -- Non-OLC Participants

Frequency of Collaborative Tools	First Semester		First Semester		Change *
	M	SD	M	SD	
Cronbach's Alpha	**α=.717**		**α=.737**		
Google Drive	1.23	1.09	1.64	1.13	0.41
Digital calendar or doodle scheduler	0.78	1.04	1.10	1.14	0.32
Compose/use email lists	1.71	1.03	2.01	1.00	0.30
Create groups on SNS	0.83	1.10	1.08	1.19	0.25
Video call via Skype/Google Hangout, etc.	0.91	1.14	0.95	1.14	0.04
Give advice or help online	0.97	1.06	0.97	1.06	0.00
Organize a group or mission	0.52	0.91	0.49	0.89	-0.03
Total	**0.99**	**1.06**	**1.18**	**1.08**	**0.19**

Responses were on a 4-point scale: 0=Never; 1=Once or Twice; 2=Sometimes; 3=Often.

* Change in mean from T1 (first semester) to T2 (spring semester).

The difference between change in OLC and non-OLC participants' frequency of collaborative tools was over 0.25 point difference (0.46 and 0.19 point increase, respectively), indicating that OLC participants had a much greater increase in frequency of use with collaborative tools than non-OLC participants.

Comfort of Collaboration

In addition to frequency, comfort and familiarity of collaborative use was also asked, as discussed above. For both OLC and non-OLC participants, the largest change from first semester to spring semester occurred in Google Drive, with a 0.65 and 0.25 point increase, respectively. For OLC participants' comfort of collaborative tools from their first and spring semester increased 0.33 points (*M*=1.04, *SD*=0.77, Cronbach's α=.765 and *M*=1.37, *SD*=0.74, Cronbach's α=.807 respectively). Table A-18 and A-19 display the breakout of comfort of collaboration for OLC and non-OLC participants.

Table A- 18. Comfort of Collaborative Tools -- OLC Participants

Comfort of Collaborative Tools	First Semester		First Semester		Change *
	M	SD	M	SD	
Cronbach's Alpha	**α=.765**		**α=.807**		
Google Drive	1.04	0.77	1.69	0.55	0.65
Digital calendar or doodle scheduler	0.92	0.85	1.35	0.80	0.43
Organize a group or mission	0.58	0.81	0.88	0.91	0.30
Give advice or help online	1.08	0.80	1.35	0.69	0.27
Compose/use email lists	1.54	0.58	1.77	0.43	0.23
Video call via Skype/Google Hangout, etc.	1.27	0.79	1.50	0.71	0.23
Create groups on SNS	0.88	0.77	1.08	0.94	0.20
Total	**1.04**	**0.77**	**1.37**	**0.74**	**0.33**

Responses were on a 3-point scale: 0=Not at all comfortable; 1=Somewhat comfortable; 2=Very comfortable.
* Change in mean from T1 (first semester) to T2 (spring semester).

For non-OLC participants' comfort of collaborative tools from their first and spring semester increased 0.13 points (*M*=1.03, *SD*=0.74, Cronbach's α=.783 and *M*=1.16, *SD*=0.74, Cronbach's α=.807 respectively). Non-OLC participants had a much lower increase in comfort of collaborative tools than that of OLC participants, by 0.20 points.

Table A- 19. Comfort of Collaborative Tools -- Non-OLC Participants

Comfort of Collaborative Tools	First Semester		First Semester		Change *
	M	SD	M	SD	
Cronbach's Alpha	**α=.783**		**α=.791**		
Google Drive	1.20	0.75	1.45	0.73	0.25
Create groups on SNS	0.87	0.80	1.08	0.82	0.21
Compose/use email lists	1.51	0.63	1.67	0.55	0.16
Digital calendar or doodle scheduler	0.90	0.74	1.05	0.76	0.15
Give advice or help online	1.02	0.73	1.06	0.74	0.04
Organize a group or mission	0.60	0.78	0.63	0.78	0.03
Video call via Skype/Google Hangout, etc.	1.15	0.73	1.16	0.77	0.01
Total	**1.03**	**0.74**	**1.16**	**0.74**	**0.13**

Responses were on a 3-point scale: 0=Not at all comfortable; 1=Somewhat comfortable; 2=Very comfortable.
* Change in mean from T1 (first semester) to T2 (spring semester).

