ABSTRACT

Title of Dissertation: THE QUEST FOR I-LITERACY: IDENTIFYING AND ADDRESSING GAPS IN INFORMATION LITERACY EDUCATION IN INFORMATION SCIENCE UNDERGRADUATE PROGRAMS

Courtney L. Douglass, Doctor of

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Information scholars, educators and librarians have grappled with defining the concept of information literacy for decades – at least as far back as the 1970's – with the most prominent common thread being as a set of skills. In pedagogy and practice, what higher education currently calls information literacy is delivered more akin to research skills or the ability to effectively conduct and share research in its myriad forms. It is problematic that for so long the emphasis on research and academic skills has wholly devalued those sources deemed non-traditional by academic measures, including popular sources, pop-culture entertainment, and the power of observation. Ironically this emphasis on academic research skills diminishes the extreme societal

impact non-traditional sources and stories have had throughout the information age in which we currently find ourselves. In this dissertation, I provide a curriculum map for the required courses in five Undergraduate Information Science Programs, with the dual purpose of aligning instruction practices and gaps with the aforementioned impacts as they determine what information literacy should mean, and encouraging iSchools to adopt and promote a socially constructed model of information literacy, which I am terming i-Literacy. This study demonstrates how iSchool undergraduate programs emphasize understanding that different information mediums are required based on audience, user needs, and the information problem, but may not highlight social and civic responsibility with information use and sharing. The map also shows a strong alignment between the seemingly antiquated 'Bibliographic Instruction' practices from the 1980's and 90's, and the current pedagogy based on the ACRL Framework.

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LITERACY EDUCATION IN INFORMATION SCIENCE UNDERGRADUATE PROGRAMS

by

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Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, College Park, in partial fulfillment
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Advisory Committee

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Dedication

I didn't know how lost I was until I found myself at the iSchool. Of course, I didn't find me alone because I didn't know I was looking. I was 33, already had a Master's Degree, lots of confidence (academically), and a solidly liberal world view. I struggled to earn my education, but I didn't subscribe to the "well I did it, so can they" mentality. I thought my own struggles gave me perspective, and allowed me to more easily connect with others. In my first semester as an MLIS student, I recognized my privilege. This was not an awesome discovery, but by the end of that first year, I learned to accept it, and to harness it. I learned to listen to conversations I once thought I should or could contribute to. I learned to seek out voices I didn't know I needed to hear. I learned to ally. i-Literacy and this dissertation is born of that discovery. My classmate, Shaina Destine showed me I could do better; Dr. Renee Hill gave a keynote speech at the first professional conference I attended that year that helped me start to understand what 'better' might look like. To them, and to every strong, Black woman who feels unseen, unheard, or unsung; I see you, I appreciate you, you inspire me, and I hope i-Literacy challenges scores of learners to engage in intersectional relationships with information that exacts real change in this world.

Acknowledgements

The iSchool at the University of Maryland has been a home for me since 2015,

and since 2018 I've had the honor to be part of the doctoral student body. I've

had wonderful opportunities to improve as a teacher, and hopefully as a scholar.

But I've also faced unforeseen obstacles. In August, 2019, I was diagnosed with

multiple brain aneurysms during a follow-up scan I was meant to have more than

a year prior. The scan became urgent early in my pregnancy. Just before the start

of the Fall semester, I miscarried, and had to bear the weight of loss, and the

fear for my own health and future. With support from my husband, Kevin, my

advisor, Paul Jaeger, and my colleagues, Ursula Gorham, and Kate Izsak, I

survived the loss, the semester, and the brain surgery, and overcame crippling

depression. Through a viable pregnancy, sleepless nights with a newborn, a

pandemic, sleepless nights with a toddler, a complicated Integrative Paper and

Dissertation Proposal, a minor harassment issue, and all the ups and downs life

and family bring, I've relied on the grace and guidance from my committee: Dr.

Ursula Gorham is ever-level and encouraging, and quite good at helping me

connect the dots more clearly. Dr. Beth St. Jean has eagle-eyes, and an attention

for detail that will forever evade my ADHD brain. But she is also the kindest

person you could ever have tearing your paper up. Dr. Renee Hill reminds me

that I am worth more than I accept, and to not accept less than I am worth. Dr.

Ira Chinoy was a late addition to this committee, but I knew from the first Zoom

meeting that he would be the perfect Dean's Representative. His insight, and

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Chapter 1: Beyond the Ordinary – A Call To New Adventure

What is a quest?

In the simplest terms, a quest is a journey. It is a manner of seeking; in fact, a now obsolete definition is that of a person who makes inquiry (Merriam Webster, 1961); folklore and popular literature add elements of difficulty to 'quest', demonstrating the need to overcome obstacles to achieve or acquire something invaluable, and how that journey inspires change. While a quest can certainly be for self-gain, some of the most well-known quests reinforce community, and even sacrifice for the betterment of society. Frodo Baggins abandons his carefree life to save Middle Earth; Aeneas sails into the unknown to find a homeland for his brethren; Hermione Granger erases her own existence to find the Horcruxes that meant the end of Lord Voldemort. What better metaphor, then to apply to a field of study built on how and why people and groups seek out information, and to emphasize that the learning and the value is in that search as much as it is in the result. Especially when for too long, public and higher education systems have emphasized results as measures of success over learning from processes, and sometimes from mistakes.

These systems do not prepare individuals to engage with and participate in their societies for society's sake; they teach them to meet a goal, or reproduce a product with limited opportunity for discovery and growth. This dissertation aims to demonstrate that information literacy instruction in particular has the potential to resolve that discrepancy, but it is limited by both time and scope, it

is pedagogically inconsistent despite the creation, advocacy, and implementation of extensive standards and frameworks, and it is wholly ineffective as merely a sidebar subject in public and higher education. Accepting that information literacy is another social construct, and that it should be designed and taught as such simply extends the idea that all learning and literacy are both social and political behaviors – that our social and political interactions and conceptions heavily shape what and how we learn, and that pedagogy driven by societal needs is more effective.

In this first chapter, I present my research goals and contributions to the field of information science and literacy. I will then offer a brief outline for the remaining chapters, and then provide the background and context for this work including a review highlighting the social and political climate currently plaguing the United States with emphasis on how educational systems are not only failing to rectify the problem, but in many ways, contribute to a climate that breeds misinformation and illiterate behaviors; additional background on literacy and literacy standards as they have evolved over time including a look at pedagogy and epistemology and competing definitions of literacy; and an historic examination of multiple models, frameworks, standards, definitions, and practices for teaching information literacy.

This background will demonstrate connections among the models that reveal a gross lack of emphasis on how information literacy skills are needed to navigate society. These gaps lead to the need for a more constructivist and socially

relevant model that should be used to help guide curriculum and educational standards.

Goals and Contributions

Active citizenship and civic participation are ancient, democratic ideals, which have been relayed for millennia, since Aristotle first outlined the path for a fruitful Athenian Democracy. His call, nested in logic, was born of Plato's "gadfly" in Socrates – the philosopher whose dialogue permeates academic inquiry and – arguably – lay the earliest foundations for information literacy. While Socrates doesn't go so far as to offer a framework, he encourages his students to challenge ideas and challenge authority rather than accept claims as true simply because they come from men in power.

Indeed, in Book 7, Chapter 14 of *The Politics*, Aristotle encourages the lawmaker to design education that embodies the true nature of man's soul – his willingness to fight for justice but longing for peace; his ability to work hard while also enjoying leisure; his awareness of that which holds "moral worth" as distinct from that which is "merely necessary and useful," and warns of the fall that comes when rulers limit the education of the ruled to no more than what best serves the interest of the ruler as "laughable … [and] with no one to stop him from using those laws, [he has] lost the good life," (Aristotle, trans. 1962, 434). Here, Aristotle identifies the tyrant who comes to power either through force or manipulation and whose power is difficult to check, but, like in the city-state of Sparta, does not stand for the good of the polis, only his own gain. To avoid such

a fall, Aristotle, thousands of years ago, encouraged fair education practices for all citizens. Ironically, the manipulation of which he warns is commonly practiced by politicians in America's great democracy, and with access to seemingly unlimited information items, United States citizens who are not literate in the ways and means of information are most susceptible to such tyrants.

Alongside higher education institutions, information institutions will need to supplement information literacy instruction by teaching citizens how to check facts, and the importance of civic engagement. Where once the Internet was presumed to reinforce the value of democracy (Granick, 2015), it has instead become a safe haven for hate-speech, and detrimental ideologies, creating a demand for critical thinking that current information literacy models don't quite meet. As such, educators and education institutions must act to rebrand literacy education for a populace that has yet to effectively manage information overload, or navigate through myriad mis/ disinformation to find the credible information that can promote greater unity, empathy, and success for both self and society. What is missing from the extensive list of information literacy standards, models, frames, skills and concepts, is a foundation upon which all students can scaffold not only academic, but job, social, and civic skills and responsibilities; one that is spearheaded by an iSchool or consortium of iSchools.

Luckily, one such consortia exists in the iSchools Organization, which has evolved from three partner schools in 1988, to more than 100 schools in 2022. Where once an iSchool offered coursework and degrees for Librarians, they now

offer undergraduate and graduate degrees in all areas of information studies including analytics, human-computer interactions, information management, and community planning. The iSchools Organization hosts an annual, internationally intended conference where members can share research, and exchange ideas including those around information literacy and pedagogy in higher education.

My goals, through this dissertation are to demonstrate a social need for education reform; reveal the value in ontologies and pedagogy that pull from multiple disciplines; and construct a curriculum map between undergraduate information science programs and existing information literacy models that helps answer the questions: ***What role do iSchools play in teaching information literacy to their own students and their universities at large?*** And ***Which models, frames, or outcomes are most represented in undergraduate core course outcomes/ objectives?***

After coding and analyzing data from 32 core syllabi across five undergraduate information science programs for connections to four conceptualizations of information literacy, I will consider themes, as well as gaps, and from them propose an information literacy framework that iSchools can adopt and promote within their programs and outcomes, and throughout their universities.

Additionally, in my own research, I have not come across a study that draws connections between iSchool undergraduate program requirements or course work, or any form of mapping study for information literacy that was not

centered on the ACRL Framework. This dissertation provides a look at curriculums that should be at least somewhat loosely aligned in their mission and outcomes for students. Additionally, it offers a new perspective for information literacy and its role in Information Science programs, and provides measurable outcomes that can be used for course design and instruction.

As far as foundational or core studies go, Information Science is the 21st century answer to true liberal arts education. As information science has its own ontology already, positioning information literacy studies as a separate ontology poses challenges as it's not necessarily separate from information science, but a laterally connected subject that should be taught by and through iSchools. Information science has a strong focus on people, in fact other fields, including nursing and other health-related fields, have already embraced understanding information behaviors and needs to better serve their patients. Ultimately, I will use the data I collect to show the extreme value of undergraduate programs in Information Science, as well as to advocate its higher positionality in the core curriculum standards for higher education.

And finally, I will demonstrate how and why iSchools should adopt a metadisciplinary, constructivist approach to teaching information literacy that promotes higher civic engagement with a strong understanding of and focus on equity and social justice.

Socio-civic background

Individuals and groups learn from and within their social environments, and those social environments are influenced by systemic and political factors. Jaeger and Burnett present the theory of information worlds (2010), wherein they make the case for information sharing, transmitting, and understanding in these same contexts. It stands to reason that each information world can have some influence on other information worlds even if they do not seem directly connected. In the same sense, different and seemingly separate cultures will influence each other even if they do not clearly intersect or overlap. With that in mind, we should consider that effective and true information literacy must include appropriate parameters for encouraging the critical thinking that helps individuals draw connections between and among myriad social and political information worlds.

Necessarily, all citizens within a democracy have the right, and should feel confident to participate in shaping and operating the society in which they live; moreover, those who have a foundation in literacy that includes cultural competence, and equity and social justice are more poised to affect, inspire and make *positive* change that benefits the society as a whole. Ironically, Americans have responded to the Internet's platform that allows for selective interaction, by demonstrating decreased interest in civic participation (Small, 2009, p. 10). In fact, Balog and Sibers (2014) study revealed that even law students had limited interest in e-government activities and would rather use the internet for entertainment or socialization, (Martzoukou & Abdi, 2017, p. 647). Unfortunately, O'Hara, Walter

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and Christopher (2009) also suggest that political information generally holds bias which limits good decision-making; moreover, the arduous process of researching candidates' positions and backgrounds, and fact-checking transcripts, is a daunting task that voters who lack cognition or drive will most likely not undertake. Even when folks in this group may want to participate, they are easily overwhelmed by the amount of mis/disinformation available (O'Hara, Walter & Christopher, 2009) and they are therefore more likely to ascribe to a paradigm of simplicity in their information behaviors. Indeed, Lyons (2016) asserts that information literacy coupled with diverse viewpoints and "steeped in civic intent," is foundational to the success of democracy, as it not only allows for easier identification of bias, it also helps folks more easily identify and understand "critical social" problems and how best to resolve them equitably, (Lyons, 2016, p. 256).

In an attempt to highlight such disparity, Dutch scholars Schouten et al., (2017) present a model for understanding the societal participation of Dutch citizens with low-literacy. They immediately acknowledge that low-literates have minimal participation in socio-civic matters (Schouten, Cremers, Groot, Hanekamp, Neerincx, & Paulissen, 2017). Moreover, these individuals have higher rates of unemployment, and without higher level social skills and processes they are more vulnerable to manipulation from news media, information available on the Internet, and people with power (Schouten et al., 2017, p.31). To avoid the stigma surrounding a low-literate status these individuals don't participate in

society, which can essentially lower their quality of life (Schouten et al., 2017, Figure. 5).

Unfortunately, those who lack the foundational literacy to navigate the civic landscape not only fail to participate in a meaningful way, they are at the mercy of those who are either more literate or more powerful. These negative social transactions often have the greatest impact on the individual freedoms of impressionable, marginalized individuals who rely heavily on social acceptance (Small, 2009, p.18). In fact, the last decade's resurgence of populism in the United States and European elections brought forth divisive rhetoric that positioned any opponents as enemies of national ideals, effectively reducing recent ballots to a "binary choice between good and evil," where those who support any candidate or idea contrary to the 'in-group' risk being ostracized by their community (Ross, 2016, p. 371).

One would hope that education, professional success and experience equate to nobler, wiser intentions, but the current political landscape in the United States demonstrates otherwise. O'Hara et al.'s (2009) study examines the cognitive needs of voters, finding that some are "high in need of cognition", and fit the profile of the "well-informed voter" called for by class democratic theory. These individuals enjoy collecting and discussing information, they are more likely to invest time seeking information, and that the information they identify is most likely of a higher quality. Further, civic engagement is often low among communities of color that don't feel represented, or worse, feel threatened by

governing bodies and systems. A Pew Research study reveals that Black and Hispanic Americans were 26% and 21%, respectively, less likely to participate in the 2020 census because of the historic implications of voter suppression and redlining in urban communities, and the 2019 reality of immigrant children being separated from their parents and housed in cages (Connor, 2019). Through the mutual understanding and empathy that can be promoted by innovative literacy education, this type of socio-political dynamic could be repaired.

The "shared set of interactions" (Jaeger and Burnett, 2010, p. 92) that create communities are tantamount to each information world, and while it isn't necessary for outsiders to interact in the same way, literacy should be built upon understanding and respecting the norms in potentially tangential groups. Teaching information literacy through a socio-political lens can do much to reinforce the public sphere (p. 107) that Jaeger and Burnett warn has been dwindling at the hands of corporate monopolies control over news and information because it is the base upon which individuals begin to challenge their own – potentially limiting – ideals. Currently, there does not seem to be a widely implemented framework, policy, or practice of connecting equity and social justice with information literacy, nor does the current ACRL framework extend naturally beyond the academic library setting for which it was designed, thereby severely limiting information literacy education.

Definitions In-Flux

Even more problematic, though with only the best intentions, scholars across disciplines have aimed to define 'literacy' and qualify/quantify what it means to be literate, including the ability to read and write, or having achieved mastery of a skill, such as carpentry or computers, even when the skill does not require reading or writing. Without a clear consensus on 'literacy,' the concept of 'information literacy' remains equally vague.

Dictionary definitions of literacy have devolved from a focus on learning and culture in 1961 to reading and writing as the primary definition by 1987, (Gorman, 1998). Moore (1997) holds to the more traditional view of literacy, also linking it with speaking and listening, but Cassidy (1997) calls for clarification that it changes over time for individuals as their worlds become increasingly complex. Roser and Ortiz-Ospina (2018) reflect on literacy as a "very restricted technology closely associated with the exercise of power," and connect its spread to the need for economic growth that is only possible from a population with a distinct understanding of how things work, and the keen insight to make necessary improvements. King and Stahl (2012) liken literacy to a linguistic practice that allows communities to share communication and create learning opportunities (p. 245). Kapur (2019) identifies elements of "school literacy" such as 'manners and etiquette' and 'self-regulation' (p. 16) and elements of "emotional" literacy" such as "development of positive thinking" (p. 24).

Historically, teaching literacy to populations at large came about during the Protestant reformation, increased as civil societies increased in complexity,

and expanded more universally with the introduction of public schooling during the late 19th century, (Lockridge, 1979).

The Protestant Reformation in Europe created an opportunity to promote a more literate population, especially as a means of ideological control – in this case by the church, but in others by the state. Protestant priests were tasked with examining their parishioners each year, and public approval won out over public shame in inspiring Swedes learn to read during the mid-1700's (p.4). Literacy became an imperative of the church so as to detract people from Satan and sin, (p.5).

Eventually, a growing economy that included laws and contracts inspired artisans to literacy during the earliest parts of the 19th Century in Europe, though most did not directly profit from their literacy skills. Lockridge (1979) likens this literacy to survival, if not to simply exist in a regulated economy, (p.8). Unfortunately, the literacy they aspired to also did not help them navigate expanding commercialism, law and politics, or banking and finance as it expands to include various forms of credit – including interest. In fact, the primary measure of literacy in pre-industrialized England aligned with the ability to sign a marriage register, (West, 1978).

During the 1830's, literacy teachers focused on letter sounds and syllables, and correct and fluent pronunciation, while comprehension and inflection were not necessary, (Resnick and Resnick, 1977, p. 380). By the mid-late 19th century, educators advocate for reading instruction that includes oral

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recitation and inflection to help the reader understand more of the authors'

intent for the story, but this does not become common practice until after WWI,

and a study that showed a significant number of male Army recruits were

illiterate. These literacy tests also revealed a correlation between vocabulary and

literacy, but could not connect either to intelligence (Altus, 1950). In response,

literacy education standards were revised to include "the ability to answer

questions or follow directions," in response to a text, and to both attain and

apply information as a result (Resnick and Resnick, 1977, p. 382). Still, the aim in

most primary and secondary schools was to establish functional literacy (reading

basic, publicly available texts such as newspapers and instruction manuals), so

students would eventually be able to obtain employment, (p. 383).

Interestingly, the increase in public schooling from the late 19th into early

20th Centuries increases the literate population in the United States, but not as a

means to an economic end. Rather, Lockridge (1979) suggests, as a means to

promote better behavior and citizenship, which still suggests literacy as a

method of control.

More so than in previous decades, literacy is essential for inclusion in

society and to provide equity that bridges the digital divide. Increasingly more

since the turn of the 21st Century, people rely on coded language – deviations

from standard speaking and writing conventions – and visual cues to

communicate. The social media feed, Twitter, limits each post to 280 characters,

which has led users to get creative in the data they share, including emojis, gifs,

and extensive shorthand that maximizes the information one tweet conveys. The literacy concept I am going to propose does not necessarily support simplifying language, rather it provides the necessary tools to decode messages regardless of form or medium. These social media communication workarounds are proof positive that folks can and will find new ways to share information, and that they are as adaptable as they are creative. Ironically, even as 'lol' becomes accepted for 'laugh out loud', and 'ur' replaces 'you are' on social media and texting platforms, other long-held, and widely understood regional, social, or ethnic dialects that don't align with outdated notions of 'Standard Academic English' are still correlated with illiteracy.

With that, I contend that information literacy is already a social construct; its instruction models are antiquated; and that it should be an independent academic subject spearheaded and taught primarily through information sciences/ studies programs. Throughout this dissertation I will highlight the limitations of current information literacy instruction, which is primarily delivered in 'one-shot' sessions where an academic librarian reviews databases, search and retrieval, and/ or understanding credibility. This often aligns with a research/ writing assignment where students have a defined objective, and have possibly already formulated a position for their argument. These sessions do not promote understanding information needs or behaviors, help students understand the need for diverse perspectives among their sources, or encourage

the types of intersectional discussions or research that highlights social or community needs over personal objectives.

Lockridge ultimately contends that literacy should encourage participation in society and foster judgment to reject rumors in favor of credible sources covering myriad world and social views, and calls for 'solidarity of literacy' by defining literacy as the 'continuing struggle for human competence in which we all partake' and that allows us to navigate society and systems of oppression, (Lockridge, 1979 p. 17). Similarly, the Tehran Declaration called for educators to "produce a literacy which frees individuals from all, even stately bondages, (Lockridge, 1979, p. 13).

Gorman calls for a flourishing 21st century ideation of literacy that allows every member of a society to reach their fullest potential, and she calls this 'information literacy,' (Gorman, 1998, p. 38). She then highlights some of the myriad approaches to reading or looking carefully at a thing to understand meaning, including watching movies or television, looking at art, listening to music, and decoding smoke signals.

Additionally, Johnston, (2022), dismisses literacy as merely a tool for demonstrating a set of skills. Literacy should provide equity through an emphasis on four forms of meaning-making, including 'social' through what becomes normalized in our daily interactions; 'multimodal' for drawing connections between different presentations of information including gestures, sounds, and symbols or illustrations; 'affective' in how an experience influences emotions

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and thought processes; and 'critical' which encourages 'constructively questioning problematic [issues]… such as racism, systemic injustices, oppression…', (2022).

Much like Bingle and Gaskell's (1994) "Scientific Literacy for Decision Making and the Social Construction of Scientific Knowledge" advocates for science education that provides average folks the tools to make well-informed decisions about 'socio-scientific' issues while also considering context, allowing for a socially constructed information literacy eliminates the elitism that perpetuates library anxiety, and information overload. If the librarian is the only person in the room who understands the framework they're teaching, their teaching is going to be less effective, (Tice, 1994, p. 41).

Information literacy is perhaps the only course of study that truly has the potential to teach critical thinking as it considers not only the information life cycle, but (should) emphasizes understanding the human experience and relationships with information. By its own nature, effective critical thought requires practice; however, learners struggle with this practice while also having to master subject-specific content. Information literacy is not only an academic discipline; it is a way of lifelong learning, and of building connections within and across communities.

While the organizational definitions differ slightly, information literacy rests at learning's foundation. Today's students and tomorrow's citizens must have a working knowledge of how to find, manage and use information

correctly, ethically, intersectionally, and effectively to both succeed in academic and professional pursuits, and to adjust to changes in society and in information dissemination.

What do information literate persons look like, and how are they identified? What's more, how do they align with classic democracy? Firstly, they exhibit confidence in their choices and their work because both are grounded in the logical analysis and evaluation of available and sought information. The information literate individual does not accept the world at face value, rather they continually explore, and their ideas continually evolve.

The most recent (2016) annual Organisation for Economic Co-operation and Development (OECD) reports indicate a stagnation in critical thinking and literacy. The United States ranks between 16-19 out of 26 countries for mean literacy score based on occupation type, and of 10 'Sustainable Development Goals' (SDG) target benchmarks, the U.S. has only hit two – those relating to vocational skills and offering diverse and inclusive school environments, (pp. 45-47). The OECD defines literacy as "the ability to understand, evaluate, use and engage with written texts to participate in society, to achieve one's goals, and to develop one's knowledge and potential," (p. 38). Literacy and education are inextricably linked as effectively communicating, processing, applying and/ or creating information. This means that students and citizens are not passive listeners and note-takers, diligently preparing for the next test or essay; in fact, the student-teacher relationship is symbiotic and continual, or at least it should

be. When this doesn't happen, when young minds are not permitted to explore their worlds, to question pre-existing notions of reality, a gross disservice exists that perpetuates the total acceptance, stagnation and eventual deterioration of a prescribed social order.

Individual nations and worldwide organizations have sought to preserve and protect the very education that maintains democracy. After the atrocities of World War II, the United Nations (1948) set forth its Universal Declaration of Human Rights, one fifth of which directly or indirectly addresses information rights. While Article 19 offers clear context for the right to freely share information, subsequent Articles provide insight for how that information should be taught, gathered, used and protected. Article 23 addresses employment rights as nested in choice; however, without access to information and education, citizens are limited to low-paying jobs. Further, Article 25 provides a social justice framework to protect a decent standard of living even in the event of "unemployment, sickness, disability … or other lack of livelihood in circumstances beyond [their] control," and "motherhood and childhood are entitled to special care and assistance," (Article 25). These articles do not directly address information, access or literacy; however, most social service agencies have transferred information and services to websites that their users can neither access or navigate without assistance. This was not the case in 1948, but the interpretation of these articles must adapt with societal change. In fact, we must assume that they were meant to be adaptable upon their creation. We can,

in fact, see how certain interpretations have been adapted to modern

technologies if we examine Articles 26 and 27, which promote education,

intellectual freedom and copyright. Media outlets have changed dramatically

since 1948, and with each new medium, we have seen new laws protecting

ownership and expression of materials while the ability to access, understand

and effectively use this information is only loosely suggested by organizations

that already have a vested interest in the information in question. It is important

to have a basic understanding of current practices and acceptable use to fully

appreciate the broad spectrum of disciplines and ideologies that fall within

Information Literacy. From international to local, organizations tackle this idea of

information literacy and how best to teach it, but despite the noblest intentions,

it is, at best, only required as supplemental to other learning.

The International Federation of Library Associations and Institutions

counts itself as the "global voice of the… information profession," (Stasselová,

2011). It stands to reason that this organization would set and uphold global

standards that promote information literate citizens, and that national and local

organizations would seek adherence to such international and unifying

guidelines. As of 2011, IFLA has issued a set of recommendations for Media and

Information Literacy (MIL) but has yet to publish standards, or measurement

guidelines to assist policy makers in better understanding and implementing MIL

curriculum. Instead, IFLA encourages "research… so that experts, educators, and

practitioners are able to design effective initiatives;" moreover, the commission

acknowledges MIL as essential to general education, even emphasizing its

benefits for underserved groups, but only recommends embedding standards

throughout a curriculum (2011).

Fortunately, other international and national organizations have taken up

IFLA's call to arms with UNESCO declaring that a system to measure MIL "is a

must for any country that wishes to promote and develop the knowledge

societies of its citizens," in its own attempt to establish competency indicators

(Moeller, et al, 2010). The commission set a baseline for such indicators to

include: access, understanding and evaluation, and use, as MIL's units of

measure. Sturges and Gastinger also note the Scottish Information Literacy

Project identifying "information literacy as a civil right;" and identifies the Prague

Declaration of 2003, The United Nations Millennium Development Goals, The

World Summit on the Information Society's Declaration of Principles; and the

Alexandria Proclamation of 2005 as international initiatives acknowledging the

importance of information literacy. Of particular note, Article 100 of the

Norwegian Constitution requires "state authorities to create conditions that

facilitate open and enlightened public discourse," as a measure to promote a

more information literate society (Sturges & Gastinger, 2009, p.198; interpreting

Norwegian Constitution, 2005).

Background on Information Literacy Models and Frameworks

From Library Skills to … Library Skills: The evolution of "information literacy"

Prior to the 21st Century, the key term used for what is now called 'information literacy' was 'bibliographic instruction'. Bibliographic Instruction or BI, covered significantly more library-specific skills because effective use of information resources and sources required students to have similar knowledge to that of the library faculty and staff. Card catalogues and indexes were difficult to navigate unless the user had some concept of information organization. However, both BI and information literacy instruction were and are still delivered "without making clear their context," and real-world applications (Kobelski and Reichel, 1981, p. 73) because the primary focus for each revolves around research skills – often a specific research assignment that requires the student to acquire, assimilate, and consolidate information (Kobelski and Reichel, 1981, p. 73). Interestingly, Kobelski and Reichel presented seven conceptual frames for BI that can be likened to the six frames adopted in the Association for College and Research Libraries (ACRL, 2016) Framework for Information Literacy for Higher Education. Kobelski and Reichel identify: Type of Reference Tool; Systematic Literature Searching; Form of Publication; Primary/ Secondary Sources; Publication Sequence; Citation Patterns; and Index Structure.

'Type of Reference Tool' was a common instructional frame that examined the myriad sources available in a specific discipline, where and how to find them, and how to prioritize and/ or organize the information (Kobelski and Reichel, 1981,

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p. 74). Similarly, the ACRL frame 'Searching as Strategic Exploration' guides students to match their search needs to appropriate tools, and rationally approach and conceptualize how information is organized, and how best to retrieve it (ACRL, 2016, p. 22). 'Systemic Literature Searching,' was a commonly taught BI principle that helped learners take a step-by-step approach to their information search, often allowing them to differentiate between materials that answer basic, or background concepts from those that present more complex information, (p. 75). This shares similar goals to 'Research as Inquiry', the ACRL frame that encourages various search methods to answer increasingly complex or new questions that arise during the research process, (ACRL, 2016, p.18). Kobelski and Reichel's third frame, 'Form of Publication' emphasizes the idea that different types of information serve different purposes, and that they serve to solve problems logically (p. 75). Instruction around 'Form of Publication' also distinguishes between reference tools that are appropriate in different disciplines and tasks. While the connection is less strong, this BI frame shares some concepts with the ACRL's 'Authority is Constructed and Contextual,' that also considers publication medium and how well a source aligns with an information need, but the ACRL frame has a stronger focus on author's credibility and expertise, (ACRL, 2016, p. 12). When teaching 'Primary/ Secondary Sources' BI librarians presented the differences between those sources deemed original and those that explicate original work. Because they also highlight that these types of sources look different across disciplines, but ultimately serve to inspire ideas and promote

critical thinking, this frame aligns with 'Information has Value,' which emphasizes the multiple purposes information has, and the importance of crediting original ideas (ACRL, 2016, p. 16). According to the ACRL, 'Information has Value' is also meant to highlight the legal, ethical, and social implications around information, (p. 16). There is a clearer connection between the BI frame 'Publication Sequence' and the ACRL frame 'Information Creation as Process'. Both frames demonstrate the often deliberate processes surrounding information creation and dissemination.

The BI frame held a stronger focus on methodically studying publication structures (p. 76), where the ACRL frame considers user needs and perceptions around information delivery, (ACRL, 2016, p. 14). 'Citation Patterns,' (BI) and 'Scholarship as Conversation' (ACRL) also share more obvious connections in that they both share the goal of students gaining "insights into the nature of research," (p. 76) as it develops over time and is inspired by other scholars in the field. The final BI frame teaches 'Index Structure,' which may not seem connected to any of the ACRL frames; however, it shares similarities to at least three. This frame teaches the importance of understanding disciplinary standards (Authority), source purpose (Value), and tagging or keyword search (Strategic Exploration). These frameworks were published 30 years apart, and librarian led instruction has certainly changed in that time; however, many of the principles underlying bibliographic instruction have been adapted for information literacy instruction, and many faculty still simply refer to either as 'library skills'.

In fact, the concept of information literacy as a library subject – the library subject – that would eventually replace bibliographic instruction only drew the attention of the American Library Association (ALA) in the late 1980's. Before that, Paul Zurkowski used the term in 1974 to describe the roughly 6% of Americans he believed to be 'information literates,' or those individuals "trained in the application of information resources," usually related to their profession, and who have the particular skillset required to effectively use information related to their needs," (Zurkowski, 1974, p. 6). In a crude figure, Zurkowski indicates that information literates could only be found in medical, government, business, and science and technology professions because outside of academia and a handful of professions, most information was largely inaccessible to the general public. Libraries did not have online databases, and information banks were limited, and highly exclusive. Where the *New York Times* had a searchable information bank, it was not widely available, and like most other information banks at the time, it was somewhat cost-prohibitive, (p. 12). In fact, the cost of information is central to the dilemma Zurkowski illustrates: libraries and other public information centers cannot financially support the information marketplace, but private and industry information banks exclude the majority of the population from achieving information literacy. The solution he proposed involved creating a clearly defined line between industry and publicly subsidized information dissemination, and a clear framework that should include, at minimum, certain themes present in the

'Reading Service Environment' that could translate to a similar commission for the 'Information Service Environment' (ISE). They are:

1. Individual fulfillment, the advancement of knowledge and the discovering of truth, participation in decision making by all members of society, and achieving an adaptable and stable community depends on a system of freedom of expression.

2. Government should not perform services for citizens which citizens are capable of performing for themselves.

3. Government has a legitimate responsibility for assuring educational opportunities for all. (Zurkowski, 1974, p. 23).

Zurkowski called for a commission to establish a "national program to achieve universal information literacy by 1984," (p. 27); however, it wasn't until 1989 that any agency took up the challenge of establishing criteria for understanding and teaching information literacy.

While the ALA worked through commissions to establish best practices and outcomes for information literacy instruction, Eisenberg and Berkowitz were the first to present a working model in 'The Big 6 Information Skills' (1990). This model was designed for primary and secondary school students working through a research process since information literacy has often been presented concurrently with research writing. The Big 6 model identifies 'Task identification,' 'Information seeking strategies,' 'Location and Access,' 'Use of Information,' 'Synthesis,' and 'Evaluation' as the necessary skills for working with

information to produce research papers. Each skill has accompanying tasks that can, in theory, be used to measure or assess mastery.

By the end of the decade, the ALA finally put out its 'Standards and Competencies for Information Literacy in Higher Education', and they are as follows.

The information literate person:

1. Determines the nature and extent of the information need.

2. Accesses needed information effectively and efficiently

3. Evaluates information and sources critically and incorporates selected information into their knowledge base and value system.

4. Uses information effectively to accomplish a specific purpose.

5. Understands many of the economic, legal, and social issues surrounding the use of information, and accesses and/ or uses information ethically and legally. (ALA, 1999)

From there, the turn of the century saw organizations and independent scholars the world over developing their own iterations for defining and qualifying information literacy and library instruction. The following list identifies a selection of these iterations:

- American Association of School Libraries and the Association for Education Communications and Technology (1998);

- Bruce's 'Seven Faces of Information Literacy' (2003);

- Council of Australian and University Librarians, and the Australian and New Zealand Institute for Information Literacy (2004);

- Edwards and Lupton's 'Six Frames for Information Literacy Education,' (2006);

- Katz and Macklin's 'Information and Communication Technology Literacy' (2006);

- Society of College, National and University Libraries (SCONUL), Seven Pillars of Information Literacy (2011);

- Secker and Coonan's A New Curriculum for Information Literacy (ANCIL) (2011);

- Scotland's National Information Literacy Framework, (2013);

- Chartered Institute of Library and Information Professionals, (2018);

- Empire State Information Fluency Continuum, (2009, 2019); and its extension,

- Framework of Skills for Inquiry Learning (FOSIL), (2010);

Where I introduced the ACRL Frames in conjunction with Bibliographic Instruction concepts, the Framework was designed to be something entirely 'other' than traditional library skills. The Framework acknowledges the information lifecycle , and the need for variety in information sources and access through its frames 'Information Creation as Process,' and 'Information has Value,' however, these theoretical concepts often elude students if they are

even highlighted during the one-shot instruction sessions I mentioned earlier in this chapter. In Chapters 4 and 5 I present findings from studies on the ACRL Framework's efficacy and/ or lack thereof.

It is important to examine these different variations of information literacy that have been taught – as was bibliographic instruction - by school and academic librarians primarily, and primarily to assist students with research writing and academic projects.

It is equally important to note the common themes that intersect through each of the models, skill sets, and frames, and that they are clearly connected to information needs and behaviors, but they are all also limited by academics, and emphasize published sources that can be sought and retrieved. Much like their predecessor, Bibliographic Instruction, the models all include exploring search platforms and types of resources, finding information, evaluating and/ or analyzing information, applying or otherwise using information, and somehow presenting or sharing information. Some also address the importance of identifying information needs, and the importance of information laws, standards, and policies. Further, while some of the models stipulate a set of skills to achieve or measure information literacy, others focus more heavily on how, when and where to teach these skills, though it rarely occurs that a session or course explicitly addresses and emphasizes the importance of each, and/ or that information literacy is a package deal.

Much like the ACRL/ ALA models, the Big 6, CILIP, and SCONUL focus on skills and observable outcomes, but the audience varies. The Big 6 model was designed for K-12 education, and SCONUL represents the standards for universities in the United Kingdom and Ireland.

Still other models, like ANCIL, and Scotland's National Information Literacy Framework aim to promote curriculum for information literacy instruction that could either be taught explicitly as 'information studies' or implicitly and scaffolded throughout other courses. Of this type of design, the Empire State Information Fluency Continuum is in a bleak minority in that it promotes "Social and Civic Growth," and "Personal Growth and Agency" (New York City School Library System, 2019) among its four anchor standards. The other two, "Inquiry and Design Thinking," and "Multiple Literacies," align more with the research and cognition skills more often stressed with information literacy, though they also emphasize agency and identity (Stripling, 2020).

The continuum, developed by New York City School Library System offers only four information literacy standards, but in a 466-page document establishes anchors, grade by grade benchmarks, benchmark assignments, and benchmark assessments for students in grades K-12. The four standards referenced above are explicated as such:, "Using Inquiry to Build Understanding and Create New Knowledge'; understanding "Multiple Literacies"; "Pursuing Personal and Aesthetic Growth"; and "Demonstrating Social and Civic Responsibility"; and offer measurable outcome ideas for how, why, and when folks interact with

information, and go a step farther to challenge how they should. These standards interconnect to explicitly emphasize personal agency, self-reflection, and the various impacts information and information behaviors can have on people, relationships, and societies, (New York City Library System, 2019).

The American Library Association concepts defined college and university library instruction until they, in conjunction with the ACRL developed 'The Framework for Information Literacy in Higher Education' in 2016. That current framework has already been addressed as it relates to bibliographic instruction, but as the "ACRL is the source that the higher education community looks to for Standards, Guidelines, and Frameworks on academic libraries," (ALA, 2016), its frames, 'Authority is Constructed and Contextual,' 'Searching as Strategic Exploration,' 'Information has Value,' 'Information Creation as Process,' 'Research as Inquiry,' and 'Scholarship as Conversation,' now guide current library instruction at least throughout North American colleges and universities.

Indeed, despite its extensive reconceptualization of information literacy, the ACRL Framework is limited in scope and reach. It's full title, 'The ACRL Framework for Information Literacy for Higher Education,' clearly identifies its place in higher education, but literacy, especially information literacy, both precedes and extends beyond the academy. Despite extensive research and publications on the framework's efficacy, academic and teacher librarians seem to have limited consensus on the best applications for teaching.

In fact, in only 4 short years since its adoption, the Framework has

inspired myriad studies and amassed an obscene number of publications on its

behalf. A search of the Academic Search Ultimate Database on the EBSCO host

platform in late January 2021 returned 24,294 sources referencing the term

"information literacy" between 1974 and 2021. Using the ALA Standards and

Competencies and ACRL Framework for search terms and subject limiters, 2,100

of those sources were published between 1974 – 2000; 13,555 were published

between 2001-2015; and 8,639 from 2016 – 2021, indicating that more than 35%

of the literature on information literacy was published in the four-year time span

since the ACRL launched its Framework (EBSCOHost Platform, 1/27/2021).

In 2020, Wengler and Wolff-Eisenberg published the first comprehensive

study focused exclusively on community college librarian sentiments and

implementation around the Framework finding, quite notably that 40% of

respondents had not read the extensive ACRL Framework document in its

entirety, and while most found value in each of the frames, they struggle with

implementation in a fashion that truly benefits the students, (Wengler & Wolff-

Eisenberg, 2020). With their study, Wengler and Wolff-Eisenberg acknowledge

that the more theoretical nature of the Framework is exclusionary and elitist to

underprivileged groups including a significant number of community college

students, and students at both two and four-year schools enrolled in remedial

courses. Battista et al. highlight not only the lack of social justice and civic

engagement emphasis within the Framework, but the deliberate exclusion of the

proposed frame "Information as a Human Right," (Battista et al., 2015, p. 114);

however, Foskey and Roper discovered that emphasis on "Authority is

Constructed and Contextual," can help academic librarians working with

underserved populations connect more easily with students (Foskey & Roper,

2020). Latham et al. conducted a more in depth survey of academic librarians

that identifies strong support for the idea behind the Framework, but concern

over its practical implementation especially when most librarian-led instruction

occurs as a 'one-shot' session in a full semester course, (Latham, Gross & Julien,

2019). Eva, Rocca, and MacKay found that more extensive information literacy

education – spread out across 4 graded sessions in a liberal arts, Freshman

Seminar course – proved effective in establishing stronger search mastery skills,

which appear in the Framework as 'Searching as Strategic Exploration,"

"Research as Inquiry," and "Scholarship as Conversation," and that the pairing

with liberal education is tantamount to learning information literacy, (Eva, Rocca

& MacKay, 2021). Further, Faix and Fyn examine each frame to identify strengths

and limitations in how they are taught, noting the exceptional conflict in how

students can interpret "Authority is Constructed and Contextual," in a post-truth

and post-fact climate (Faix & Fyn, 2020).

    While the abstract language in the ACRL Framework has certainly

provided instructor librarians with a more critical set of teaching tools, the

shortcomings and limitations around language, interpretation, and classroom

instruction time create barriers to achieving information literacy.

As foundational to education systems the world over, it is essential to re-evaluate literacy in such a way that it benefits both individuals and the collective population. As undergraduate programs in information science emerge throughout colleges and universities, they must establish relevance as a unique discipline not to be mistaken for computer science or information technology. They do so by considering 'people' – information users, and their various needs. Currently information literacy standards encourage meeting individual need, but iSchools have a great opportunity to demonstrate how and why information literacy must be taught as a social construct.

Dissertation Outline

Chapter 2 offers a focused literature review of teaching and learning research and examines myriad literacy models including but not limited to library science that support the need for a more constructivist information literacy design. This chapter looks at an ontology presented by philosopher, Sir Francis Bacon in the 17th Century; principles for literacy including literacy as a human right, and a community initiative from Special Educator Scholars; a framework for 'meaningful literacy' divined by psychologists; an 'equity literacy' framework for recognizing, responding to, and offering redress for inequities as outlined by an Education Scholar and think-tank founder; advocacy for counter-narratives in all

aspects of education; and a review of those determinants that limit or prevent people and populations from becoming information literate citizens.

In the third chapter, I include a description of the 'Bachelor of Science in Information Science' and its strong connections to both the hard and soft sciences, as well as the humanities. For context, I also provide an overview of higher education accreditation practices, and the policies that relate to information literacy, cultural competence, and informed citizenship before describing my study design, justification, methods, and data collection. This chapter also includes a basic code list, and examples and rationale for coded outcomes.

Chapter 4 details the study results with a primary focus on emergent themes, connections and commonalities. I examine each of the selected models separately both holistically and by institution; however, I also highlight the most prominently reflected and most notably absent concepts across the models and the institutions. In this chapter, I present themes, which also includes the concepts that are lacking.

Throughout this dissertation, I highlight myriad definitions, frameworks, models, and standards for information literacy, and in the penultimate chapter, I reinforce the existing gaps in information literacy's conceptualization and teaching, and how the models and frames highlighted in Chapter 2 inspire a new pedagogical framework of information literacy (or i-Literacy). I continue examining those philosophical and cultural implications that have guided earlier pedagogical practices around reading, writing and understanding to shape

something new that iSchools can embrace, and share with their respective institutions.

Finally, in Chapter 6 I stress the content and future work that will naturally evolve from this dissertation, and how it will re-shape information science education and programs with the reasonable expectation of positioning them as central to general education outcomes across higher education. In this final chapter, I will present plans to share i-Literacy with the iSchool Consortium, and advocate for its adoption by participating iSchools.

Chapter 2: Crossing the Threshold; A Literature Review

This literature review looks at the social and political factors that reinforce the need for information literacy instruction that is shaped by societal needs, as well as presents evidence from studies that deduce how and why populations interact with information, and how and why they may or may not engage in civic responsibilities. I build on the inconsistencies as well as evolving historical perspectives of literacy demonstrated in Chapter 1 to further reiterate that pedagogy should be equitable and consistent; it should also be malleable to reflect the needs of and promote just and civil societies.

Further, this literature review includes works supporting the value and fundamentally philosophical nature of teaching literacy and information, including the importance of understanding rhetoric/ discourse, and moral philosophy. Moreover, I review research from cultural studies to include critical theories that promote cultural competence, diversity and inclusion, and social justice. Ultimately, the literature review will make clear the connections between these fields, information science, and information literacy.

What did information literacy look like prior to the 21st Century?

The concept of 'literacy' derives from the Latin, *litera* – letters or characters that represent sound when spoken. Information professionals understand that data or characters create information when appropriately arranged, suggesting that 'literacy' – understanding characters (or data) – depends heavily on one's ability to find, retrieve, analyze, evaluate, create, and

disseminate information. During the 21st Century, library and information scholars have dubbed the combined aforementioned abilities as 'information literacy,' a concept that has not had the reach it should.

The ancient Greek alphabet was one of the earliest scripted alphabets, and serves as the progenitor to alphabets in the Western world (Diringer and Olson, 2020). Assigning unique characters to phonetic sounds that pair with other unique characters to represent spoken word allowed priests and royalty to record events and ideas, and ultimately became a way for information to reach wider audiences. Prior to this, civilizations kept records and shared information on building, farming, hunting and law, and they did so without *litera*. Intricate drawings, murals, and hieroglyphs offer a rich and insightful record of human civilization; likewise, the tradition of storytelling for teaching and morality is well-documented, demonstrating the power of information to transcend its modes of delivery.

Even after alphabets and the printing press, the concept of literacy has changed based on cultural needs. Ntiri (2009) identifies the ability to read, write, and speak Latin as a mark of literacy in medieval England, and most Europeans in the 21st Century are at least bi-lingual. While standards often fluctuate to meet societal needs, they are often weak – including identifying the literate as one who can read and write their name; follow basic instructions; or who can read and write simple statements about daily life (UNESCO, 2008, p.18). However, at the very least, any definition of literacy should include more complexity of thought

and critical reasoning (Bernardo, 2000, p. 457) from myriad data and information sources. However, Bernardo only identifies text-based or other printed language, making his idea equally exclusionary, insufficient, and stagnant.

International Literacy Association President, Diane Barone, recognizes literacy is essentially being redefined daily, and that a fixed definition of literacy can't really exist, (Barone, 2015, p. 7); however, I contend that it needs redefining as cultural, technological, and communication mediums evolve, and it becomes increasingly important to consider people and social groups as information. Intersectionality conceptualizes overlapping identities to better understand the dynamic between power and oppression (Áleman, 2017), so positioning information literacy as an intersectional construct calls for innovative epistemologies that require focusing on developing a better understanding of how and why communities outside of our own share information.