Section 5: Network Smarts

Connections

An essential aspect of digital literacy advancement is students' ability to be 'network smart,' meaning they are aware of their connections and the potentials of expanding their networks to assist them now and in the future. Students were asked of their perception during their first and spring semester at Ohio University, *How did/do you connect with most of your friends and establish social connections?* Types of connections included: (1) classes or school; (2) going out (socializing); (3) where you live (dorms, housing); (4) sports, clubs, organizations; (5) Facebook or other online groups; and (6) LinkedIn or professional networks. Responses were coded on a 3-point Likert scale ranging from none to most connections. During the first semester, for both OLC and non-OLC participants, students made most of their connections through housing (*M*=1.50, *SD*=0.65 and *M*=1.44, *SD*=0.71, respectively). Although for both OLC and non-OLC participants, students clearly had the largest increase in connections through LinkedIn or other professional networks with a 0.35 and 0.17 point increase, respectively. For OLC participants' connection from first to spring semester, there was only a .05 point increase (*M*=1.09, *SD*=0.66, Cronbach's α=.502 and *M*=1.14, *SD*=0.69, Cronbach's α=.321). Table A-20 and A-21 display the breakout of connections for OLC and non-OLC participants.

Table A- 20. Connections -- OLC Participants

Connections	First Semester		Spring Semester		Change *
	M	SD	M	SD	
Cronbach's Alpha	**α=.502**		**α=.321**		
LinkedIn or professional networks	0.19	0.49	0.54	0.71	0.35
Sports/clubs/organizations	1.12	0.86	1.23	0.77	0.11
Facebook or other online groups	0.85	0.73	0.96	0.72	0.11
Classes or school	1.46	0.51	1.42	0.58	-0.04
Going out (socializing)	1.42	0.64	1.31	0.68	-0.11
Where you live (dorms, housing)	1.50	0.65	1.35	0.69	-0.15
Total	**1.09**	**0.66**	**1.14**	**0.69**	**0.05**

Responses were on a 3-point scale: 0=None; 1=A few connections; 2=Most connections.

* Change in mean from T1 (first semester) to T2 (spring semester).

For non-OLC participants' connection from first to spring semester, there was only a .06 point increase (*M=1.02*, *SD*=0.64, Cronbach's α=.435 and *M*=1.08, *SD*=0.66, Cronbach's α=.461). Non-OLC participants had a greater increase from first to spring semester; however OLC participants' indicated more connections during both their first and spring semester in comparison.

Table A- 21. Connections -- Non-OLC Participants

Connections	First Semester		Spring Semester		Change *
	M	SD	M	SD	
Cronbach's Alpha	**α=.435**		**α=.461**		
LinkedIn or professional networks	0.12	0.36	0.29	0.58	0.17
Going out (socializing)	1.41	0.65	1.55	0.61	0.14
Classes or school	1.40	0.52	1.51	0.54	0.11
Sports/clubs/organizations	0.98	0.78	1.07	0.78	0.09
Facebook or other online groups	0.75	0.71	0.77	0.71	0.02
Where you live (dorms, housing)	1.44	0.71	1.27	0.74	-0.17
Total	**1.02**	**0.64**	**1.08**	**0.66**	**0.06**

Responses were on a 3-point scale: 0=None; 1=A few connections; 2=Most connections.

* Change in mean from T1 (first semester) to T2 (spring semester).