Connecting 'information literacy' to an Interdisciplinary set of Ontologies
Sir Francis Bacon's Divisions of Knowledge

In conjunction with the basic measures common to information literacy standards, the six theories and frameworks referenced in this section provide the ontology and epistemology for i-Literacy.

During the height of Greek antiquity, and again during the European Enlightenment, philosophers from Aristotle to Sartre reinforced the need to think critically, question the status quo, and explore the human condition. With an aim to "establish progressive stages of certainty," (86) Francis Bacon (1662)

expounded philosophies that lead to, but ultimately transcend 21st Century conceptualizations of literacy.

Knowledge exists, as does the information that creates it. When illiterate humans distort information to create "idolatrous representations," (p. 411) of knowledge (or fake news), where "what a man had rather were true, he more readily believes," attaining a socially-centered information literacy becomes increasingly more challenging (Bacon, Book I. 49). Instead, Bacon encourages having "divisions of knowledge … understood and used in such a way that they mark and distinguish, rather than cut and separate knowledge… to avoid breaking continuity among," communities (Bacon, 1662, p. 580). Likely, Bacon is referencing academic disciplines, but this idea also connects well to differentiation of learning styles and needs. Meeting those needs translates to 'experiential literata' or "ascending through a series of increasingly more focused accounts of reality," through research and investigation, (Giglioni, 2013, p. 417). Ultimately, achieving information literacy nested in social needs allows "our knowledge to be translated into real action," (p. 409).

Buckland might connect this ideology to his 'Information-as-Thing' theory where information does not always equate to knowledge, and it is not always tangible, retrievable or transferable, (Buckland, 1991). In fact, the intangible is equally important to the socially constructed concept of information literacy. Bacon (1638) speaks of imagination, but not in the sense that we generally understand, which is made-up/distortions of reality, or fiction. Rather,

imagination is the origin of human thought – the initial perception or inclination that allows one to make sense of new information. It is reason and investigation that work with imagination to create the perpetual motion of our revised information literacy, which allows us to grasp "the larger structures of meaning that constitute… human understanding of the world," leading to continued inquiry and further empirical investigation. Therefore, imagination is the natural human reaction to information, which triggers inquiry, allowing "knowledge [to grow] and thrive through questions," (422) which ultimately lead to new experimental strategies and patterns of knowledge, (Bacon, OFB XI, 160).

In the fifth book in "Of the Dignity and Advancement of Learning," Bacon offers what

> "is arguably a centuries old precursor to information literacy standards and frameworks. He divides logic into "the arts of Discovering, of Judging, of Retaining, and of Transmitting," (Chapter 1, 59) which, he indicates in his *Great Instauration*, is part and parcel to a societies' learned success and ability to create a "better condition than that in which it now is," (66). Thus, it is not enough for the individual or small groups to be information literate. The society must set this literacy as its highest priority for its own success," (Douglass, 2017).

He expands on that taxonomy in books 6-10 in "Of the Dignity and Advancement of Learning." Under 'discovery' Bacon lists the subjects of art, and of arguments;

judging includes induction, and syllogism; retaining requires 'helps of memory' and 'memory itself'; and transmitting considers the 'organ of discourse,' the 'method of discourse,' and the 'illustration of discourse.'

Table 2.1 – Bacon's Epistemology from 'Of the Dignity and Advancement of Learning'

Discovery	Judging	Retaining	Transmitting
Art Arguments	Induction Syllogism	Helps of memory Memory itself	Organ of Discourse Method of Discourse Illustration of Discourse

Considerably more modern, Paolo Freire's (1971) work in Latin American communities in the 1970's reveals a similar dichotomy of fact and fiction where persons must "critically perceive limit-situations, and 'demythologize' reality," if they hope to transcend their dominated stations and "(re)humanize their experience," (Weninger, 2018, p. 86).

Keefe and Copeland's Principles

Keefe and Copeland (2011) propose a set of principles that any definition of literacy should consider: The first is a reminder that all people are capable of acquiring literacy, and the second that literacy is a human right fundamental to

the human experience. This echoes Articles from the United Nations Universal Declaration of Human Rights (1948), which identifies education as a right that also promotes tolerance (26.2) and creates a consciousness wherein the literate individual holds and allows others to hold and share unique opinions absent of persecution (19). Article nineteen's assertion that the right to information comes without 'interference' provides the foundation upon which information literacy must be championed.

Furthermore, Keefe and Copeland's (2011) third through fifth principles build on developing the human condition to connect literacy to community. It is not something that exists within a person independent of others. It is a social construct, and for literacy to have meaning, there must be communication, with the expectation that all individuals and groups can effectively and equitably interact; moreover, those experiences are the responsibility of all persons in a community in a such a way that creates comprehension in all the ways that folks communicate information (p. 97). Keefe and Copeland's five Principles are listed below:

1. All people are capable of acquiring literacy.

2. Literacy is a human right and is a fundamental part of the human experience.

3. Literacy is not a trait that resides solely in the individual person. It requires and creates connection (relationships) with others.

4. Literacy includes communication, contact, and the expectation that interaction is possible for all individuals; literacy has the potential to lead to empowerment.

5. Literacy is the collective responsibility of every individual in the community; that is, to develop meaning making with all human modes of communication to transmit and receive information. (Keefe and Copeland, 2011, p. 97)

These principles support all facets of society including the self, the communities we are party to, the economies we participate in, and our educational systems and structures; moreover, education should be relative to a society's needs, and so should its concept of literacy. In an information society marked by self-publishing mediums, instant access to news, and overwhelming, often unregulated commentary, literacy instruction must transcend the ability to read and write to include information, which at its most literal indicates the formation of the mind.

When members of society choose to continually learn, they expand opportunities for individuals and communities. Oral histories, cave drawings, hieroglyphs each suggest that education does not have to include literacy if reading and writing is not how learning takes place in a community or for an individual. Therefore, revising information literacy should promote embracing and fostering cultural differences in teaching and learning, and around information behaviors, poising it for inclusion in iSchool and general education curriculum.

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A key concern around defining literacy in education includes examining the needs, communication, and abilities of all students in a community. The complexity of public education in the United States places unfair constraints on those children the Department of Education considers 'High Need.' Labeling a child illiterate or determining that they do not meet the state requirements for 'readiness' sets entire communities up for failure, when, in reality literacy is "based on assumptions, ideological dispositions, and political influences," (Keefe & Copeland, 2011, p. 94). This reinforces literacy as a social construct, which can be manipulated as power dynamics shift. Understanding literacy as relative to individual advancement and social progress limits government leaders and officials from dictating what people should or can know to be considered literate. Instead, the literate person regularly seeks and/ or shares data and information to advance learning and social justice.

Deagle and D'Amico's 'Meaningful Literacy'

An excellent example of evolving through a socially constructed information literacy program is presented in Deagle and D'Amico's (2016) study that revolves around adult individuals with Down Syndrome and other developmental disabilities working toward what they call 'meaningful literacy'. Because neuro-diverse and otherly-abled learners experience overly-structured, segregated curriculum where their "choices are superficial at best," Deagle and D'Amico created a "socially inclusive literacy instruction group," (164), where

participants could establish autonomy, and connect with materials, subjects, and other people. A 2009 study by Morgan et al. demonstrates that individuals with Down Syndrome have the capacity for and often enjoy reading and discussing various texts; however, neurotypical-centered pedagogy typically excludes them from discussion, which discourages independent learning (167). To foster that independent learning, Deagle and D'Amico offer a series of sessions where participants engage in learning and sharing activities closely connected to Bacon's taxonomy. Over the course of 12 weeks, the six participants were encouraged to engage in the **art of discovery**, establish **judgement through syllogism**, demonstrate **retention and memory**, and **transmit ideas** using learned **methods of discourse.** Throughout the course, each student had read aloud and informal presentation opportunities on texts and topics they enjoy (169). Journaling assignments revealed a desire for independence and autonomy as they are often denied "opportunities to engage," (171) outside of their immediate circles, and/ or face dismissal that they are competent and capable. However, throughout the sessions, each participant led group discussions, delivered oral presentations, analyzed each other's work, and demonstrated self-reflection.

After coding participant journals, Deagle and D'Amico identified two core themes: independence (through autonomous action, autonomous choice, and/ or in connection with literacy); and perceived skillfulness and mastery, of which, both point to a deeper satisfaction with literacy instruction. Prior to the study, Deagle and D'Amico presumed to support a definition of 'meaningful literacy' related to

"non-survival based, personal reasons," (164); however, they ultimately conclude that 'meaningful literacy' applies to those activities "which allow… [a person] to use their own voice in a productive, non-judgmental way," (Deagle and D'Amico, 2016, p. 174).

Deagle and D'Amico's meaningful literacy contributes to a revised information literacy – a subject that is already nested in working with data to create or understand information that subsequently becomes or challenges knowledge. The participants in this study have unique needs, but they demonstrate the relationship between quality of life and participation and autonomy in their literacy instruction. Through this type of literacy, learners are recognized as individuals, and valued for their differences, allowing them to understand, and engage with others and their communities in a way that traditional literacies do not foster.

The reading and writing standards of 'literacy' are no longer viable since the methods by which humans read, write, and generally share and prepare information have changed irrevocably, promoting the need for what educators have deemed critical literacy with a pledge to "empower students to read both the word and the world in relation to power, identity, difference, and access to knowledge, skills, tools and resources," (Weninger, 2018, p. 85; Janks, 2013). Weninger (2018) and Ntiri (2009) each highlight Freire's (1970; 1973) contribution to literacy and pedagogy charging both educators and individuals to fight for and enact substantive change to literacy education that equalizes opportunity in

cultural and sociopolitical contexts where "learners could be taught to evaluate and critique their own sociocultural and political environments, [so] empowerment of the community would be more likely," (Ntiri, 2009, p. 99). Unfortunately, critical literacy education, which stems from Critical Race Theory (CRT) is challenged or banned in many predominantly white schools. In other words, politics in education blocks CRT and other teaching models that stress the value and necessity for equity and social justice, but only in predominantly white schools.

Fig 2. - Gorski's (2016) Equity Literacy Framework

- The ability to *recognize* even the subtlest forms of inequity, such as subtle ways in which students' home languages might be denigrated in a school environment.

- The ability to *respond* in the immediate term to inequity, such as by skillfully challenging colleagues or students who denigrate students' home languages;

- The ability to *redress* inequity in the long term, such as by effectively and equitably attending to deeper cultural dynamics of the institution that make people believe it is acceptable to denigrate students' home languages; and

- The ability to *sustain* equity efforts – even in the face of resistance.

Gorski's Equity Literacy Framework

Similarly, Gorski (2016) considers the need for education practice that extends ideas of cultural competence to a focus on equity and social justice, including an 'equity literacy' framework that proves consistent with developing a

new and standard information literacy curriculum. In current practice, some cultural competence pedagogy trains teachers in cultural sensitivity while failing to provide a thorough grounding in what it means to be racially or linguistically just. (Gorski, 2016, p. 222). Even more dangerous, many cultural competency lessons focus solely on the marginalization that exists within certain groups, while failing to acknowledge the privileged systems that create the conditions responsible for that marginalization. In doing so, these lessons ascribe responsibility for poverty-based education disparities to the group that suffers (Gorski, 2016, p. 222). It's important to consider that pedagogy focusing on the systemic foundations of the disparity can help to eliminate racial prejudice and negative stereotypes. Perhaps most importantly, Gorski highlights the flaws inherent in "embracing the idea there is some singular and consistent true nature shared among large groups of people," instead of focusing on the practices that disadvantage certain groups because they are often perceived as a singular group of others (Gorski, 2016, p. 223). Instead, students need to learn about, understand and work to correct systemic oppression while also acting to reconcile those biases and prejudices they hold (Garcia & Guerra, 2004; Nolet, 2017).

This framework for teaching practice pairs well with ideals from the United Nations Humans Rights Office of the High Commissioner's Convention on the Rights of the Child (CRC). This document reaffirms principles set forth in The Universal Declaration of Human Rights, and the International Covenant of Human Rights, with children, or humans under the age of eighteen, as the focus. In Article

29, the convention agrees to prepare youth for civic engagement through a quality education, which supports ideals of acceptance of diversity, and can begin the grounding process for equity education and for promoting social justice in K-12 education (1990, Article 29). Taken together, Gorski's framework, and the CRC can also promote a "sustainability worldview" that helps young people gain a stronger understanding of how to identify needs and exact meaningful change in their communities and beyond. (Nolet, 2017, p. 167).

Cooke's 'Counter-stories'

Ultimately, critical evaluation is instrumental in a person's ability to make connections across social strata, which can ultimately bolster empowerment of both the self and a society (Ntiri, 2009). While these connections are important, much power rests in the individual who can affect change most effectively by building on their own existing bodies of knowledge. There is however, still the danger in confirmation bias and those building their knowledge base on 'stock stories' – those accounts that do little more than reinforce existing social status and stereotypes – and mis/disinformation. To combat this danger, and give voice to the marginalized, Cooke (2018) advocates for invaluable "hands-on" pedagogy where the "power of self-generated knowledge" is central, through counter-stories, which are stories or information that better represent minority and underserved communities. They include:

Concealed stories – stories of overcoming and survival often met with doubt

Resistance Stories – stories that show a pattern of behavior that shocks privileged folks but highlights the very real struggles of marginalized communities

Emerging/ Transforming – stories that are "a product of reflection and new intentions and have the possibility of replacing existing stock stories" (Cooke, 2018, p. 114)

This type of storytelling and information sharing serves as a foundation for helping not only underserved groups, but those with narrow worldviews combat mis/ disinformation. Recognizing and valuing others, and normalizing diverse experiences also limits stereotyping and generalization, and helps folks recognize some of the inflammatory approaches creators of mis/ disinformation lean on to reinforce or create division.

Yu et al. Digital Divide Determinants

Finally, Yu et al. (2018) identify access, resources, and forces as thematic approaches to understanding the causes and determinants that outline where communities exist along the digital divide.

Table 2.2 – Digital Divide Determinants

Access (Type of)	Resources (Required)	Influencing (Forces)
Material	Material	Industrial
Cognitive	Cognitive	Public/ Administrative
Social	Interpersonal	Personal
Motivational	Educational	Community
	Psychological	Ideological
	Financial	

They define access as the "totality of an individual's ability to make use of ICT's", identifying four key types identified in Table 2.2 (p. 554). Also included in Table 2.2 are the types of resources, including both materials and infrastructure, that enable the end-user to have access, and the types of forces or influences that can "change ICT use and its empowerment" (p. 557). The concepts listed in this table provide a basic framework for studying the digital divide in a way that helps students understand the value of equity and inclusion while also recognizing the need for social justice reforms.

This literature review details five conceptualizations that separately and collectively support theories, pedagogy, and frameworks for information literacy including but also extending beyond the information lifecycle. Each considers the 'individual' and 'community' as information, and as they are affected by information. Understanding that information and literacy are interconnected concepts, and they are also interconnected with equity, access, and social justice should serve to inform higher education reform.

Currently, the research on information literacy focuses more specifically on the efficacy of certain models, namely the ACRL Framework, without considering how the frames or skills contribute to the overall education experience. Additionally, higher education accrediting bodies indicate that information literacy is a valuable skill without offering any measurable outcomes guidance, or in fact, even requiring it be measured. My study aims to understand how iSchool undergraduate programs address and teach information literacy, so that information scholars can advocate for change to the existing policies that devalue information literacy.

Chapter 3: Into the Unknown – Mapping the curriculum study design and methods

This chapter begins with a background on the Bachelor of Science in Information Science degree, and its place in the academy, followed by a general introduction to what 'information literacy' and other relevant outcomes and requirements look like in Higher Education policy in an effort to stress just how short they actually fall. I will then provide the design for a curriculum mapping study to determine the extent of existing required coursework in iSchool undergraduate programs that includes objectives or outcomes related to four conceptualizations of information literacy – Paul Zurkowski's (1974) Information Service Environment; Kobelski and Reichel's (1981) Bibliographic Instruction; The Association of College and Research Libraries' Framework for Information Literacy for Higher Education (2016); and Empire State Information Fluency Continuum (2019) .

What role do iSchools play in teaching information literacy to their own students?

The Bachelor of Science in Information Science

Information Science as a discipline is often connected with related disciplines such as Library Science, Computer Science, Information Technology, and indeed shares similarities in theory, subject matter, and career paths. However, Information Science extends from Library Science, and shares many of the core values of librarianship, including diversity, access, intellectual freedom,

and social responsibility (ALA, 2004). Information Science students have the option to study in concentration areas that include User Experience, Digital Curation, Health Informatics, and Human Computer Interaction. They pursue careers in private, public, and government sectors that include research, research design, information architecture, accessible design, big data and analytics, and cybersecurity among others.

LIS education is a natural point of entry for core information literacy instruction, because of the data, information, knowledge triangle, and because LIS graduates, including undergraduate information science students, ultimately serve as teachers and change agents in the myriad fields they enter across public, private, and government sectors. Those earning a Bachelor's degree in the information sciences create and share information in healthcare professions and the legal and policy arena among others; they may have careers analyzing social data for community planning or smart city design, while others elect to curate and maintain the information that tells stories about human behaviors. Their influence on the information lifecycle, and on how information and access shapes societies calls for specialized education focused on information literacy where it intersects with the diversity of human behaviors and needs.

While it's important to analyze the definitions of literacy across disciplines, reflecting on historic ideals and frameworks provides a more solid foundation on which to build the new information literacy. For example, the ancient philosopher, Aristotle brought a stronger context to the alphabet after establishing his library

in Lyceum. But his decades of public discourse added new dimensions to literacy that didn't necessarily involve reading. In fact, the alphabet was so new, and written documents so rare, scholars, philosophers, and rhetoricians memorized essays, legal documents, court decisions, and political doctrines which they would recite at public forums. In these forums, scholars also demonstrated knowledge of the documents through discourse and debate, and it was Aristotle who demonstrated and ultimately taught discourse and rhetoric by highlighting fallacies. He learned this strategy from his teacher, Plato who chronicled Socrates' public protestations and propensity for soap-boxing, and encouraging young people to continually ask questions. Socrates was nicknamed the 'gadfly' as his line of inquiry provoked agitation from authority figures and educators whose teachings focused on memorization, acceptance, and recitation. Plato even recorded Socrates trial and execution (for corrupting Athenian youth), and his astute observations provided the perfect framework for his own teachings. Aristotle's eventual rhetoric also encourages critical thinking, and challenging existing notions of the world, but as he essentially created logic, his fate was much different from Socrates'. Again, the phonetic alphabet as we know it had not been officially adopted, and writing/ transcribing speeches and arguments was tedious. Reading and access to scrolls was limited, yet these ancient scholars and their students were literate even when reading or writing was not foundational to how they shared information, or created knowledge. In fact, these now-dead white guys, with the help of a Goddess, birthed the first known democratic society,

sustained by a socially-constructed information-literacy that allowed Greece and its neighboring societies to flourish for centuries with high civic engagement, and a populace with a desire, and the means to learn and grow.

Higher Education Policies on Information Literacy

Currently, there are six regional accrediting bodies in the United States charged with the oversight of institutions of higher education. These organizations conduct thorough audits of currently accredited and new colleges and universities to guarantee some degree of continuity in course offerings and learning outcomes for college graduates. Accreditation for colleges and universities occurs on a rolling basis with most schools preparing for review every 10 years. The accrediting organizations are:

- Southern Association of Colleges and Schools, Commission on Colleges

- Higher Learning Commission

- Middle States Commission for Higher Education

- New England Commission on Higher Education

- WASC Senior College and University Commission

- Accrediting Commission for Community and Junior Colleges

Much the same way each state and county set teaching and learning standards for primary and secondary schools, each regional higher education accrediting body establishes academic standards its institutions must set in place for student learning. Included among most of these standards and objectives are information literacy, and cultural competence; however, scholars offer varying views on what

both of these concepts mean, leaving individual institutions open to broad interpretation and application, allowing students the option to satisfy core credit requirements for, but without necessarily achieving information literacy, cultural competence, or equity literacy. Since understanding contextual authority is lacking in current information literacy instruction (Gammons and Inge, 2017), these ideas are exceedingly valuable to building and implementing an information literacy design by, for, and delivered through LIS programs.

The three largest accrediting bodies in the United States are the Higher Learning Commission, Middle States Commission on Higher Education, and the New England Commission for Higher Education. Of the six regional accrediting organizations, I will only be focusing on the two that oversee the institutions reflected in my study. The Higher Learning Commission (HLC) holds jurisdiction in 19 states including Wisconsin, Illinois, Indiana, and Michigan, where four of the five schools under this study are accredited; and the Middle States Commission for Higher Education (MSCHE), which holds jurisdiction in eight states, Puerto Rico and the Virgin Islands. Maryland and Pennsylvania are accredited through MSCHE. I am specifically reviewing these policies for standards and guidance on teaching 'information literacy', 'cultural competence' 'rhetoric', 'ethics' and 'civic engagement'. These concepts are important to a Liberal Arts education that prepares graduates for social interactions and responsibilities in and beyond their careers, and since information science majors will ultimately shape and reshape

our information society, it will be important to assess if and how undergraduate information science programs emphasize them.

For example, all accredited and degree-granting higher education institutions in the state of Maryland are bound by policies set forth and enforced by the Middle States Commission on Higher Education, and the Maryland Higher Education Commission (MHEC). MHEC, essentially, maintains regulations through the Code of Maryland Regulations (COMAR) that align with Middle States, which updates its standards and recommendations almost annually, though the official 'Standards for Accreditation and Requirements for Affiliation' (SARA) was most recently updated and accepted in May 2015. While Middle States offers credibility to an institution through accreditation, MHEC and other state agencies review and approve programs of study at accredited higher education institutions. Both consider factors such as mission and vision; societal value; faculty expertise; instructional delivery; and outcomes and assessments.

Unfortunately, standards and regulations are often loosely defined, and open for interpretation under 'academic freedom' policies, and it is not uncommon to see language in these policies that allows for approval based on alignment with an institutions mission. Under SARA's 'Requirements for Affiliation', institutions are required to have a mission statement, (2015, p.2), which is reinforced in Standard I. Standard III requires institutions design and deliver learning experiences "appropriate to the institution's mission," (p. 6), and

Standard V asserts that each accredited institution should have clearly stated educational goals that relate to the institutions mission (p.8).

Additionally, under Standard III of the 2015 SARA, 'Design and Delivery of the Student Learning Experience,' all accredited institutions must offer "a curriculum designed [to include] at least oral and written communication, scientific and quantitative reasoning, critical analysis and reasoning, technological competency, and information literacy" (SARA, 2015). Further, Middle States recognizes the need for "consistent interpretation and application" of SARA by 2017, as established in its 'Strategic Goals and Objectives,' (http://www.msche.org/?Nav1=ABOUT&Nav2=MISSION).

However, in a 2003 publication, the Commission made clear that information literacy need not be "defined and assessed separately," nor will schools need a "distinct assessment instrument" to evaluate student information literacy competency (Developing Research and Communication Skills). It defines information literacy too broadly as acquiring and using or creating any information, but at least recognizes that information literacy is distinct from information technology.

Middle States has essentially left it to individual institutions to set clear requirements for information literacy and to assess on their own standards. MHEC also identifies information literacy as a general education required skill, but like Middle States, MHEC offers no indication of how schools should approach it. Under COMAR 13b.02.02, MHEC outlines the general education

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requirements for state schools including earned-credit guidelines; however, information literacy is not recommended as a required credit-bearing course.