Cultivation of Networks

Students were also asked about their perceived cultivation of networks during their first and spring semester at Ohio University, *In what ways have you tried to cultivate you network for your future career?* The types of cultivation included: (1) create/update resume or CV; (2) use LinkedIn to find, connect, and build relationships with people in your field; (3) endorse someone or ask for references on LinkedIn; and (4) join industry-related groups and read news in your field. Responses were coded on a 5-point Likert scale ranging from never to very often. For OLC participants, the largest increase from first to spring semester occurred as students joined industry-related groups (0.65 points), followed by endorsing someone or asking for references on LinkedIn (0.50 points). In both first and spring semester students most frequently updated their resume/CV, OLC participants (M=1.88, SD=1.24, and M=2.15, SD=1.46) and non-OLC participants (M=1.71, SD=1.25, and M=1.94, SD=1.37), respectively. Overall OLC participants' cultivation of networks increased 0.45 points from their first semester to the spring semester (M=1.18, SD=1.18, Cronbach's α=.856 and M=1.63, SD=1.62, Cronbach's α=.915 respectively). Table A-22 and A-23 display the breakout of cultivation of networks for OLC and non-OLC participants.

Table A- 22. Cultivation of Networks -- OLC Participants

Cultivation of Networks	First Semester		Spring Semester		Change *
	M	SD	M	SD	
Cronbach's Alpha	**α=.856**		**α=.915**		
Join industry-related groups and read news in your field	1.23	1.21	1.88	1.73	0.65
Endorse someone or ask for references on LinkedIn	0.65	1.06	1.15	1.62	0.50
Use LinkedIn to find, connect, and build relationships with people in your field	0.96	1.22	1.31	1.64	0.35
Create/update resume/CV	1.88	1.24	2.15	1.46	0.27
Total	**1.18**	**1.18**	**1.63**	**1.62**	**0.45**

Responses were on a 5-point scale: 0=Never; 1=Once or Twice; 2=Occasionally; 3=Often; 4=Very Often.
* Change in mean from T1 (first semester) to T2 (spring semester).

For non-OLC participants, the largest increase from first to spring semester occurred as creating or updating students' resume/CV (0.23 points), followed by endorsing someone or asking for references on LinkedIn (0.18 points). Overall non-OLC participants' cultivation of networks increased 0.13 points from their first semester to the spring semester (*M*=1.02, *SD*=1.19, Cronbach's α=.819 and *M*=1.15, *SD*=128, Cronbach's α=.851 respectively), indicating that students cultivated their networks *once or twice.*

Table A- 23. Cultivation of Networks -- Non-OLC Participants

Cultivation of Networks	First Semester		Spring Semester		Change *
	M	SD	M	SD	
Cronbach's Alpha	**α=.819**		**α=.851**		
Create/update resume/CV	1.71	1.25	1.94	1.37	0.23
Endorse someone or ask for references on LinkedIn	0.52	1.02	0.70	1.19	0.18
Use LinkedIn to find, connect, and build relationships with people in your field	0.72	1.19	0.84	1.26	0.12
Join industry-related groups and read news in your field	1.11	1.28	1.11	1.30	0.00
Total	**1.02**	**1.19**	**1.15**	**1.28**	**0.13**

Responses were on a 5-point scale: 0=Never; 1=Once or Twice; 2=Occasionally; 3=Often; 4=Very Often.
* Change in mean from T1 (first semester) to T2 (spring semester).

When comparing OLC and non-OLC participants, those who participated in the OLC had a larger overall increase in cultivation of their networks. OLC participants had a 0.45 point increase in comparison to the 0.13 point increase for non-OLC participants from first to spring semester.

Section 6: Ohio University/Institutional Know-How

The last form of digital literacy that students were surveyed on was institutional know-how, specifically Ohio University. Students were asked during their first and spring semester at Ohio University, *How would you rate your confidence in effectively locating and navigating OU's webpages and resources?* Types of resources included: (1) navigate Blackboard or other online system; (2) use My OHIO student portal, DARS, registrar, and bills; (3) navigate webpage for your major or college; (4) find library or scholarly resources online; and (5) use Google to find things I need at OU. Responses were coded on a 4-point Likert scale ranging from very uncomfortable to very comfortable. The largest increase from first to spring semester occurred for both OLC and non-OLC participants' comfort in finding library or scholarly resources online (0.92 and 0.54 point increase, respectively). For OLC participants, in both their first and spring semester, they felt most comfortable navigating Blackboard or other online learning system and using Google to find things needed at OU (T1: *M*=2.27, *SD*=1.00 and *M*=2.27, *SD*=0.96; and T2: *M*=2.73, *SD*=0.72 and *M*=2.73, *SD*=0.67 respectively). Overall, OLC participants' Ohio University know-how increase 0.63 points from their first to spring semester (*M*=1.99, *SD*=0.94, Cronbach's α=.855 and *M*=2.62, *SD*=0.77, Cronbach's α=.921), indicating students' perceived comfort in OU know-how increased from *somewhat comfortable* to *very comfortable.* Table A-24 and A-25 display the breakout of institutional know-how for OLC and non-OLC participants.