As an example of these guidelines in practice, The University of Maryland, College Park prides itself as an institution that fosters "intellectual dexterity… from understanding the many ways knowledge is produced," (The University of Maryland, UG Catalog). The school sets extensive, global-minded and culturally inclusive general education requirements; however, it does not specifically delineate Media and Information Literacy (MIL) in the General Education Learning Outcomes. The outcomes – spread out over 40 credit hours – do address elements of UNESCO's baseline, ACRL's competencies, and MHEC's guidelines. Embedded within, roughly, 12 courses, students must "evaluate, analyze, and synthesize appropriate sources," use source material ethically, and apply critical thinking, but the *Outcomes* do not speak to the first three objectives identified in the ACRL Framework, (Learning Outcomes).

The Higher Learning Commission (HLC) includes standards for practice and curriculum requirements that establish the importance of recognizing diversity, including course offerings that "recognize the cultural diversity of the world in which students live and work," (HLC Policy Handbook, 3.B, 4, 2019). Policy 3.B, 3 also requires that any accredited institution "engages students in collecting, analyzing, and communicating information," and "developing skills adaptable to changing environments," (2019). Middle States Standard III.5a. requires that the general education curriculum that expands students' "cultural

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and global awareness and cultural sensitivity," also allows them to make "well-reasoned judgments outside as well as within their academic field,"; and III.6.b requires a general education program that includes information literacy, and studying values and ethics, (Middle States, 2015).

However, these bodies and institutions should revisit standards around promoting equity for the sake of information literacy, rather than just outlining cultural differences, which don't necessarily reinforce literacy unless taught in conjunction with ideas on information behaviors, and/ or the digital divide. (While I promote information literacy education in the dissertation, there are few for-credit course offerings, and even fewer institutions that require credit hours specific to information literacy. In fact, researchers who have attempted to map such courses have been bound to fewer than 200 options, (Hyrcaj, 2006; Elrod, Wallace, and Sirigos, 2012).)

In the Fall of 2019, I reviewed college rankings through U.S. News and World Report to identify highly-ranked institutions accredited through Middle States and Higher Learning Commission, and subsequently reviewed institutional requirements for University of Connecticut, Rutgers University and the University of Michigan, then I reviewed course descriptions and outcomes for courses that officially met the school's general education requirements. The University of Michigan (2019), which also has an information science program, in Ann Arbor has a 'Race and Ethnicity' requirement that students could satisfy by taking DUTCH 160 First Year Seminar. This course, which is taught in English,

simply walks students through basic literary and artistic concepts in Dutch

culture (University of Michigan, 2019). Rutgers University (2019) requires six

undergraduate credits in 'Contemporary Challenges', including three credits

designated 'Diversities and Social Inequalities (CCD)', and three designated 'Our

Common Future (CCO). To earn a 'Contemporary Challenges' course designation,

the course need only meet one of the following outcomes:

- Analyze the degree to which forms of human difference shape a person's experiences of and perspectives on contemporary issues.
- Analyze a contemporary global issue from a multidisciplinary perspective.
- Analyze the relationship that science and technology have to a contemporary social issue.
- Analyze contemporary issues of social justice. (Rutgers University, 2020).

Further, Sandell and Tupy (2015) followed and evaluated undergraduate,

pre-service teachers in two intercultural competency courses at the University of

Minnesota, Mankato to determine the efficacy of each, only to find that even in

more "intensive, intentional, and reflective" (p. 375) courses, students are not

achieving even the moderate level of cultural self-awareness they perceive

themselves having (p. 377). Instead, the same study finds that the students view

diversity in simplistic terms of those ideals and celebrations that revolve around

"cultural festivals, food, costumes, games, and celebrations" (p. 366).

Cultural competence, equity, and civic responsibility are key elements for

a socially-relevant information literacy. The above referenced policies and courses

demonstrate that these concepts are easily white-washed, suggesting that information literacy instruction in its current form can also be easily manipulated to align with conflicting agendas.

Where my study focuses on information science courses alignment with 4 information literacy models, at least one of those models explicitly addresses social responsibility, and these concepts of 'cultural competence' and equity may be more effectively taught in conjunction with information literacy.

Data Collection

Justification for my selection and design

There are 14 schools in the Big Ten Academic Alliance, a consortia of Research I institutions committed to academic, research and collegial collaboration. As of May 2021, the schools are University of Illinois, Indiana University, University of Iowa, University of Maryland, University of Michigan, Michigan State University, University of Minnesota, University of Lincoln-Nebraska, Northwestern University, Ohio State University, Pennsylvania State University, Purdue University, Rutgers University – New Brunswick, and University of Wisconsin – Madison. Each of these schools, with the exception of Northwestern University are public, 4-year state institutions with an undergraduate population of over 20,000 students. As of 2019, Northwestern, a private institution, only enrolled 8,284 full-time undergraduate students. I reviewed each schools' websites for undergraduate programs represented in or by an iSchool. Six of the schools, Illinois, Wisconsin, Maryland, Pennsylvania State,

and both Michigan schools offer undergraduate programs related to information science; however, Michigan State University's program is in moratorium effective Summer 2021 – Spring 2024, and will no longer be part of the curriculum map. While Iowa, Rutgers, and Wisconsin at Madison have either an iSchool or traditional information science programs housed under a related college, they currently only offer graduate degrees; however Wisconsin at Madison's undergraduate Digital Studies Certificate/ minor requires 15 credit hours, and is included in the curriculum map[1]. Additionally, all of the Big 10 iSchools with undergraduate programs are iCaucus members of the iSchool Organization Consortium, which holds the iConference each Spring to bring together information scholars and professionals across the globe.

Because state/public colleges and universities' tuition is up to 72% less than private institutions (Powell and Kerr, 2020), they often set competitive program and curriculum standards that combined with sticker price, attract more applicants. More applicants translates to wider visibility, and potentially increases demand for neighboring institutions to implement sought after programs to attract transfer students, and/ or those students who did not gain acceptance to their first choice school. Additionally, it's not unusual for state schools to partner

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[1] The University of Wisconsin, as of July, 2022, offers a BA/BS degree in Information Science. Details for this program are available on the school's website https://ischool.wisc.edu/programs/undergraduates, and the emergence of this degree less than a year out from my initial data collection further supports the value of these programs, and the need for unique, representative information literacy standards.

with in-state community colleges to guarantee Associates Degree graduates a transfer spot. For example, the Maryland Transfer Advantage Program (MTAP) accepts students from participating community colleges that have successfully completed a 2-year program at that school, (Howard Community College, 2021) My study focuses on these state institutions because of their size, connection to the iSchool organization, and potential to influence more widespread curriculum changes. As iSchool Organization members, each of these schools has the opportunity to easily network with other iSchools through member lists, listservs, and the annual iConference. Additionally, the iConference is an ideal platform to share the results from this study.

Methodology

As mentioned, I elected to conduct a curriculum mapping study as the primary research method for this dissertation. Curriculum maps help show relationships and reveal gaps in or across curriculums. Conducting this type of study involves indexing relevant curriculum information – often outcomes or objectives, but could also include assignments, reading materials, or grades. Educators and instructional designers use mapping to determine program or individual course strengths, areas for improvement, and potential need for change. Maart, Adam, and Frantz highlight the value in curriculum mapping as central to aligning competencies and identifying gaps (2021, p.100), while Cueves, Matveev and Miller emphasize curriculum mappings importance for aligning

higher education general education requirements to specific department offerings and requirements, (2010, p.10). They also contend that comprehensive curriculum maps allow faculty and advisors a way to help students understand the "complexities of program progression", and how their coursework is interconnected (Cueves, Matveev & Miller, 2010, p.11).

Curriculum maps can involve the broad examination of courses within a program, a narrow analysis looking for inclusion or exclusion of specific content, or the extent/efficacy of standards implementation. In the LIS field, most broad curriculum mapping looks at implementation of the ACRL Framework.

During the spring and summer of 2021 (see Appendix A for a detailed timeline) I collected current enrollment statistics, mission statements, core requirements and program outcomes, and core courses syllabi from the five Big 10 iSchools via their websites or by contacting the schools directly. I reviewed the accreditation requirements for each of the higher education accrediting commissions. After careful review of all 32 syllabi I was able to obtain, I began with an inductive line by line coding for each of the iSchool's core course learning outcomes to identify common themes and values; From the 32 syllabi, there are a total of 175 objectives or outcomes (See Appendix B-F), which translated to 530 relevant lines of data derived from language and concepts in each objective that I coded to identify alignment with:

Zurkowski's Information Service Environment (1974)

Bibliographic Instruction (1981)

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ACRL Framework (2016)

And the Empire State Continuum (2019).

I selected the four models identified above for range of ideas, and to consider change across time. Paul Zurkowski first referenced the Information Service Environment in 1974, and his vision was for an equitable and accessible information literate society that could effectively participate in decision making based on "individual fulfillment… advancement of knowledge… [and] discovery of truth," (1974). Bibliographic Instruction is often discussed as 'library skills', and that term has not faded from academic vocabularies. The ALA Standards and Competencies for Information Literacy was the first nationally recognized conceptualization of information literacy for higher education, but it is currently its successor, the ACRL Framework, which provides the language for higher education accrediting bodies. Including each of these conceptualizations will provide perspective on how or if time and language have allowed for relevant change, while also highlighting the gaps that still exist, and possibly most important, whether any of these ideals holds actual weight in the academy. The last concept is the Empire State Information Fluency Continuum, which, like Zurkowski's earlier vision connects information and literacy to civic engagement and empowerment. This curriculum map will reveal if, how, and where some of the top-ranked Bachelor of Science in Information Science programs do the same.

The University of Maryland's Bachelor of Science in Information Science presents 9 courses its students must complete to earn their degree; the

University of Michigan requires 4 courses specific to its program; The University of Wisconsin's certificate program consists of 6 courses that students must successfully complete; The University of Illinois' program has seven required courses, and Pennsylvania State requires six.

Together, these courses present 175 objectives/ outcomes that totaled 538 rows of text, separated by program, and then by course, and broken down by concept which make up the coded 'lines'. Because coding is a more subjective practice, it's important to stress where continuity exists. For the Empire State Information Fluency Continuum (ESIFC), I looked for words and phrases such as 'social' 'personality' 'ethnicity' 'values' 'power' 'politics' and others that align closely with social sciences or humanities (sociology, political science, philosophy) to signal 'Social and Civic Responsibility' because they clearly reflect the language in Standards 3.1, 3.2, and 3.3 of the ESIFC. Standard 3.1 encourages recognizing why accurate information carries value in a "democratic society" and how to apply information from "diverse community and global perspectives," (ESIFC, 2019); 3.2 encourages "effective collaboration"; and 3.3 connects digital citizenship to "ethical decision making," (ESIFC).

The anchor standard, 'Inquiry and Design Thinking' (IDT) highlights those parts of the information lifecycle that relate to research and reflection. I coded words like "investigate", "reflect", "analyze" "discover" and "experiment" as 'IDT' because it is directly connected to Standards 1.1 and 1.2 of the ESIFC (2019). Further, anchor standard 2, Multiple Literacies (ML) requires reviewing,

creating, and applying "multimedia" or "multiple formats", and understanding

how and when they are "appropriate for the purpose and audience" (2019);

therefore, words such as "media", "format", "audience" and others that suggest

how and why various media is used in the information lifecycle reflect 'ML'.

Lastly, Personal Growth and Agency (PGA) encourages pursuing and developing

personal interests and strengths, engaging in "personalized independent

learning," and "develop[ing] agency" and engaging in advocacy. Therefore,

language that reflects communicating ideas, "creativity" and "decision making"

support 'PGA'.

As the 'Information Service Environment' is both concrete and abstract,

coding the objectives to the standards was relatively straightforward. I assigned

more abstract or social science related terms with 'DT' or Discovery of Truth, and

the more concrete language choices most clearly aligned with 'Decision Making'.

Discovery of Truth and Advancement of Knowledge (AK) are very similar

concepts; Table 3.1, from the University of Wisconsin's LIS 201- The Information

Society, offers a clear view of how they differ, in that reflective (or information

for self) terms such as 'understand' equate to 'DT' while expressive terms like

'evaluate' (which create knowledge or information for others) equate to 'AK'.

Table 3.1 Sample of Course Objective Concepts Coded to the Information Service Environment

OBJECTIVE	Zurkowski
understand moral contexts - information technologies	DT
understand political contexts - information technologies	DT
understand social contexts - information technologies	DT
understand historical contexts - information technologies	DT
critically evaluate moral questions re info tech	AK
critically evaluate political questions re info tech	AK
critically evaluate social questions re info tech	AK
critically evaluate historical questions re info tech	AK

I could argue that 'Individual Fulfillment' applies to all of the objectives; however, I assigned this code more subjectively and arbitrarily than the rest. The connection is self-directed language.

For example, the capstone course, INST 490 at the University of Maryland requires students to 'assess own learning'; Illinois' IS 309, Computers and Culture includes understanding the effects of tech cultural on the individual; and Wisconsin's LIS 350 – The History of the Book has an objective for gaining experience in the bookmaking process.

I used the codes in table 3.2 to identify alignment with stated objectives and outcomes across iSchool core courses, assigning a code to each standard or frame along the ACRL Framework, Empire State Information Fluency Continuum, Bibliographic Instruction, and Zurkowski's Information Service Environment, and I created a separate column for each model. Two codes, 'N' and 'X' applied to

each model as 'Line content not applicable to any standards or frames', and 'Line

content not relevant,' respectively. I deleted rows labeled 'X' after separating

the data by model, leaving 529 codable lines for the ACRL Framework; 525 for

the Empire State Information Fluency Continuum; 530 lines for Bibliographic

Instruction; and 523 codable lines for the Information Service Environment.

Table 3.2 Information Literacy Models, Standards or Concepts with Corresponding Codes

ACRL Framework	Code:
Authority is Constructed and Contextual	ACC
Information Has Value	IV
Research as Inquiry	RI
Information Creation as Process	ICP
Scholarship as Conversation	SC
Searching as Strategic Exploration	SSE
EMPIRE STATE INFORMATION FLUENCY CONTINUUM	
Inquiry and Design Thinking	IDT
Multiple Literacies	ML
Social and Civic Responsibility	SCR
Personal Growth and Agency	PAG
BIBLIOGRAPHIC INSTRUCTION	
Type of Reference Tool	RT
Systematic Literature Search	SLS
Form of Publication	PF
Primary/ Secondary Sources	PS
Publication Sequence	PX
Citation Patterns	CP
Index Structure	IX
ZURKOWSKI'S INFORMATION SERVICE ENVIRONMENT	
Individual Fulfillment	IF
Advancement of Knowledge	AK
Discovery of Truth	DT
Participation in Decision Making	DM
Freedom of Expression	FX
Government responsibility for service and accessbility	GT
GENERAL CODES	
Line content not applicable to any standards or frames	N
Line content not relevant to code	X
Covers multiple frames/ standards within a model	G

The ACRL Framework has 6 frames, and each frame also has 'Knowledge

Practices' and 'Dispositions'. For simplicity sake, I looked only at the primary

definition for each frame to code these objectives. Authority is Constructed and

Contextual (ACC) includes language such as 'expertise', 'credibility', 'context',

and 'authority' to support concepts such as information needs and use and how

this may differ across community. I coded words and phrases like "power and

politics", "gender and diversity" and "global differences" as 'ACC' (Table 3.5).

Information Creation as Process (ICP) examines the deliberation of the

information lifecycle to 'convey' messages through specific and appropriate

formats. I coded words that demonstrate the lifecycle, such as "researching"

"creating", "disseminating", and "information product", as well as 'strategy' or

other 'process' related terms like 'design' or 'construct' as 'ICP'. Further, the

frame 'Information has Value' (IV) focuses on why information exists, and how

presentation (or format) makes a difference in impact. I assigned words and

phrases that reflect social, economic, political, and ethical impacts, as well as

those that relate to format, and decision making as 'IV'.

Research as Inquiry (RI) and Searching as Strategic Exploration (SSE)

both cover the research process as 'nonlinear' and 'iterative'. They are

quite similar, and I found these to be the most difficult to code. The

primary difference is that 'inquiry' suggests that one person's research

should lead to additional questions and additional research, where

'searching' encourages the willingness to change course during the

research process as "new understanding develops," (ACRL, 2016, p. 22).

Table 3.3 reflects parts of the objectives, "Identify and articulates a **problem that can be addressed** or a **need that can be fulfilled** by making use of information and technology tools and methods from within the field of information science," and "**Identify** the **approaches, methods, tools** and **processes** that can be used toaddress the problem or the need in question; and pick the most suitable solution mix given the requirements and constraints at hand," from the UMD Capstone course, INST 490 where the first two lines reflect broad social problems and implications; whereas the remaining five lines more directly represent the isolated process for the students own research. In this example, the students ability to 'identify' a need as well the 'approaches', 'methods', 'tools' and 'processes' they apply align with 'Searching as Strategic Exploration' because each serves as its own component of a students' search strategy. I considered each concept with 'address the problem or the need in question' to make the best determination.

Table 3.3 Sample of Coded Course Objective Concepts to the ACRL Framework

OBJECTIVE	ACRL
1. a problem that can be addressed	RI
2. a need that can be fulfilled	RI
identify	SSE
1. approaches	SSE
2. methods	SSE
3. tools	SSE
4. processes	SSE

And lastly, the frame 'Scholarship as Conversation' (SC), which also shares similarities to 'Research as Inquiry' in that they both encourage continuing and building upon existing research, enforces the importance of continuing and building upon existing research, especially when examining ideas through unique/ diverse lenses. I coded words and phrases like "communicate"; "diverse perspective" as well as ideas that encourage evaluating, editing, or transforming existing work as 'SC'.

The final model I evaluate is Bibliographic Instruction, and most of its concepts are very direct. 'Type of Reference Tool' (RT) indicates that information is available in myriad forms and venues, and there are different methods for accessing that information. Any line that specifically indicates needing to understand why a specific 'type of information' might be needed or used, or specifically states understanding how to access the information, I coded for RT. This is slightly different than 'Form of Publication' (PF) which aligns more with

the Empire State's 'Multiple Literacies' and understanding which media is most

appropriate for an information need. Penn State's IST 110 – Information, People

and Technology, offers an example of coding for 'Form of Publication' including

understanding the different options for storing, transmitting and retrieving

information and data, (Table 3.4). I also coded PF to lines that included analyzing,

evaluating, creating or otherwise using different source/ media types like

'sketching', 'wire-framing', and 'video scenarios'.

Table 3.4 Sample of Course Objective Concepts Coded to Bibliographic
Instruction

OBJECTIVE	Bibliographic Instruction
describe how digital data is stored	PF
describe how digital data is transmitted	PF
describe how digital data is retrieved	PF
create narrative of information transformed into knowledge	PF

Form of Publication is actually the third Bibliography Instruction concept.

The second, is 'Systemic Literature Search' (SLS), which matters because teaching

bibliographic instruction carried more emphasis on search and retrieval as a

linear process. I coded this concept to words such as 'locate', 'identify', 'analyze',

and 'extract'. The most broad division of sources is into 'Primary and Secondary

Sources' (PS), which I only coded for lines that explicitly included that language.

Additionally, the concept of 'Publication Sequence' (PX) is not dissimilar from the

ACRL's 'Information Creation as Process', though much less specific. Where a line

lays out the process, or makes mention of 'information flow', I assigned the code 'PX'.

The remaining two concepts in Bibliographic Instruction are more vague, and also more broad. Citation Patterns (CP) encourages understanding that research does not exist in a vacuum, and Index Structure' 'IX' could be considered a precursor to metadata. Neither of these codes align with any of the objective concepts.

Table 3.5 offers a snapshot of a coded objective for course IST 301: Information Organizations at Penn State.

> *Organizational Culture – Students will be able to analyze an organization's culture, including underlying rules, values, and norms regarding power and politics, gender and diversity, and global differences.*

For the objective reflected in 3.5, I assigned the code 'X' to concepts with connecting words and phrases, such as, 'regarding', and 'Also', and for sub-headings like 'organizational culture' indicating faculty included content specific objectives, and these applied across each model. In some lines, such as '2. analytical', the content clearly followed a verb. In this example 'develop', and could be coded for Empire State (2019) and ACRL (2016), but had no clear connection to Bibliographic Instruction (1981) or Zurkowski (1974). The code 'G', showing general application, appeared most often at 13 times under ACRL and Bibliographic Instruction with examples of researching varying issues/ arguments around information and ICT's. These lines suggested 'Inquiry and Design

Thinking' under Empire State, and Discovering Truth under Zurkowski, but align

more generally with research literacy and processes reflected in the ACRL

Framework and Bibliographic Instruction. This occurs again with 'productively

use library resources', which connects with 'Multiple Literacies' for Empire State,

and Discovering Truth for Zurkowski, but applies more generally to most or all of

the ACRL Frames and Bibliographic Instruction outcomes.

Table 3.5 Sample of Course Objective Concepts Coded to All Four Models

OBJECTIVE	Empire State	Zurkowski	Bibliographic Instruction	ACRL
Organizational Culture	X	X	X	X
analyze organization culture i.e.	IDT	N	N	N
1.underlying rules	SCR	N	N	N
2. values	SCR	N	N	N
3. norms	SCR	N	N	N
regarding:	X	X	X	X
1. power and politics	SCR	DT	N	ACC
2. gender and diversity	SCR	DT	N	ACC
3. global differences	SCR	DT	N	ACC

Table 3.6 shows a coded objective for the University of Maryland course, INST

335, Organizations, Managements and Teams. Under the general expectation

that students should be able to understand and explain, this objective looks at

"principles, theories, and research on motivation, leadership, groups, personality

and individual differences, organizational and national culture, communication,

teamwork, creativity and innovation, conflict and negotiation, decision making,

stress, and selection hiring." This one objective translates to 13 lines of code as it

encourages examining related but unique concepts. In this case, most of the

concepts did share similarities within and across the four models. Primarily, it

aligns with 'Social and Civic Responsibility' under ESIFC, and 'Discovery of Truth'

under Zurkowski; however, lines for 'communication', 'creativity and innovation',

and 'decision making' align more strongly with 'Multiple Literacies' under ESIFC

with 'creativity and innovation' also reflecting 'Freedom of Expression' under

Zurkowski. This objective is one of a handful that generally represents the aims

of Bibliographic Instruction and the ACRL Framework, which is encouraging in

Table 3.6 Sample of Course Objective Concepts Coded to Each Model and Showing Similarities
Between ACRL and Bibliographic Instruction

OBJECTIVE	Empire State	Zurkowski	Bibliographic Instruction	ACRL
5 principles, theories, research on:	SCR	DT	G	G
a. motivation	SCR	DT	G	G
b. leadership	SCR	DT	G	G
c. groups	SCR	DT	G	G
d. personality and individual differences	SCR	DT	G	G
e. organizational and national culture	SCR	DT	G	G
f. communication	ML	DT	G	G
g. teamwork	SCR	DT	G	G
h. creativity and innovation	ML	FX	G	G
i. conflict and negotiation	SCR	DT	G	G
j. decision making	ML	DM	G	G
k. stress	SCR	DT	G	G
i. selection and hiring	SCR	DM	G	G

the sense that Information Science courses should include objectives that broadly address information literacy aims. In fact, it is this type of course where explicit instruction about information literacy could prove highly effective and beneficial.

The University of Illinois' Introduction to Information Science Course presents three objectives, that logically translate to only 5 lines of text, as seen in table 3.7. The objectives are:

- *Understand the complex relationships between people, information, and technology as these pertain to information across its life cycle.*
- *Gain familiarity with the history, theory, methodologies, practices and professions associated with the field of information sciences;*
- *Be able to apply critical analytical skills to information problems.*

Table 3.7 Sample of Introduction To Information Science Course Objective Concepts Coded to Each Model and Revealing Limited Connections

OBJECTIVE	Empire State	Zurkowski	Bibliographic Instruction	ACRL
complex relationships people information technology	SCR	IF	N	IV
history	IDT	N	N	IV
theory	IDT	N	N	G
methodologies	ML	N	N	G
critical analytical skills	IDT	DT	N	G

Eight of the twenty codes in this example are 'N' because they do not offer a clear connection to either Bibliographic Instruction or the Information Service Environment. This course aligns with 'Social and Civic Responsibility', 'Inquiry

and Design Thinking', and 'Multiple Literacies' under ESIFC, and aside from promoting 'Information has Value', the objectives offer a more general connection to the ACRL Framework.

Doubling Back

Sometimes questing means changing course or retracing certain steps. After analyzing the data from course objectives, I felt strongly that I should also review and code the mission statements available. To remain consistent, I used the lines I recorded in late summer, 2021 when I recorded and coded the course objectives. Four of the five schools presented mission statements: The University of Maryland, College Park, The University of Illinois, Urbana-Champaign; The University of Wisconsin, Madison; and The University of Michigan. The four statements account for 55 lines, most of which include basic nouns, adjectives, or verbs as seen in Table 3.8, featuring a representative snapshot of lines for each of the schools. The full Mission Statements can be reviewed in Appendix G.

After coding the missions, I generated charts, tables, and tallies identifying the standards, concepts, and/or frames that appear most frequently for all schools, then for each school. I then analyzed that data next to the most commonly reflected standards, concepts, and/ or frames from the course objectives. Again, I analyzed this data holistically and for each institution.

The ultimate objective of this study is understanding commonalities in how information literacy is taught, and determining the feasibility of curriculum

change where Information Science undergraduate degree programs fulfill an

obligation to their institutions to set the standard for information literacy, and

the instruction therein. I also aimed to identify where, if it all, these programs

support a more socially-centered approach to information literacy. One that

Table 3.8 Mission Statement Sample Concepts for the Five Big 10 Universities Featured in this Dissertation

Maryland	improve lives
Maryland	improve people
Maryland	through information
Maryland	groundbreaking research
Maryland	innovative academic programs
Maryland	strengthen information institutions
Maryland	foster responsible information use
Maryland	increase information reliability
Maryland	ensure equitable access to information
Michigan	create knowledge
Michigan	share knowledge
Michigan	so people will use information with technology
Michigan	to build a better world
Illinois	understanding use of info sci in:
Illinois	1. culture
Illinois	2. society
Illinois	3. commerce
Illinois	4. diverse activities of daily lives
Illinois	change the world
Wisconsin	information use
Wisconsin	economies
Wisconsin	cultures
Wisconsin	policies
Wisconsin	affect access

connects information to social justice, ethics, rhetorical techniques, and

diversity.

Limitations

As with any research, the potential for limitations or setbacks exist. I am only

mapping one syllabus per course, and some of the available syllabi date back as

far as 2017. In March of 2020, all of the schools represented in this study moved

to virtual teaching to protect their communities from the Covid19 virus. Students,

faculty, and staff have considerable freedom to learn, teach or work from home,

which limits collaboration, and could also affect faculty willingness to make

significant changes to their syllabi. Additionally, course evaluations, and student

assessment measures during the Spring 2020 semester, and through the 2020-21

academic year may not accurately reflect performance or indicate the need to

update syllabi or curriculum.

It is also important to note that academic freedom allows instructors to

alter syllabi to better align with their teaching styles. Ideally, each school will

implement standard/ required objectives and/ or outcomes for the required

program courses, but that is not a guarantee, and I will have to be clear of this

limitation. Instructors may also build in discussions, activities and assignments

that supplement or contradict course outcomes, and these details could easily

change the study results. Additionally, not all programs provide or require a

standard syllabus format. Some include objectives, while others identify

outcomes, others may have both; assignment descriptions may be vague or in depth. And of course, I aim to code objectively in alignment with the standards, concepts, and frames language and definitions, but qualitative research will always have a subjective lens. Admittedly, the more often I review the data, I find myself questioning if I could or should change a code.

And lastly, as an undergraduate instructor who has taught remedial Reading and writing courses, as well as freshman composition and literature, I have seen the gaps in student research and information handling skills, and harbor ideas on how to fill or patch those holes; moreover, teaching with an undergraduate information science program gives me current, first hand insight into my diverse student populations' needs, interests, and behaviors, all of which influence objectivity.

Chapter 4: The Arrival - Satisfaction and Frustration

Results from Prior ACRL Framework Mapping

With burgeoning enrollment at both two and four year schools, academic librarians are often overwhelmed accommodating multiple departments and hundreds of courses during a semester; moreover, some institutions have implemented online modules or tutorials to replace the aforementioned "one-shot" introductory sessions that are common across freshmen composition or first year experience courses. But, most college students - particularly first year undergraduates - do not know the term "information literacy". They do not realize it falls under a specific academic discipline, and they have no concept that it is the key to their academic and -quite likely - career success. Just as grade schoolers cannot flourish without fluency in reading, writing, and mathematics, college students cannot navigate their coursework without a solid foundation in research and the ability to aptly find and appropriately apply the most relevant and credible information to an assignment, project or body of work. Moreover, they are not likely to appreciate and therefore not likely to acquire the information literacy skills they so desperately need through this limited exposure. A pressing component of this problem is the lack of respect afforded to librarian faculty and to information literacy as its own discipline.

With over four thousand institutions of higher learning in the United States, Elrod, Wallace and Sirigos (2012) set out to analyze the syllabi for at least 406 credit-bearing information literacy courses to expand on the model set by Hrycaj in 2006 (2011). Not surprisingly, the team was only able to identify the same 100 syllabi from Hrycaj study, and found that the biggest shift was from teaching finding sources to properly citing them. Moreover, 40% of the courses were offered for only 1 credit hour suggesting that library, and information literacy "skills are not taken seriously by the academe," (2011).

Over the past six years, the ACRL Framework has been a central focus in Library and Information Science research, with practitioners and researchers alike examining its implementation throughout higher education, and alignment with curriculum and other prominent models. Studies have mapped connections to Common Core, and ALA standards, and aimed to measure efficacy and application in instruction.

Bennalack and Rundels (2021) reviewed 12 for-credit information literacy syllabi and found that the most prominently reflected frame was 'Searching as Strategic Exploration,' and 'Authority is Constructed and Contextual' was the least, (p.7). This aligns with Gammons and Inge's (2017) multi-year study of student reflections after one-shot instruction sessions for a first-year composition course. The pilot study found that nearly 70% of student feedback suggests they associate these lessons with information search, and finding sources (Gammons and Inge, 2017). The full-scale study of over 3,000

undergraduates did not yield different results with the majority of student

reflections mapping most closely to 'Information Creation as Process,' and

'Searching as Strategic Exploration,' (Gammons and Inge, 2017, p. 178).

Gregory and Higgins (2017) looked for higher-level thinking and

connections between the Framework and the ALA's Core Values of Librarianship.

In mapping the frames to the values, they were able to see connections only

when they examined the narratives behind the frames. Ideally, they hoped to

extrapolate social justice initiatives and outcomes, but discovered the

Framework's language lacks the context and conviction to help developing

pedagogy that promotes recognizing systemic divides.

Study results on one-shot vs. credit-bearing

Two and four-year colleges and universities regularly assess student GPA and

other measures of success to promote their institutional quality. A successful

student body equates to more competitive admissions standards and higher job

placement and/ or transfer ratings. Sanabria's 2013 study of information literacy

integration throughout a First-Year Seminar at Bronx College of New York shows

"solid increases in average GPA's of freshmen students" (p. 98) who participated

in the course over those who did not. Further, after taking this seminar, students

gained confidence to attempt more credits/ semester than their counterparts.

This confidence should be attributed directly to library-led instruction and

programs, which may not always be able to address higher order information

literacy concepts within their 1-2 hour time constraints, but often represent a

welcoming, orientation environment for new students. Studies also indicate that college students who use library services are often more likely to succeed in their coursework and actively participate in campus activities. In this respect, the information literacy skills help students become acculturated to college life (Grallo, Chalmers & Baker, 2012). The information and programs that academic libraries offer encourage students to engage in the scholarship of their universities, and this engagement in turn promotes student persistence.

Stagg and Kimmins (2014) refer to the information literacy component of library instruction as "generic information literacy," as it is often taught "as supplementary to course content," which ultimately "reinforces the idea that these skills are generic in nature," (p. 143). While I do not agree with the language choice, I do agree that embedding IL within other disciplines reduces its value to little more than temporary tools to support a singular task. In the same study, Stagg & Kimmins observed that first year graduate students struggle as much, if not more than their undergraduate counterparts, suggesting that the research literacy taught in first-year composition courses does not support lifelong learning (Stagg and Kimmins, 2014). Additionally, a stand-alone information literacy course can reach the "affective domain," thereby supporting student self-esteem and allowing them to "make accurate judgments about their skill level," in relation to information literacy as well as other academic demands (p. 144).

This affective design, as well as active, explicit teaching and learning support student success and retention. When students have the opportunity to develop their desired skillset, they are more likely to connect with content, their peers, their instructors, and their institutions (Wilkes et al., 2015). Like academic writing skills, information literacy skills should be supported across the curriculum not only because they support student success but because they foster lifelong learning.

Results of iSchool Core Undergraduate Curriculum Mapping Study

Themes – Connections across Programs

The primary aim of my research is to identify connections between information science undergraduate programs, and alignment with various conceptualizations of information literacy, with the equally important objective of filling in the pedagogical gaps for information literacy instruction that promotes inclusion, equity, and social justice.

Each of the five schools in this study offers a 100 or 200-level introduction to information science course; however, the University of Michigan does not include this course as part of its core requirements. The other four all emphasize the relationship between people and information; the emergent nature of information science programs and careers; need for effective communication; and the value of effective communication in the 'Information Society'. These primary courses also stress understanding the development and

influence of information and communication technologies (ICT's), social factors that shape the information society, and information as fundamental to the human experience. The University of Maryland, University of Michigan, University of Illinois, University of Wisconsin, and Pennsylvania State University each require coursework in programming, and/or web-design; the University of Maryland, University of Illinois, and Pennsylvania State University each require some form of mathematical reasoning course; and the University of Maryland, University of Michigan, and Pennsylvania State University each require a course focused on information and/ or information management in a work environment.

Themes - Syllabi Outcomes Alignment with Information Literacy Models

The ACRL Framework

Despite the ACRL Framework having been designed to promote information literacy instruction in higher education, and despite the extensive research and mapping around this Framework, it is not the most prominently reflected of the models I compared for this study. Figure 4.1 offers a comparative overview for each school and the frequency with which each objective concept aligned with each ACRL frame. In fact, the code 'N' indicating that a line of content is not applicable to any of the standards, frames or concepts appears most frequently first under Bibliographic Instruction, and then under the ACRL Framework. This code appeared least often under the Empire State Information Fluency

Continuum, followed by Paul Zurkowski's 1974 proposal of the Information

Service Environment.

Of the 529 codable lines in the ACRL column, 180 did not apply to any of

the six frames. 'Information Has Value' had the second highest count at 108;

'Information Creation as Process' appeared 95 times; 'Research as Inquiry'

occurred 44 times; 'Authority is Constructed and Contextual' appears 35 times;

thirty of the lines could apply generally or 'cover multiple frames; 'Scholarship as

Figure 4.1 Bar Graph Comparing Coded Data Alignment to ACRL Framework, by School
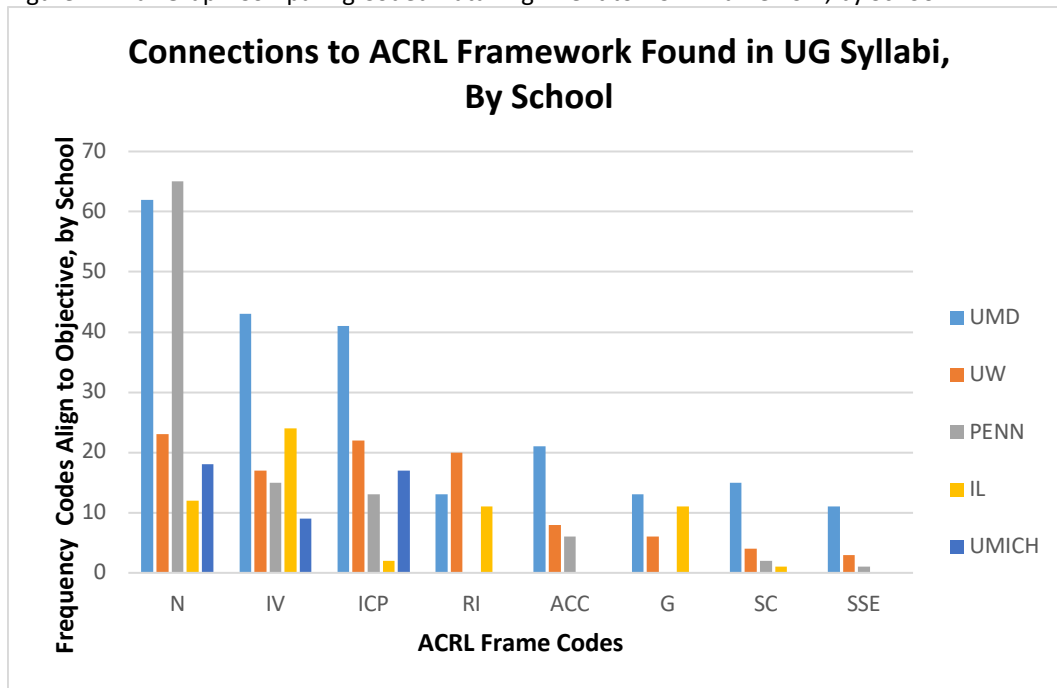
Conversation' is reflected in 22 lines; and 'Searching as Strategic Exploration'

shows up only 15 times.

ACRL Frames Represented in Core Course Outcomes at the University of Maryland's Undergraduate Information Science Program
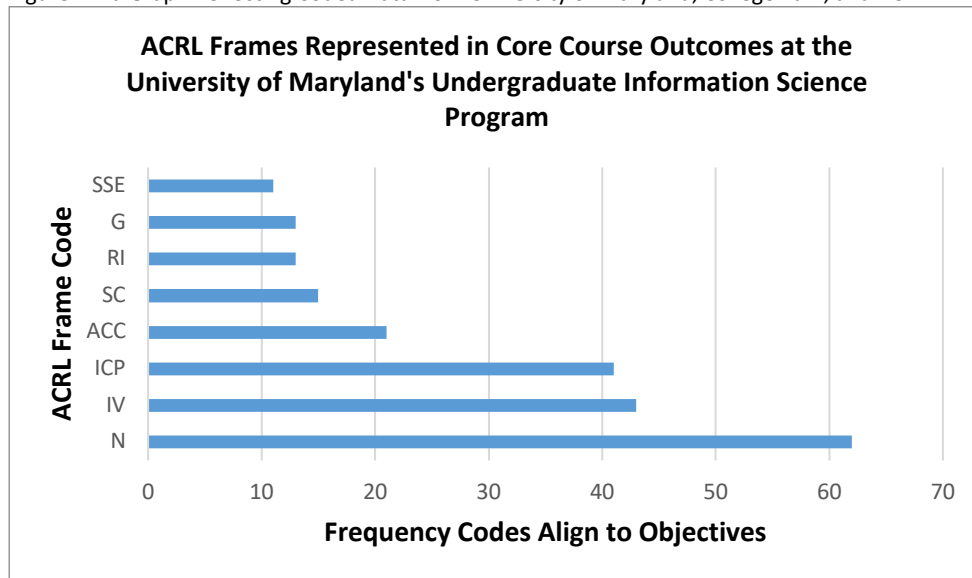
This trend holds across the five schools where 'N' or 'IV' – 'Information Has Value' appear as the dominant code for each. 'ICP' or 'Information Creation as Process' only has a position of prominence over 'IV' at Michigan where they stand 17 to 9 respectively. Further, with 61 concept lines, Illinois returns 24 for 'Information Has Value', and 12 for 'N'; in its 219 lines, the University of Maryland sees 62 occurrences of 'N', and 43 for 'Information Has Value'; the University of Michigan, of 44 lines, returns 18 'N'. Penn State has 102 lines for the ACRL Framework, of which more than half – 65 – are 'N', with the next highest value of 15 going for 'Information Has Value'; and Wisconsin's 103 lines see 'N' at 23, and 'Information Creation as Process' at 22 lines. The frequencies are apparent in Figures 4.1.a for the University of Maryland, 4.1.b for the University of Michigan, 4.1.c for the Pennsylvania State University, 4.1.d for the University of Wisconsin, Madison, and Figure 4.1.e for the University of Illinois, Urbana-Champaign.

Figure 4.1.b Bar Graph Reflecting Coded Data from University of Michigan and ACRL

ACRL Frames Represented in Core Course Outcomes at the University of Michigan's Undergraduate Information Science Program
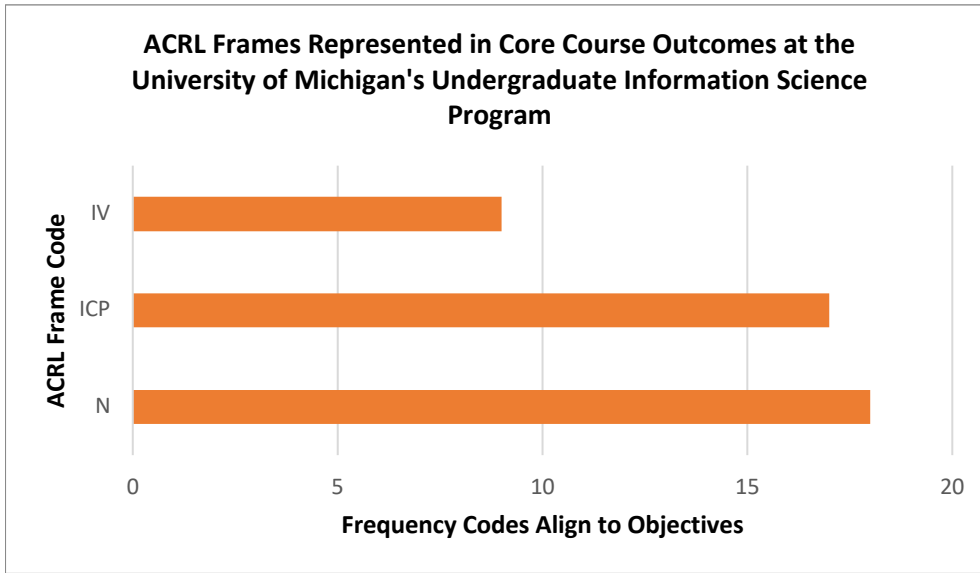
Figure 4.1.c Bar Graph Reflecting Coded Data from Pennsylvania State and ACRL

ACRL Frames Represented in Core Course Outcomes at the Pennsylvania State Universities Undergraduate Information Science Program
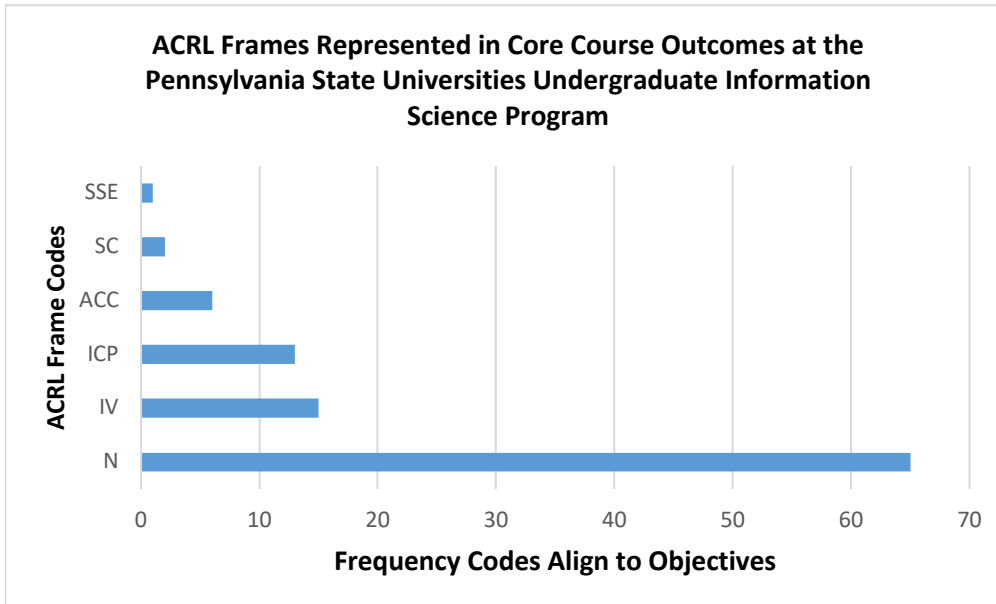
These findings are somewhat consistent with earlier framework mapping studies where the frames associated with information search, and retrieving sources were most-often reflected. However, the 108 lines coded for 'Information has Value' demonstrate that iSchools aim to help their graduates

92

Figure 4.1.d Bar Graph Reflecting Coded Data from University of Wisconsin, Madison, and ACRL

ACRL Frames Represented in Core Course Outcomes at the University of Wisconsin's Undergraduate Information Science Program

Y-axis label: **ACRL Frame Code**
X-axis label: **Frequency Codes Align to Objectives**

Categories (top to bottom): SSE, ACC, SC, AC, G, IV, RI, ICP, N
X-axis scale: 0, 5, 10, 15, 20, 25
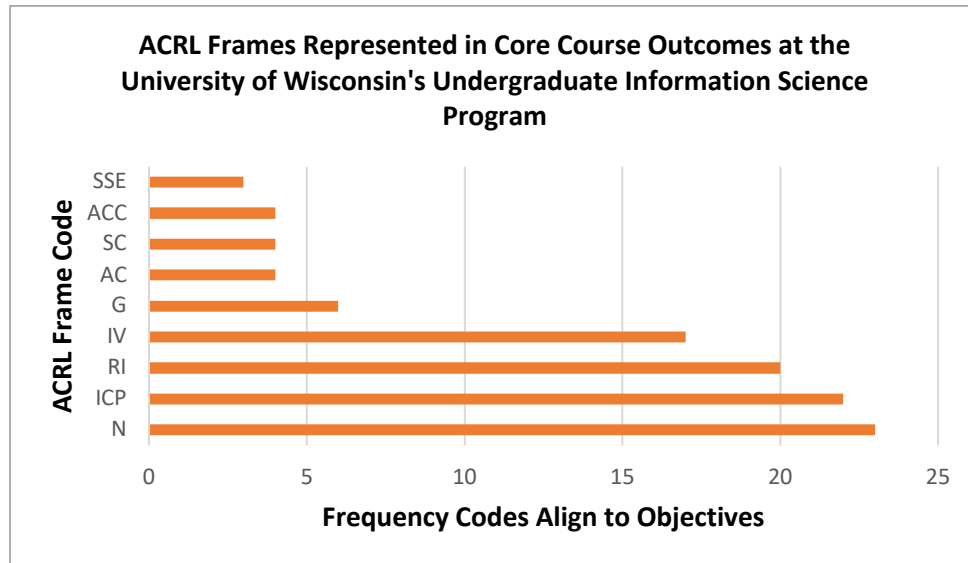
recognize the myriad dimensions in and of information, and that information literacy as a tool prepares them to more successfully navigate their worlds.