Table A- 24. Ohio University Know-How -- OLC Participants

OU/Institutional Know-How	First Semester		Spring Semester		Change *
	M	SD	M	SD	
Cronbach's Alpha	**α=.855**		**α=.921**		
Find library or scholarly resources online	1.46	1.03	2.38	0.90	0.92
Navigate webpage for your major or college	1.92	0.74	2.58	0.81	0.66
Use MyOHIO Student Portal, DARS, Registrar, and Bills	2.00	0.94	2.65	0.75	0.65
Navigate Blackboard or other online learning system	2.27	1.00	2.73	0.72	0.46
Use Google to find things I need at OU	2.27	0.96	2.73	0.67	0.46
Total	**1.99**	**0.94**	**2.62**	**0.77**	**0.63**

Responses were on a 4-point scale: 0=Very Uncomfortable; 1=Somewhat Uncomfortable; 2=Somewhat Comfortable; 3=Very Comfortable.

* Change in mean from T1 (first semester) to T2 (spring semester).

For non-OLC participants, in their first semester, they felt most comfortable using Google to find things they needed at OU (*M*=2.44, *SD*=0.74). In the spring semester, students felt most comfortable navigating Blackboard or other online learning system (*M*=2.79, *SD*=0.50). Overall, non-OLC participants' Ohio University know-how increased 0.42 points from their first to spring semester (*M*=2.14, *SD*=0.81, Cronbach's α=.822 and *M*=2.56, *SD*=0.65, Cronbach's α=.747), indicating students' perceived comfort in OU know-how increased from *somewhat comfortable* to closer to *very comfortable.* The difference between change in OLC and non-OLC participants' OU know-how was over 0.20 point difference (0.63 and 0.42 point increase,

respectively), indicating that OLC participants had a much greater increase in institutional know-how than non-OLC participants.

Table A- 25. Ohio University Know-How -- Non-OLC Participants

OU/Institutional Know-How	First Semester		Spring Semester		Change *
	M	SD	M	SD	
Cronbach's Alpha	**α=.822**		**α=.747**		
Find library or scholarly resources online	1.78	0.93	2.32	0.81	0.54
Use MyOHIO Student Portal, DARS, Registrar, and Bills	2.09	0.84	2.59	0.64	0.50
Navigate webpage for your major or college	1.99	0.82	2.44	0.65	0.45
Navigate Blackboard or other online learning system	2.39	0.72	2.79	0.50	0.40
Use Google to find things I need at OU	2.44	0.74	2.64	0.62	0.20
Total	**2.14**	**0.81**	**2.56**	**0.65**	**0.42**

Responses were on a 4-point scale: 0=Very Uncomfortable; 1=Somewhat Uncomfortable; 2=Somewhat Comfortable; 3=Very Comfortable.
* Change in mean from T1 (first semester) to T2 (spring semester).

Overall, OLC participants had greater improvements from first semester to spring semester digital literacies. A majority of OLC participants' T1 skills were lower than non-OLC participants; however, OLC participants' T2 skills were greater in all digital literacies except one (focus) compared to non-OLC participants. A breakout of each subdomain of digital literacy is displayed below for OLC and non-OLC participants' during T1 and T2.