That only 35 lines connect with 'Authority is Constructed and Contextual', suggests iSchool core curriculums may not provide enough explicit instruction around ideas of power and privilege. Additionally, 'Scholarship as Conversation' only appears 22 times, indicating that students may need to pursue upper-level coursework that reinforces the power of sustained discourse, and how they can ultimately contribute to the discussion.

Figure 4.1.e Bar Graph Reflecting Coded Data from University of Illinois, Urbana-Champaign, and ACRL

ACRL Frames Represented in Core Course Outcomes at the University of Illinois' Undergraduate Information Science Program
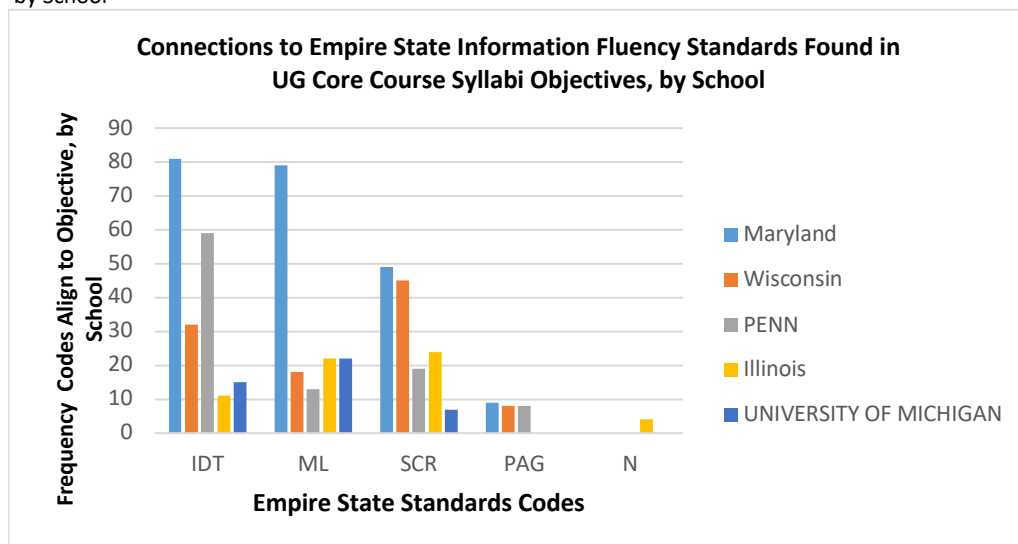
(Bar chart. Y-axis: ACRL Frame Code. X-axis: Frequency Codes Align to Objectives, ranging 0 to 30.)

- SC: 1
- ICP: 2
- RI: 11
- G: 11
- N: 12
- IV: 24
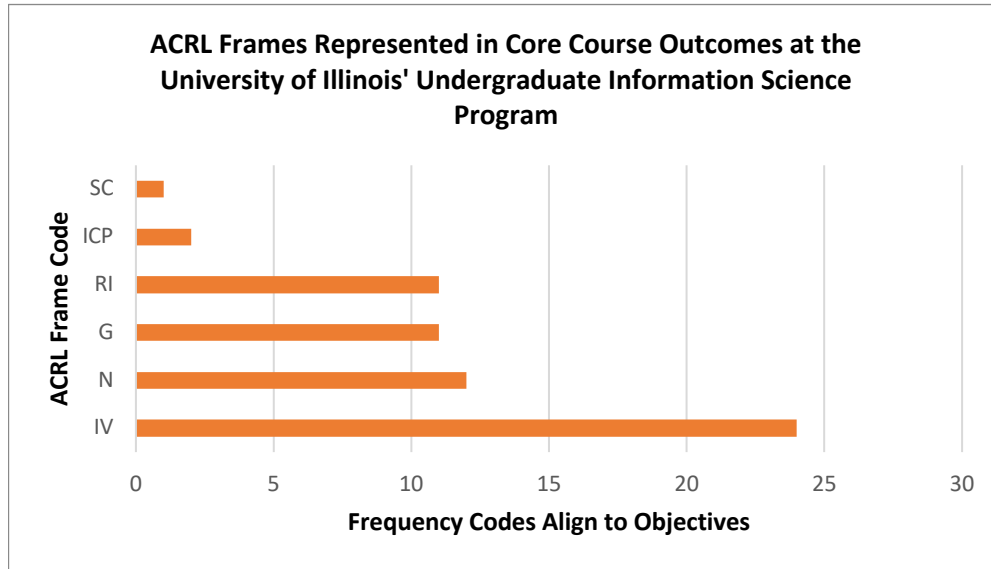
Empire State

It is, in fact, the more recently updated Empire State Information Fluency Continuum, which was designed by public librarians in conjunction with public school teachers and media specialists that has the fewest 'N' lines at only 4.

Figure 4.2 Bar Graph Comparing Coded Data Alignment to Empire State Information Fluency Continuum, by School

Connections to Empire State Information Fluency Standards Found in UG Core Course Syllabi Objectives, by School

(Bar chart. Y-axis: Frequency Codes Align to Objective, by School, ranging 0 to 90. X-axis: Empire State Standards Codes: IDT, ML, SCR, PAG, N. Series: Maryland, Wisconsin, PENN, Illinois, UNIVERSITY OF MICHIGAN)

'Inquiry and Design Thinking' occurs 198 times; Multiple Literacies appears 154; Social and Civic Responsibility is reflected 144 times, and Personal and Aesthetic Growth appears 25 times. Figure 4.2 contains a bar graph showing each school's connections to the ESIFC through the frequency by which each Standard Code aligned with objective concepts.

However, each school in the study varies in the Empire standard that dominates. Figure 4.2.a is a Bar Graph reflecting the coded data from the University of Illinois against ESIFC, and Figures 4.2.b, 4.2.c., 4.2.d, and 4.2.e provide the same for The University of Maryland, University of Michigan, Pennsylvania State University, University of Wisconsin, and University of Illinois, respectively. From this, we see 'Social and Civic Responsibility', and 'Multiple Literacies' take the top slots at 24 and 22 occurrences out of 61 lines; Maryland (Fig. 4.2.b) shows 'Inquiry and Design Thinking' 81 out of 218 lines, and 'Multiple Literacies' at a close second with 79 lines; Michigan (Fig. 4.2.c) only has 44 lines of code from its core curriculum because the curriculum design focuses more

heavily on career tracks; however half of those lines align most closely to

'Multiple Literacies'; Penn State (Fig 4.2.d) reflects more 'Inquiry and Design

Thinking' than other standards, with 59 of 99 lines; and Wisconsin's (Fig 4.2.e)

program shows 45 of its 103 lines aligned with 'Social and Civic Responsibility'.

Figure 4.2.a Bar Graph Reflecting Coded Data from University of Illinois, Urbana-Champaign, and Empire State
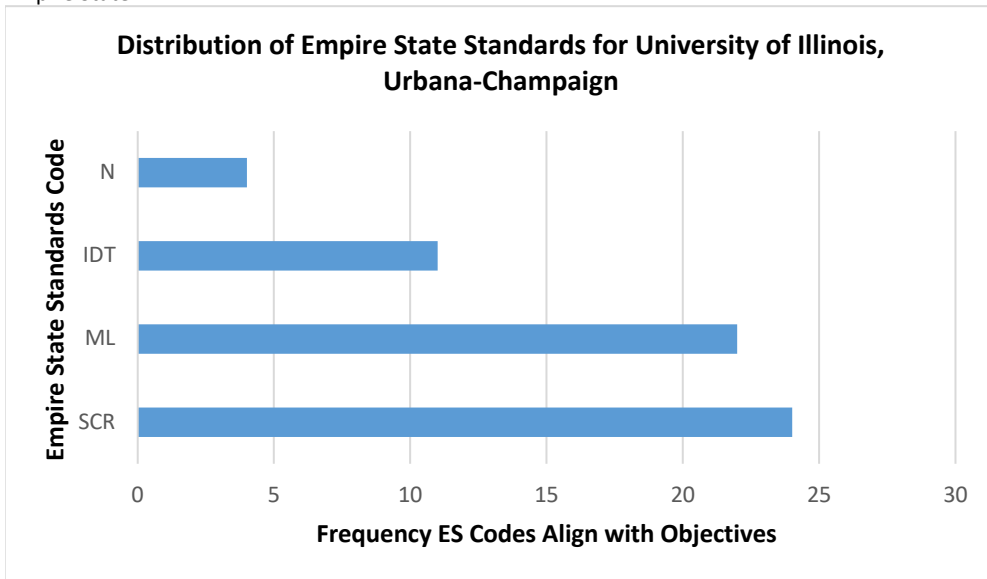
Distribution of Empire State Standards for University of Illinois, Urbana-Champaign

Empire State Standards Code (y-axis)
Frequency ES Codes Align with Objectives (x-axis)

Code	Frequency
N	~4
IDT	~11
ML	~22
SCR	~24

Figure 4.2.b Bar Graph Reflecting Coded Data from University of Maryland, College Park, and Empire State

Distribution of Empire State Standards for University of Maryland, College Park

Empire State Standards Code (y-axis)
Frequency ES Codes Align with Objectives (x-axis)

Code	Frequency
PAG	~8
SCR	~49
ML	~79
IDT	~81

96
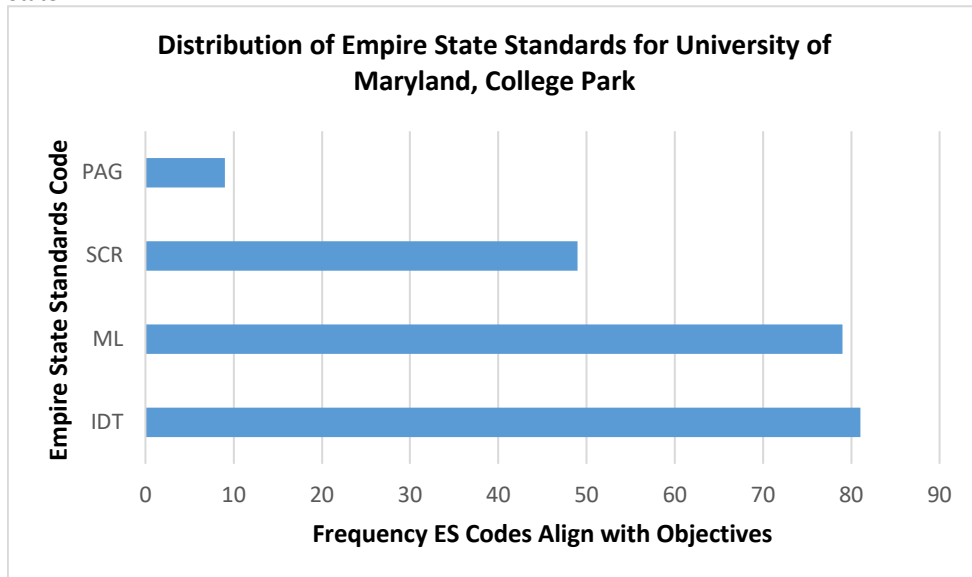
These Standards were implemented for students in pre-K through 12th grade, yet they are the most prominently reflected of the four models in this study. Fortunately, the ESIFC was designed to promote individual agency, empowerment, and reflection – both contextually and of the self. 'Inquiry and Design Thinking', as the most prominent standard covering approximately 38% of the outcomes, establishes that agency, where 'Multiple Literacies' and 'Social and Civic Responsibility' with 29% and 27% respectively promote the omnipresence and value in information, and encourage exploring context and positionality with regard to information consumption, creation, and sharing.

Figure 4.2.c Bar Graph Reflecting Coded Data from University of Michigan, and Empire State
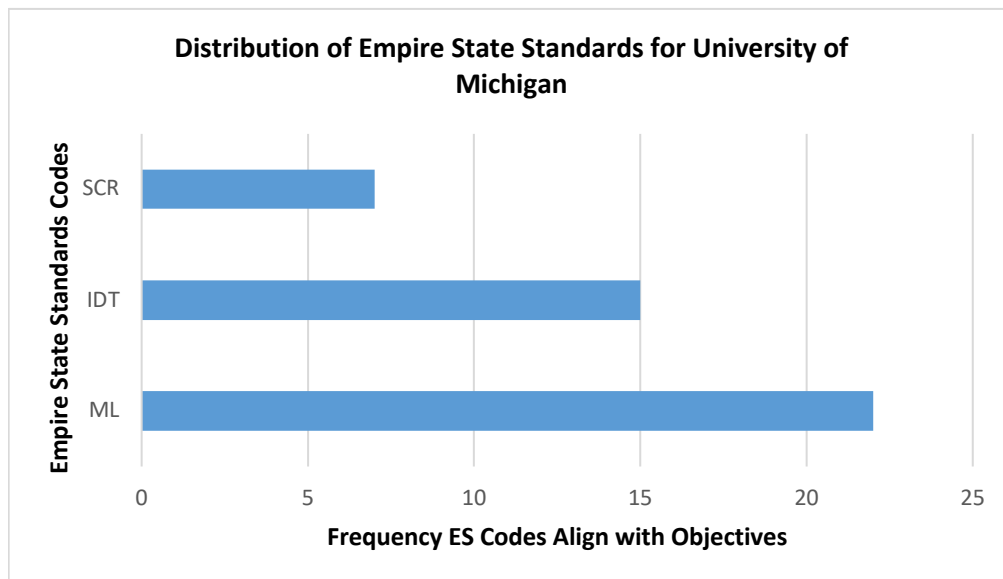
While 'Personal Growth and Agency' only accounts for approximately 5% of material, and did not appear in Michigan or Illinois' curriculum, this aligns with the ACRL findings that indicate a gap in critical thinking and learning.

Figure 4.2.d Bar Graph Reflecting Coded Data from Pennsylvania State University, and Empire State
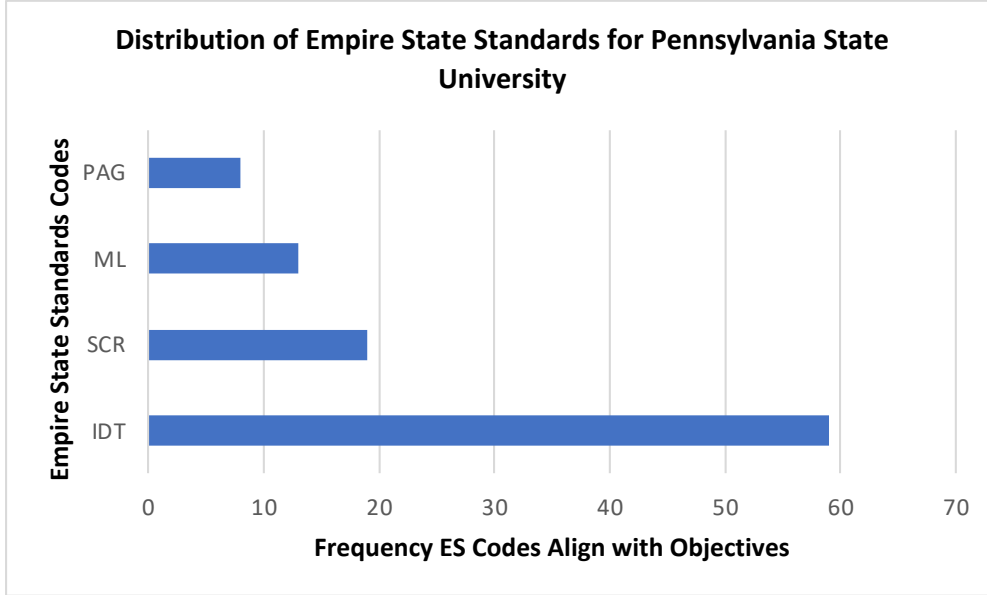
Distribution of Empire State Standards for Pennsylvania State University

Empire State Standards Codes (y-axis): PAG, ML, SCR, IDT

Frequency ES Codes Align with Objectives (x-axis): 0, 10, 20, 30, 40, 50, 60, 70

- PAG: ~7
- ML: ~13
- SCR: ~19
- IDT: ~59

Figure 4.2.e Bar Graph Reflecting Coded Data from University of Wisconsin, Madison, and Empire State

Distribution of Empire State Standards for University of Wisconsin, Madison

Empire State Standards Codes (y-axis): SCR, IDT, ML, PAG

Frequency ES Codes Align with Objectives (x-axis): 0, 10, 20, 30, 40, 50

- SCR: ~45
- IDT: ~32
- ML: ~18
- PAG: ~8
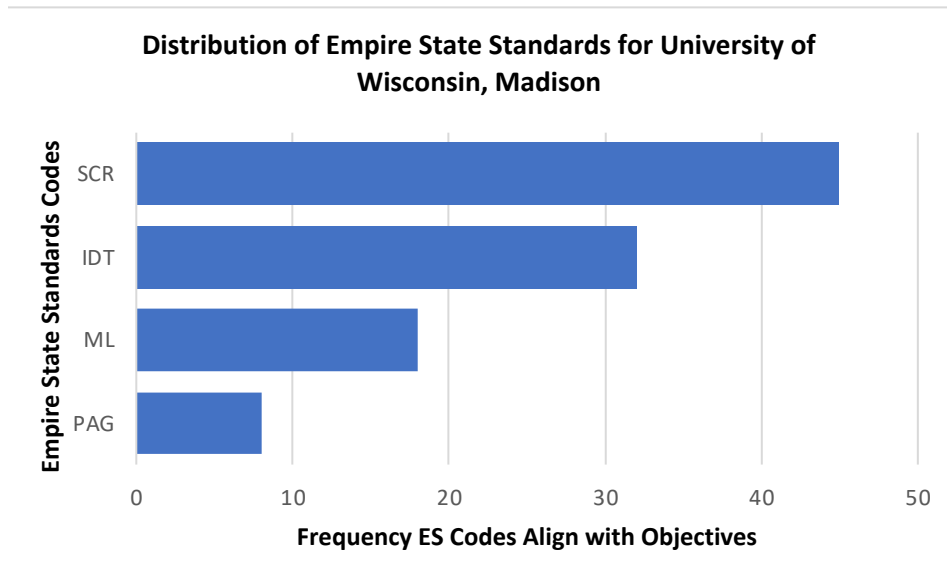
Information Service Environment

The Information Service Environment, as the original conceptualization for information literacy, still holds some credence across the five iSchools' core course objectives I analyzed; Totals from the comparative Bar Graph in Figure 4.3, which shows how often each ISE concept aligned with the five school's core objectives, support 'Discovery of Truth' accounted for 162 total lines, and 'N' was a close second at 154; 'Decision Making' connected with 100 lines; 'Advancement of Knowledge' aligned with 90. The remaining indicators did not

Figure 4.3 Bar Graph Comparing Coded Data Alignment to Information Service Environment, by School
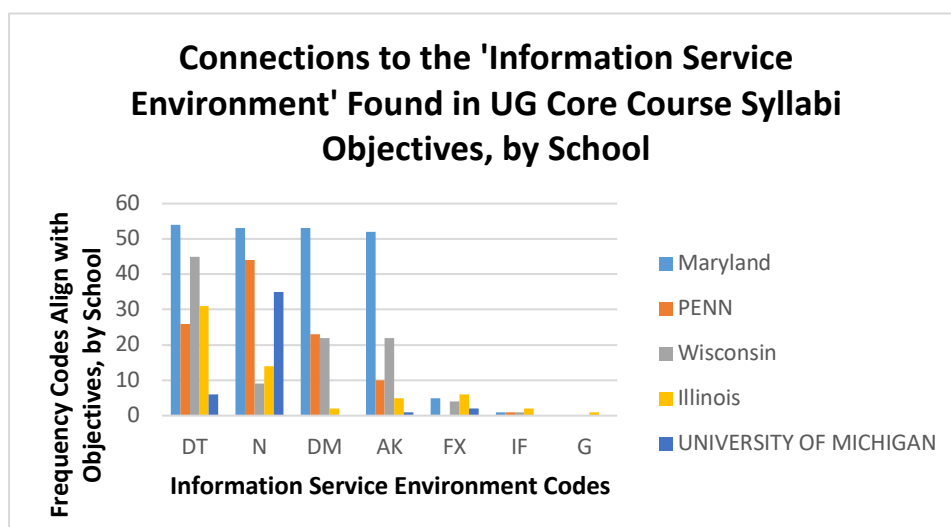
perform as well with 'Freedom of Expression' applying to 17 lines; 'Individual Fulfillment' connecting with five; 'Generally applies' occurs once, and 'Government Responsibilities' did not connect at all.

Zurkowski's (1974) ISE is not a framework, rather it was meant to guide the creation of a national standard for information literacy; therefore, it is not easily measured. In fact, the second and third concepts as shown in Table 4.1

apply more directly to how power structures should provide access and

opportunity, which accounts for 'Government Responsibilities' weak showing in

the map. The first concept singularly embodies the other five indicators I applied

to the course objectives and outcomes. Table 4.1 shows Zurkowski's (1974)

Table 4.1 Original Information Service Environment Concepts and Corresponding Indicators

ORIGINAL LANGUAGE	UNIQUE INDICATORS	CODE
Individual fulfillment, the advancement of knowledge and the discovering of truth, participation in decision making by all members of society, and achieving an adaptable and stable community depends on a system of freedom of expression.	INDIVIDUAL FULFILLMENT	IF
	ADVANCEMENT OF KNOWLEDGE	AK
	DISCOVERY OF TRUTH	DT
	PARTICIPATION IN DECISION MAKING	DM
	FREEDOM OF EXPRESSION	FX
Government should not perform services for citizens which citizens are capable of performing for themselves.	GOVERNMENT RESPONSIBILITY	GT
Government has a legitimate responsibility for assuring educational opportunities for all.		

original language for the three concepts, and how I separated key language for

coding.

Grammatically, one could argue that Zurkowski's primary focus in the

first concept is 'freedom of expression', which also showed more poorly than

the four others. However, 'freedom of expression' and 'Decision Making' were

coded in lines that promote the information creation process, 'Decision Making'

also demonstrates a degree of agency that is promoted by the ESIFC, and

Figure 4.3.a Bar Graph Reflecting Coded Data from University of Wisconsin, Madison, and Information Service Environment
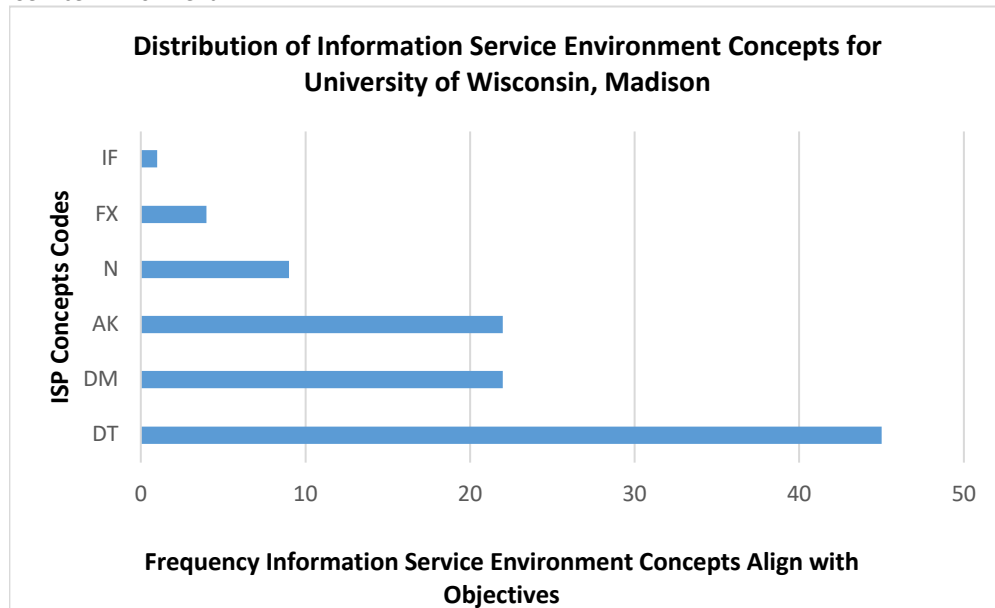
Distribution of Information Service Environment Concepts for University of Wisconsin, Madison

Frequency Information Service Environment Concepts Align with Objectives

Figure 4.3.b Bar Graph Reflecting Coded Data from University of Illinois, Urbana-Champaign, and Information Service Environment

Distribution of Information Service Environment Concepts for University of Illinois, Urbana-Champlain

Frequency Information Service Environment Concepts Align with Objectives
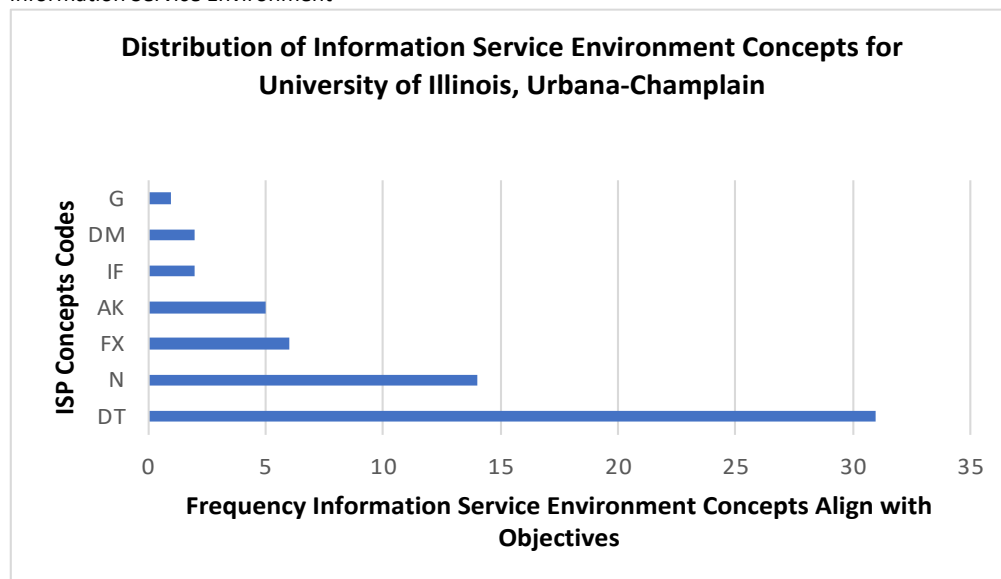
similarly reflected in the curriculum map. Figures 4.3.a-e respectively show the

frequency with which the 6 indicators align to the core course objective concepts

for the University of Wisconsin, University of Illinois, University of Maryland,

Pennsylvania State University, and University of Michigan.

Figure 4.3.c Bar Graph Reflecting Coded Data from University of Maryland, College Park, and Information Service Environment
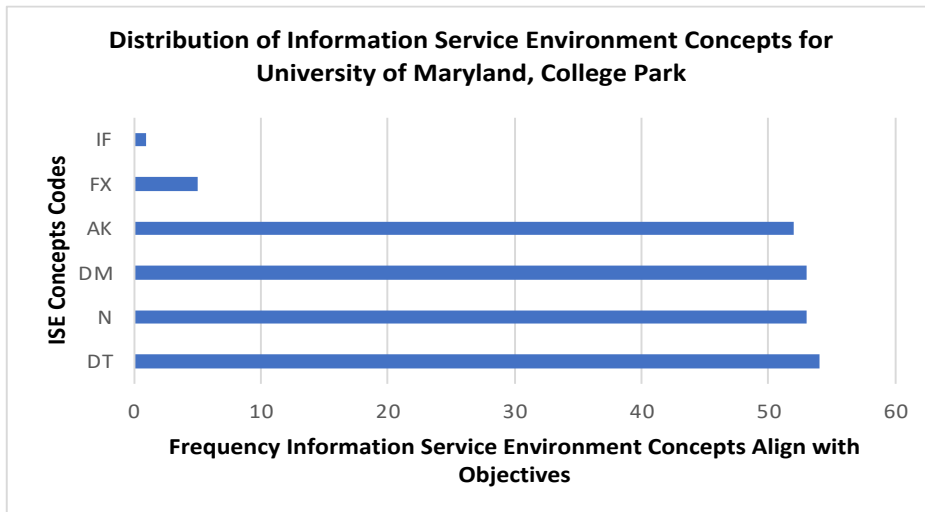
Distribution of Information Service Environment Concepts for University of Maryland, College Park

Figure 4.3.d Bar Graph Reflecting Coded Data from Pennsylvania State University, and Information Service Environment

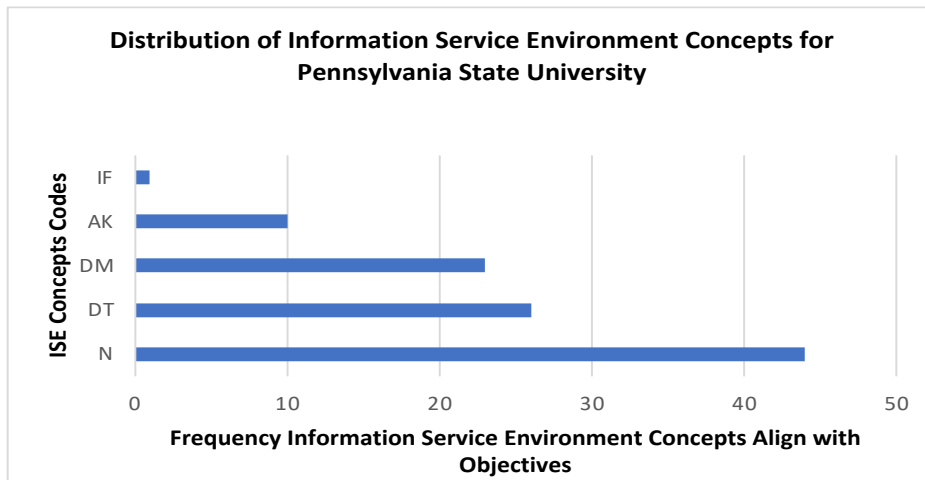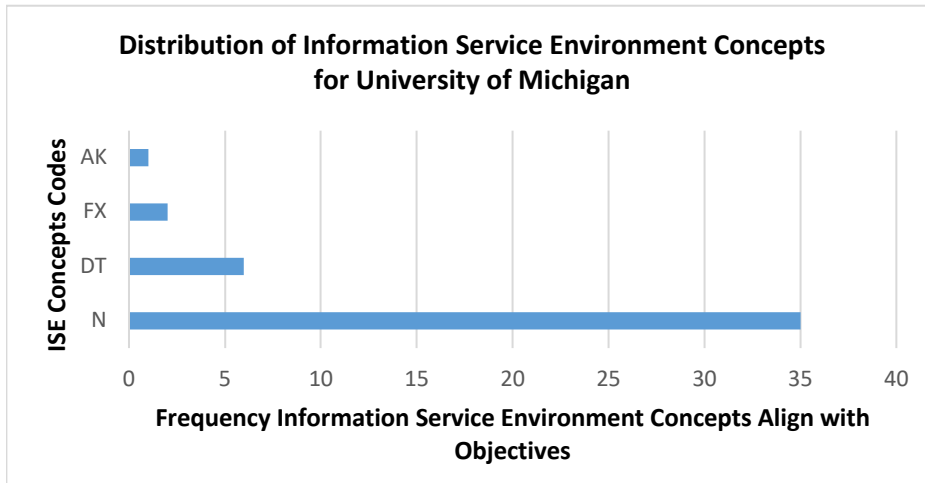**Distribution of Information Service Environment Concepts for Pennsylvania State University**

Figure 4.3.e Bar Graph Reflecting Coded Data from University of Michigan, and Information Service Environment

**Distribution of Information Service Environment Concepts for University of Michigan**

Bibliographic Instruction

Conversely, Bibliographic Instruction was wholly inapplicable to most of the coded objectives. Of the 530 lines of data codable for Bibliographic instruction, 355 (or two-thirds) were coded as 'N'; 69 applied to 'Form of Publication'; 58 for 'Type of Reference Tool'; 27 connected with the overall process; ten applied to 'Primary/ Secondary Sources'; eight to 'Systematic Literature Search' and three for 'Publication Sequence'. There was no school for which 'N' did not occur most frequently, and in fact, only Maryland's had more than half of its lines coded for BI outcomes with 114 of 219 applicable lines. For the remaining four schools, 'N' accounts for 86 out of 104 at Wisconsin; 78 of 102 at Penn State; 55 of 61 at

Figure 4.4 Bar Graph Comparing Coded Data Alignment to Bibliographic Instruction, by School
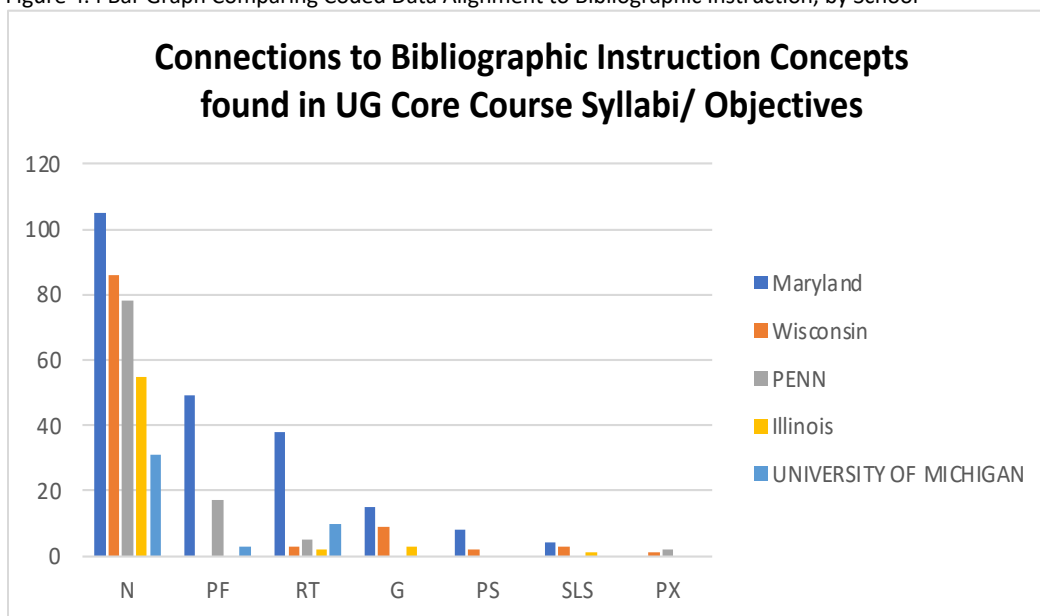
Illinois; and 31 out of 44 at Michigan.

Even though these results do not favor Bibliographic Instruction skills, there is still a general trend toward search and retrieval through 'Form of

Publication' and 'Type of Reference Tool'. I provide a visual breakdown of this analysis in Figure 4.4, which is a bar graph reflecting the compared, coded data for each of the five schools in the study.

Alignment between Objectives and Missions

Of the five schools in this study, four of them (Maryland, Illinois, Wisconsin, and Michigan) provide a 'Mission' Statement easily accessible from their respective web pages that contributed to an additional 55 lines of code. Keywords include 'responsible', 'adept', 'access', 'social good', and represent a common ideology that Information Science programs want to promote social change for the better.

This is most clearly represented in the 27 lines coded as 'SCR' (Social and Civic Responsibility) from the Empire State Information Fluency Continuum. While the ACRL's 'IV' (Information Has Value) aligned with 21 lines, another 21 lines in the ACRL column did not reflect any of the frames. The most balanced model comes from Paul Zurkowski, with 'Advancement of Knowledge' aligning with 16 lines, 'Discovery of Truth' with 14, and 'Decision Making' reflecting 13.

Where the University of Maryland saw Empire State's 'Inquiry and Design Thinking' and 'Multiple Literacies' reflected most often in its objectives at 81 and 79 lines respectively out of 219 lines of data for objectives and outcomes. The 15 lines for the school's mission are most reflective of 'Social and Civic Responsibility' at 12 out of 15 lines under Empire State, and the ACRL's

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'Information has Value' at 8 out of 15 lines under its column. The two most

prominently aligned models for both the objectives and the mission statement

Table 4.2 Most Frequently Occurring Codes, by Objective Code, Count, Mission Code, and Count for the University of Maryland, College Park.

The University of Maryland, College Park			
Objective Code	**Count**	**Mission Code**	**Count**
IDT	81	SCR	12
ML	79	IV	8
DT	54	DM	7
DM	53	AK	6
AK	52	N (ACRL)	6

are the Empire State Information Fluency Continuum, and Paul Zurkowski's

Information Service Environment. Table 4.2 shows the most frequent codes that

appeared in the objective study, alongside the most frequent codes that

appeared in the mission statement study for the University of Maryland, College

Park.

Illinois's course objectives reflect the 'Discovery of Truth' from The

Information Service Environment with 31 out of 60 objective lines, and 7 out of

16 mission lines; 'Social and Civic Responsibility' from Empire State appears on

24 out of 60 objective lines, and 7 out of 16 mission lines; and 'Information Has

Value' from the ACRL framework aligns with 24 out of 60 objectives and 8 out 16

mission. While the ACRL frames align fairly consistently in Maryland, and Illinois'

Table 4.3 Most Frequently Occurring Codes, by Objective Code, Count, Mission Code, and Count for the University of Illinois, Urbana-Champaign

The University of Illinois, Urbana Champaign			
Objective Code	**Count**	**Mission Code**	**Count**
DT	31	IV	8
SCR	24	SCR	7
IV	24	DT	7

missions, they are still overshadowed by Empire State and the Information

Service Environment.

The ACRL Framework also failed to show well at the University of

Wisconsin, Madison where 11 of the 21 mission lines were coded 'N' indicating

no alignment. 'Information Creation as Process' did appear with 6 of the 21

mission lines, and is also the ACRL frame that appears most often at 22 out of 60

lines under the school's objectives. However, 'Discovery of Truth' from the

Table 4.4 Most Frequently Occurring Codes, by Objective Code, Count, Mission Code, and Count for
the University of Wisconsin, Madison

The University of Wisconsin, Madison			
Objective Code	**Count**	**Mission Code**	**Count**
DT	45	SCR	7
SCR	45	ML	6
IDT	32	AK	5

Information Service Environment, 'Social and Civic Responsibility' from Empire

State, and 'Inquiry and Design Thinking' from Empire State appear more often in

Wisconsin's objectives with 45, 45, and 32 out of 60 lines. Further, Empire State's

'Social and Civic Responsibility' connects with 7 and 'Multiple Literacies'

connects with an additional 6, while 'Advancement of Knowledge' from the ISE

aligns with 5 of Wisconsin's 21 mission lines. The Information Service

Environment has a high 'N' count, appearing in 1/3 of its 21 lines.

The brevity of University of Michigan's mission statement – *'We create*

and share knowledge so that people will use information – with technology – to

build a better world,'(Michigan, 2021) - proves for rather unremarkable coding

results. Translating to only for conceptual lines for coding, 'Multiple Literacies'

from Empire State and 'Discovery of Truth' from the Information Service

Environment appear twice in their columns; the only other code to have more

than one line was 'N' in the ACRL Framework column, also appearing twice.

Michigan's 43 objective lines most reflect 'Multiple Literacies' from Empire State

at 22 lines; 'Information Creation as Process' with 17 lines, and 'Inquiry and

Design Thinking' from Empire State at 15 lines. The mission statement does not

offer enough context for substantial data or an accurate comparison with the

coded objective results.

The Universities of Maryland, Wisconsin and Illinois seemingly require

coursework that strongly supports their respective missions; however, it is

important to note that none of the five schools in this study boasts course

objectives or missions that align with the ACRL Framework. As these programs

are not library related, it's easy to argue that they don't need to, and while I

agree with that logic, the results of this study demonstrate that undergraduate

iSchool programs have a unique opportunity to teach information and

information literacy across their respective institutions, which they should

approach through branding, explicit design, and incorporating into the general

education curriculums at colleges and universities.

Chapter 5: Choosing Wisely – A discussion on the new 'Holy Grail'

Information literacy has long since been proprietary to academic and school libraries. All of the six United States Higher Education accrediting bodies address information literacy as mandatory to curriculum but offer no guidance for teaching or clear outcomes for measurement. As increasing numbers of iSchools and related programs introduce undergraduate degrees in Information Science, it has become equally important for those programs to offer the missing guidance and measurements by piloting a unique pedagogical approach to information literacy instruction. It is no longer enough for Higher Education Accrediting Bodies, and individual institutions to pay lip-service to 'information literacy' in their requirements, values, or other assessment measures without recognizing it as an independent ontology and epistemology that strongly supports civic engagement, equity and inclusion, and social justice.

Advocating for Change

Based on the information literacy models, policy reviews, and the curriculum mapping in this dissertation, it is evident that information literacy instruction does not have the support or reach that it should in the academy, nor does it align with the very people-centered missions set forth by the iSchools investigated through the curriculum mapping process. There is limited evidence that the current, prominent information literacy (one-shot) instruction practices

bolster civic engagement or even promote critical thinking to help young people recognize ethical and integrity violations around information, or even to understand the basic life cycle of information. The Empire State Information Fluency Continuum's 'Social and Civic Responsibility' standard aligns with more than half of the ideas touted in the coded mission statements, yet it is reflected in less than 1/3 of the course objective concepts. Moreover, earlier ACRL Framework mapping initiatives support the Framework's limitations in teaching advanced critical-thinking skills or helping students to recognize "self-bias" (Gammons and Inge, 2017, 174). Even after librarian-led sessions, students focus more on search and retrieval, but do not connect with the frame 'authority is constructed and contextual'. In fact, even credit-bearing information literacy courses still tend to focus on the more measurable outcomes around search strategy than fostering critical thinking (Benallack & Rundels, 2021).

The responsibility to teach information literacy extends beyond academic libraries because we exist in an information society – one that is plagued by inequity, and broken by the digital divide. Individual schools, even individual faculty at those schools decide how and how much they teach information literacy, and the teaching focus remains on search more than it does information, information needs, information behaviors, or information worlds. Even with a common framework established by a national organization, there is no standard structure for teaching information literacy as a stand-alone course. Badke contends that information literacy cannot be achieved if it is not explicitly

taught as its own academic discipline with a distinct and "confirmed role within the curriculum." (2008). And it is evident, perhaps now more than ever, that information literacy is a necessary competency for everyone, particularly Internet users, who should be taught "to read like fact checkers," because "the kinds of duties that used to be the responsibility of editors, of librarians now fall on the shoulders of anyone who uses a screen to become informed about the world," (Wineberg & McEvers, 2016).

To relegate information literacy instruction and assessment to a goal that can be achieved when scattered is to threaten the credibility of other disciplines or other general education goals. If information literacy can be achieved as embedded throughout other coursework, then composition skills, for example can, arguably, also be learned as embedded throughout other disciplines. But logic establishes that students need a foundation in a skill before they can recognize when they are practicing and/ or becoming adept at said skill. Burying information literacy objectives – objectives that students need to recognize as connected to success – under objectives in other disciplines does not give students the competence needed for effectively navigating academic, career or social goals.

Furthermore, undergraduates, who have "difficulty resolving, and sometimes even acknowledging discrepancies," and relevance in a source, often need 'hand-held' support through a search task (Britt & Aglinskas, 2002). Lupien and Oldham (2012) examine the common characteristics assigned to

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"millennials" as a user group in the library and higher education literature.

Importantly, they note that many claims are broad generalizations that extend

beyond what empirical research suggests and that fail to capture the nuances of

Millennials as a user group. Especially subject to this is assuming all Millennials

are true digital natives, living and breathing technology. Lupien and Oldham

challenge this assumption and urge libraries and librarians to avoid using

technology for technology's sake. Instead, higher education needs to make a

broader effort to understand Millennials, and Gen-Z students as separate user

groups and grasp their actual use and comprehension of information sources

and products to develop courses and lesson plans that best match their interests

and needs, and that prepare them to contribute to a civil, information driven

democracy.

Bloom and Deyrup's 2012 study presents findings that indicate how

students "tried to find the shortest path to finishing their research project"

without learning how to fully navigate databases (595). In their own study they

found students most often had no plan in their searching, but had "an inflated

view of their on-line research skills" (599). Similarly, in their study of students in

an introduction to communications class, Biddix, Chung, and Park (2011) also

found that students "value efficiency over credibility" (180). Students will choose

search engines like Google, which allow "natural language," rather than

complicated library databases which incorporate Boolean logic and specified

search terms (180). College students are barely effective information users in an

age where the most successful are information producers, and the one-hour

they are required to spend learning these valuable skills is not enough.

One student even stated, "Google is very straight forward. You put in

your word and it searches. It also corrects spellings to rectify your search. Bright,

eye-catching– simple. Not confusing" (546). This statement along with students'

reluctance to use the library website led Griffiths and Brophy (2005) to conclude

that students do not know how to search for information outside of popular

search engines such as Google or have tried other sources but prefer to "Google

it."

Georgas further explores undergraduate students' interaction with the

Google search engine in a 2014 study conducted at Brooklyn University in New

York City. She set up a scenario that prompted direct comparison of

undergraduate students' searches in Google and in a library search tool.

Although the comparison takes place in a research context, we can glean cues

about the students' relationship with Google as a search tool. Another strength

of the study is its diverse sample group, encompassing a wide range of ages and

academic disciplines, while also providing a fairly accurate demographic

representation of the undergraduate enrollment. In her study, Georgas identifies

several key concepts that echo the findings from Biddix, Chung, and Park (2011).

First, students' search strategies are simplistic. This may indicate that they

cannot fully express their information need in natural language, much less

articulate in sophisticated search strategies. Second, students quickly scan

results, usually on the first page, and modify their search rather than delve further into the results list.

These inefficient search skills born of limited experience and reliance on search engines inform Badke's 2009 article "Stepping Beyond Wikipedia" that insists on information literacy instruction reform. From scholarly research and his own experience working with undergraduates, he notes that students rely heavily on the open web and sites such as Wikipedia during information searches. Bloom and Deyrup (2015) also note that students use inefficient skills learned in high school when approaching their college assignments; they call for steps to be taken within the information profession to teach better researching practices. As far as helping students find credible and relevant sources, they note, "technology can only do so much" (599).

Regardless of students' searching proficiency or preference for web-based search engines, it is important to know how students actually seek information when they use library resources. For example, O'Brien and Symons' (2005) study on undergraduate students reinforces myriad findings around the information-seeking behavior of the millennials as highly dependent on social media, and source material that is easy to retrieve echoing Abram and Luther's (2004) assertion that millennials expect to have sources before they even have a prompt. These turn of the Century publications were necessary to resolve academic librarians' anxiety around teaching information literacy skills not only in line with the ALA's new standards, but in such a way as to connect with

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students from whom they are separated by two generations. Early teaching around online databases was further complicated when considering the students' information needs and behaviors were not consistent across disciplines. Students studying in the Arts and Humanities still favored physical resources, while STEM students wanted to engage with electronic materials. O'Brien and Symons' data also indicate students are most likely to consult the open web for information, and least likely to reach out to their instructor, or instruction librarian.