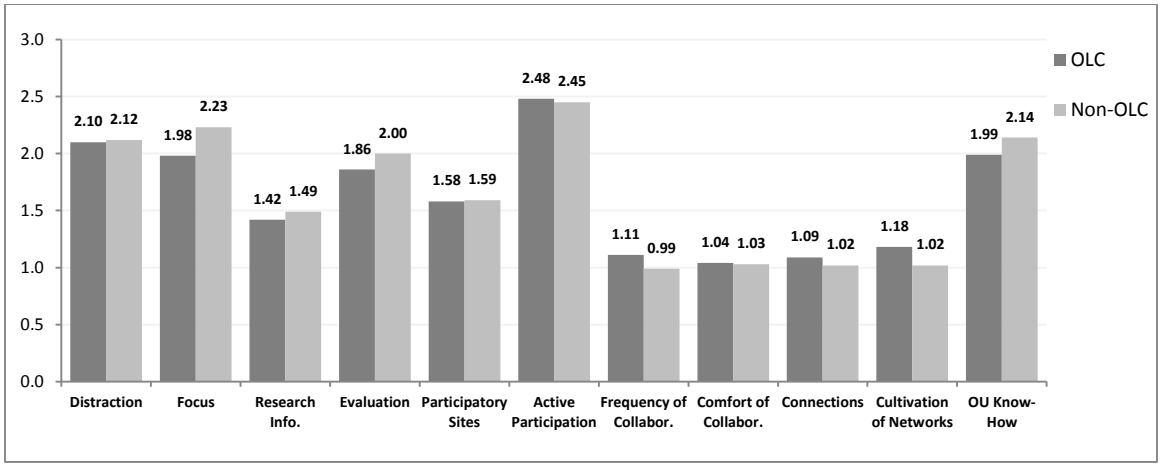

Figure A- 1. Domains of Digital Literacy at T1, by OLC

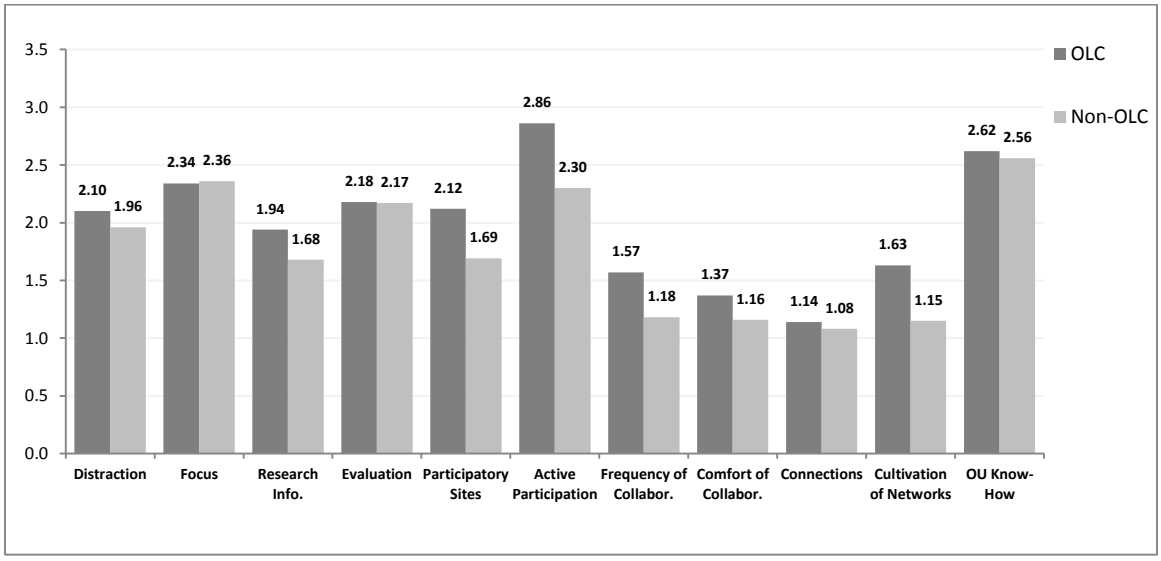

Figure A- 2. Domains of Digital Literacy at T2, by OLC

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