As social media platforms grew in popularity, undergraduates' engagement with library databases and resources continued to wane in favor of personalized news feeds, (Kim, Sin, and He, 2013) including Microblogs like Twitter, Wikipedia and similar sites, and even Social Q&A platforms such as Yahoo! Answers (2). Kim, Sin, and Yoo-Lee's (2014) follow-up study found that over 98% of students use Wikipedia and 95% use social networking sites such as Facebook for information seeking including social updates, news, and opinions, (447).

On the other hand, Britt and Aglinskas' (2002) research focuses on document level literacy skills, with findings that benefit the instruction design for a stand-alone information literacy course. The study of high school seniors and college undergraduates demonstrates increased success in search and application when guided by the 'Sourcer's Apprentice' online learning platform, which helps them better understand the efficacy of a particular source. The

participants who worked independently struggled in this regard demonstrating the need for additional guidance in both finding information and assessing its relevance and compatibility, which are basic information literacy skills. The primary goal of a stand-alone IL course is to help students attain higher-level IL skills, and to become successful, independent information seekers, evaluators, users, and producers.

The above referenced studies demonstrate how college students are learning how to use their school's library resources, but many of them will not feel comfortable doing so. This goes back to a lack of awareness, and lack of context. Without knowing what information literacy means, the students have no way of knowing how to learn or practice it. Library databases are meant for academic research, and most young adults do not consider this kind of research as relevant to their post-academe lives. As a result, time will naturally erode the coarse and delicate composition of their information literacy cornerstone.

The solution seems simple. Recognize information literacy as an academic subject; however, the academic subject 'information literacy' needs heavy revision that reflects the social and civic, as well as the information behaviors and needs of online citizens. The next section is perhaps the heart of this dissertation; an odd inclusion perhaps but I aim to approach research as advocacy. Therefore, I propose the socially constructed academic discipline, information literacy, which I'm calling i-Literacy to distinguish from its predecessors.

Defining the Epistemology and Ontology of i-Literacy

This preliminary pedagogical theory and ontological design demonstrate that i-Literacy reinforces information studies/sciences' focus on the relationships between people, technology, and information. The constructivist view considers the gaps in both literature and curriculum, by taking into account the taxonomies, pedagogies, definitions and standards highlighted in Chapter 2 that center information literacy as a human right vital to the success of communities, societies, and democracies. After this extensive review, the 'i' in i-Literacy represents more than 'information'. In fact, that 'i' establishes the potential outcomes or goals that can guide course revision and design for i-Literacy, such as concepts of 'intentionality', 'intersectionalism', 'inequality', 'injustice', 'inclusion' 'information' and 'innovation'. These i's also support the iSchool mission statements' ideals around access, innovation, and social good.
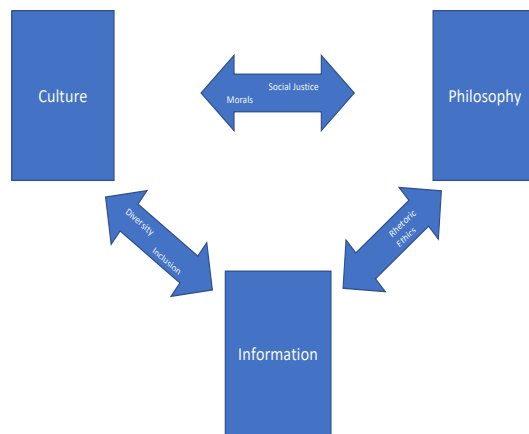
In developing the i-Literacy outcomes detailed in Table 5.b I did consider the themes apparent in most information literacy models – identifying or establishing an information need; understanding source type and origin; information seeking and/ or search; evaluating and/ or analyzing information; applying and/ or using information; and presenting/ sharing information. Then I align those actions with critical theory concepts that support social and civic needs, and challenge existing power structures.

i-Literacy is also meant to shape curriculum through three essential

pillars: culture, philosophy, and information. Figure 5a provides a visual

representation of the concepts and content areas that connect each pillar, and

will be most useful in devising the epistemology of i-Literacy. Bacon's ontology

(1662) and Deagle and D'Amico's 'Meaningful Literacy' support including

philosophical principles,

Figure 5a. i-Literacy Pillars and Content Area Connections

discussions and ideals; Cooke's

(2017) Counter-stories, and

Gorski's 'Equity Literacy

Framework' (2016) hold up the

pillar for cultural competence; and

Keefe and Copeland's 'Principles

for Literacy' (2016), and Yu et al.'s

(2018) thematic determinants highlight information access and literacy as a

human right; moreover, each helps shape the outcomes for i-Literacy. Courses

and lessons can then be tailored to support concepts of diversity and inclusion as

they relate to and connect the 'information' and 'culture' pillars; demonstrate

the relevance of social justice and morals for appreciating and respecting

otherness in both the 'culture' and 'information' pillars; and explicitly

demonstrate the value and nuance rhetoric and ethics offer to the 'information'

and 'philosophy' pillars.

Core course requirements across undergraduate information science

programs already align more strongly with a social construction iteration of

information literacy, and the model I'm proposing strengthens the frames and

standards most reflected in the curriculum mapping study. Three of the five

most reflected standards come from the Empire State Information Fluency

Continuum; the codes for Inquiry and Design Thinking appear 198 times in the

map; Multiple Literacies appears 154, 'Social and Civic Responsibility', 144. The

other two well-represented codes are Zurkowski's (1974) 'Discovery of Truth' at

162, and ACRL's 'Information has Value' at 108. And each of these standards

support the interdisciplinary models identified in Chapter 2. Both Gorski's 'Equity

Literacy Framework', and Keefe and Copeland's principles align with the Empires

view of 'Multiple Literacies'; 'Inquiry and Design Thinking' shares commonalities

with Cooke's counter stories; 'Social and Civic Responsibility' support Yu et al.

(2018) and their examination of accessibility and bridging the digital divide.

i-Literacy Outcomes

The first outcome, 'intentional observations,' indicates that a person can

identify an information need through a culturally competent lens, and

understands that sometimes the 'i' in information should take a back seat to the

'for'. This reinforces Cooke's (2018) advocacy for counter stories that are not

always easy to find in mainstream search, and supports the deliberative, action-

oriented standards in Gorski's (2016) Equity Literacy Framework. The quality and

efficacy of any information product or transaction hinges on understanding that information needs and behaviors are neither universal or static. Elementary and secondary school teachers are told to 'differentiate' how they teach because each learner has unique needs, and responds differently to content (information) based on how it is delivered as well as related conditions. And while corporate/ capitalist culture wants nothing more than autonomous society, diversity in learning and our relationships with information does not conform to rigid standards.

The second i-Literacy outcome is 'Intersectional interactions', which considers how and why folks engage with source material, and encourages engaging with both unconventional and culturally diverse sources. Such sources could include people, podcasts, entertainment in the form of music or other works of fiction that represent ethnic, racial, economic, gender, religious, and sexual orientation beyond one's own. Keefe and Copeland (2011) stress the importance of connection, communication, and community for acquiring literacy, and this second outcome explicitly encourages engagement with different communities. Some learners may struggle with this type of engagement, or establishing connections. While the ideal 'intersectional interaction' forges meaningful, interpersonal connections, some may need to engage first with print or digital mediums. Another challenge to promoting 'intersectional interactions' is the notion of 'safe spaces,' a term often used to signal allyship; however, it's easy for some to interpret 'safe' as 'safe for me to

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ask any question I want' or 'safe for me to demand others justify their experience'. In both concepts – 'safe space' and 'intersectional interactions' – educators and advocates must be explicit about the value of listening, and taking time to reflect upon and digest information that challenges a learner's existing worldview.

Third, practicing 'informed discovery' involves navigating those sources with the explicit aim to find just and equitable solutions to information problems. This outcome connects well with the Empire State Standard 'Multiple Literacies', and the deliberative nature of Gorski's framework. We have now moved from recognizing an information need, to identifying the most appropriate and accessible materials to sustainably fulfill that need. 'Informed discovery' moves beyond databases and also supports that authority is often a construct. This concept will likely face hurdles because it challenges learners to seek out less conventional sources including smaller publications and/ or those information items produced for a specific audience; those that may not be constrained by Academic English; and even popular culture mediums. The key to 'informed discovery' will be thoughtful, and explicit teaching that supports when, where, why, and which of these avenues are relevant in context, and how best to incorporate them.

The fourth objective, conducting 'impartial analysis', evolves from Bacon's ontology that highlights when to focus on deductive reasoning (examining general concepts to make specific determinations) or inductive

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reasoning (highlighting specific details to make or understand generalizations), and highlights the key aspect of 'Inquiry and Design Thinking' that learners make background connections and also ask questions for deeper reflection (2019). It serves as a reminder that our experiences and worldviews will not always take center-stage when we engage with information. Rather, the best course is sometimes to look/ listen and learn either to bridge gaps in learning, generate knowledge for the self, or create and share something new.

i-Literacy's fifth objective, 'inclusive judgments' serves as a strong reminder that 'Information Has Value', and shares similarities with Gorski's (2016) commitment to recognizing inequity, and Cooke's (2018) encouragement to allow marginalized voices be heard. The concept for this objective suggests examining data and information with a critical mindset, potentially challenging power structures, and determining the value of information, information products, and information services as they appeal to various user groups, and/ or create inclusive and equitable environments. Making 'inclusive judgments' allows learners and practitioners to make collaborative decisions on how best to equitably present information before moving to sharing it.

And finally, using 'innovative transmissions' methods involves sharing and advocating information and knowledge across platforms that reach marginalized and otherwise excluded groups thereby supporting equity and inclusion. This objective speaks strongly to 'Multiple Literacies' and 'Information Has Value', as well as Gorski's (2016) need to redress inequity, and sustain equity initiatives,

Deagle and D'Amico's (2016), and Cooke's (2018) promoting agency, and Keefe

and Copeland's (2011) emphasis on community and communication. How folks

retrieve and/ or receive information matters a great deal in terms of actual

access. User Experience researchers and designers consider how end-users might

interact with a website, application, or other tool. But 'innovative transmissions'

goes beyond to consider why certain individuals or groups prefer one medium

over another. It also considers if the available mediums in their current forms

effectively reach not only a target audience, but audiences that could equally

benefit from the information being shared.

Ultimately, an i-Literate learner would recognize blatant discriminatory

practices against marginalized groups as determined by those groups. i-Literacy

encourages practicing cultural competence and respect, so learners will become

adept at not only including diverse groups in the narrative, but knowing when to

step aside for a more relevant driver. Educators and learners alike must be

willing and able to have potentially difficult discussions around topics of conflict

including but not limited to racism, cultural appropriation, and white privilege

with individuals and groups that have experienced these assaults, and do so with

an aim to listen and learn from those individuals and groups.

Furthermore, i-Literate practitioners will seek out additional information

sources created and/ or endorsed by, for, and about populations that have been

historically and systemically marginalized and discriminated against via hate-

based rhetoric and acts, exclusionary practices, tokenism, and micro-aggressions.

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Importantly, i-Literacy promotes active and continual learning, and requires collecting and analyzing data and information from mainstream, academic, and unconventional sources while always considering a source and its publication's positionality and purpose. They will question how these positions align with the arguments, evidence, and rhetorical strategies applied. Before taking action, i-Literate folks aim to consult with those who have traditionally lacked platforms for advocacy and information sharing to determine how best to represent their needs, voices, and concerns when sharing information on a given topic; moreover, they are willing to confront offenders or offending groups with information that helps them recognize their role in spreading or supporting prejudicial practices and white supremacy.

Table 5b below offers a snapshot of the i-Literacy outcomes and competencies, and offers examples of what students who have achieved i-Literacy should be able to.

Table. 5b i-Literacy Outcomes, Competencies & Examples

Outcome	Competency	Example
Intentional Observations	Take stock of social, political, academic, and professional environments through a culturally competent lens.	Recognize blatant discriminatory practices, and micro-aggressions against folks outside the social majority.
Intersectional Interactions	Engage with marginalized groups and perspectives to willingly and openly acknowledge how and where their voices have authority.	Discuss ideas and incidents of racism, cultural appropriation, and/ or white privilege with victimized groups to begin understanding the extent of the problems their populations face.
Informed Discovery	Whatever the need, the i-Literate person navigates information resources from myriad social and cultural perspectives that will lead to relevant, and just results or answers; this 'finding' also includes comprehension of both the information need, and of the resource.	Seek out information sources created and/ or endorsed by, for, and about populations that experience marginalization, discrimination, hate-based rhetoric and acts, exclusionary practices, tokenism, and micro-aggressions.
Impartial Analysis	Challenge status quo/authority to examine data and/or information through a culturally competent lens.	Collect and critique data from mainstream sources, considering positionality, purpose, arguments, evidence, and rhetorical fallacy.
Inclusive Judgments	Make value judgments based on the quality, reliability, transferability, and applicability of information sources as they appeal to diverse groups	Consult with folks who have traditionally lacked platforms for advocacy and information sharing to determine how best to represent their needs, voices, and concerns when sharing information on a given topic.
Innovative Transmissions	Share and advocate information and knowledge in such a way to support equity and inclusion, and with a broad reach	Confront offenders or offending groups with information that helps them recognize their role in spreading or supporting prejudicial practices and white supremacy.

Chapter 6: The Journey Home – Concluding one quest to begin another

I began my undergraduate education in the Fall, 2000 at (then) Villa Julie College, out of Baltimore, MD. That same fall, a new president began his term with the school, making his mark implementing the slogan, 'Imagine Your Future, Design Your Career'. Not long after earning my Bachelor's degree, the school re-branded itself as Stevenson University, shedding its female-majority, commuter-heavy, liberal arts reputation to a career-centered institution undergoing unprecedented growth in athletics, and graduate education. The institution evolved. Its success depended highly on that evolution, and that stands true across higher education.

In my first semester at (then) Villa Julie, I attended an instruction session through my English Composition course, with the campus librarian. The transition from Bibliographic Instruction to searching digital databases was new. This should have felt exciting to an 18 year-old Xennial (that micro-generation that was raised like a Gen-Xer, but had to adapt to digital like a Millennial) who loved to read, write, and learn, but I was bored out of my mind.

Twelve years later, I was the English Composition teacher, standing in the same room in the (now) Stevenson University library. The same librarian is delivering an almost identical session (keyword search; EBSCO platform, create an account so you can save your sources), but I was not bored. I had been

teaching undergraduates for five years. I knew how to write a paper, and I knew

how to teach someone else about content, style, structure, and word choice. I

knew how to find, analyze, evaluate, and use information, but I could not for the

life of me impart these life-altering skills on my students. Neither could the

librarian. I was the English teacher who rigorously prepped her students for that

library session, and built in my syllabus follow-up instruction. The content and

activities just didn't resonate, maybe because Gen-Z, and millennials are over-

confident in their search skills, or maybe because they didn't realize they weren't

just being taught a harder way to Google. And maybe, also, I wasn't i-Literate

enough to connect with those students, or connect them with most helpful

resources or concepts. So long as learners connect these library sessions with

search and retrieval instead of an increasingly complex information literacy, and

so long as instructors lack the ontology to teach i-Literacy, student engagement

will remain limited, and their actual skill isn't likely to improve.

Policy change from programmatic to accreditation:

Much like composition wasn't always its own subject, let alone required,

information literacy must be recognized as a core academic subject. It should still

be supported by library instruction to reinforce the immense value. In fact,

pedagogy should be central to MLIS education as librarian-educators will

maintain a crucial role in revised, holistic, course design and i-Literacy

instruction. As i-Literacy takes hold, so will the need for adept educators.

While colleges and universities have historically stressed the importance of written communication, 'Composition' only evolved as a field of study in response to a literacy crisis in the 1970's (Nystrand, Greene & Weimelt, 1993). It wasn't until the early 1980's that the first doctoral programs and refereed journals in Composition were launched, and the earliest developments pulled ontologically from existing fields of "rhetoric, linguistics, cognitive science, sociology, and thought about language in general," (p. 272, 1993). This is important to the evolution of higher education, and the key point that higher education must continually evolve as a social construct, based on social needs. Policy, standards, and curriculum must respond to social needs and limitations. Much like the literacy crisis inspired 'composition studies', the divide that is widening in the information society suggests the time for sweeping curriculum reform is now. That divide exists because communities lack access, resources and positive influential forces (Yu et al., 2018), and can only be bridged through explicit instruction.

It seems unlikely that accreditation bodies will exact such bold policy change unless institutions like those in this study that have substantial influence across the academe first implement bold initiatives that demonstrate the value of i-Literacy, with clearly reciprocal benefits. Piloting i-Literacy in the Big 10 iSchool undergraduate programs will reinforce the value of all iSchool programs, and will lead to expansion. More schools will offer undergraduate information science degrees, and those programs will need instructors with backgrounds in

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Library AND Information Sciences, communications, journalism, and social

sciences.

Incidentally, introducing i-Literacy through the iSchool consortium offers

a means to unify undergraduate instruction in the information sciences, while

positioning these programs as central to higher education's general education

initiatives.

Challenges

Librarian and classroom faculty tend to view "information literacy as a

cornerstone for student learning," but believe that it must "be taught within the

disciplinary," subjects and thus its frames are broken up and spread across the

curriculum (Chambers & Smith et al., 2013). Many colleges have adopted

standards for writing across the curriculum, and this makes good sense since

these schools also require all students to take at least one foundation writing

course and one or more upper-level writing course where the focus is on

composition and rhetoric. The students are aware of this, as those words likely

appear in the course title, description, and/or syllabus. But information literacy is

not often mentioned because its teaching is not explicit. It is grouped with other

subjects to form a new substance, but its distinct properties remain. College

students need a strong foundation in socially-centered i-Literacy as much as they

need a foundation in writing and mathematics, and their user behaviors suggest

that hodge-podging information literacy instruction is not strong enough to

support students' and graduates' lifelong learning needs.

Maria E. Grabe and Jessica G. Myrick (2016) offer a multidisciplinary view of what it means to be an informed/ engaged citizen and the factors that influence said behaviors. Grabe and Myrick encourage readers to transcend Enlightenment ideals of democratic practice to embrace the modern system and its corresponding technological influences. They present scientific theory advocating for affect as strongly influencing decision-making particularly as it connects to the enormity of audio-visual material that permeates airways, roadways, and the Internet. While the two seemingly contend that knowledge-based intellect and rational thought may not carry as much weight in a more visual access society, information literacy is, a) even more necessary given the limited information citizens can process, and b) includes the visual literacy that guides the emotions that compel citizens to action.

College accrediting bodies need to revisit their position on information literacy as a stand-alone subject. I will not dispute the value in academic libraries and their instruction librarians' contributions to student retention and success; however, the struggle to fully teach all the information literacy frames is real. If the academe continues limiting its focus to research and information consumerism with "fixed knowledge stocks," when students need fluidity that promotes "participation … that leads to the creation of new knowledge," and provides the stable cornerstone upon which they can build success as lifelong learners. Nesting information literacy in research skills for specific subjects or

assignments does not prepare graduates for the initiative they will need to demonstrate in their careers or lives.

Fulfilling the right to information requires higher education accrediting bodies to take the necessary steps "to help people avoid misinformation and disinformation and to ensure that relevant and comprehensible information is available," (Mathiesen, 2014, p. 12). To accomplish this arduous task in an age of information overload, public and information institutions need to collaborate on teaching the critical skills that students and citizens need to be active in their democracy but also to ask questions of the information they have on hand. "If students learn to habitually ask 'why' as beginners, that habit will continue," throughout their adult lives (Burkhardt, 2016, p. 9).

With evidence backing full semester information literacy courses as effective, and online information literacy instruction in a volatile stage of experimentation, the time has come for major research universities to set a new standard of information literacy instruction. Undergraduate students already feel they "should be introduced to the library system and research materials" early in their college careers, and want longer and more frequent instruction from the librarians (Kim & Schumaker, 2015), but online modules and one-shot instruction sessions often limit relationship building and personal interaction with a librarian. What's more, online coursework often results in "higher attrition… because participation can be technically challenging and because sticking with an online course requires strong motivation" (Christensen et al., 2006).

Additionally, Thomas Atwood references 'The Cult of Teaching' as being a limiter to the success of information literacy instruction. As such, librarian faculty have the daunting task of providing the most valuable instruction first year college students can receive in minimal time, through largely ineffective mediums, and (often) without the support of their faculty colleagues (2015). Studies demonstrate that collaboration and learning communities offer the relevance that students need to connect to the less familiar concepts of information literacy proving a need for more explicit instruction in this subject.

The solution, while daunting, is obvious. i-Literacy positions iSchools at the heart of higher education instruction, provides a framework for the explicit instruction learners need to navigate and succeed in the information society, and satisfies cultural competence requirements in a way that creates change-agents, and aims to bridge the digital divide.

Future Research

The future is now, and research is advocacy. Or at least it should be. When information scholars study human behaviors, they should not simply want to publish a paper. The over-arching objective – the true quest – is to exact positive change based on the study results. While my preliminary research results in a published work, i-Literacy now faces myriad bureaucratic hurdles, and quite likely pushback from those protective of the ACRL Framework. And so the true labor begins here at the end.

Over the next several years, I will design, conduct and advocate for additional pilot studies, establish interest groups, and design courses that support i-Literacy instruction with suggestions on what each might look like. Some valuable follow-up studies will include focus groups, interviews, and surveys with students, faculty, and staff from undergraduate information science programs at the Big Ten consortium schools to establish a greater understanding of the efficacy of current information literacy education, and also to establish an understanding of what works and what is lacking from information literacy pedagogy, and as a potential ontology.

Additionally, the five schools reflected in this curriculum map are a small, albeit integral part of a fast evolving and spreading undergraduate course of study. It will be important to repeat this process with other types of institutions including additional large, state, research institutions; mid-size public schools; private colleges; international institutions; community colleges; and even graduate information science programs. A study on Library and Information Science programs can offer additional insight to the readiness or needs of future i-Literacy instructors, and how such programs can better prepare graduates for their role as i-Literacy educators.

In order to further support the value and impact of i-Literacy, I aim to design and implement undergraduate courses that allow learners hands-on practice with the information lifecycle in a way that also promotes advocacy, equity, and inclusion. These could appear as methods courses, and/ or special

topics where each offering allows for concentrated research on a different, marginalized or underserved population. I will also propose leading a similarly structured research cohort whose key deliverable is an Open Education Resource or other highly accessible information product.

At the same time, faculty, academic program, and other academe-based interest groups exploring and aiming to implement i-Literacy objectives, concepts and outcomes, should more closely examine the Empire State Information Fluency Continuum's standards, outcomes, design and measures as a model for implementing i-Literacy or an equally effective program and conceptualization of information literacy for and through information science programs. Through these reviews and discussions, i-Literacy will be developed with clearer standards with multiple examples, as well as with metrics to determine competency vs. mastery for each of the 6 concepts, and holistically.

Conclusion

Throughout this dissertation, I support the sweeping claim that information is everywhere, in every thing, and every person. Race, gender, ethnicity, sexual orientation, economic status, social status, are more than demographics. They are information, and each contains more information that may be very different from its counterparts of the same category, but different does not mean wrong. Conceiving of and teaching information literacy as a social construct affects the dynamic of human interaction where folks continually practice a set of skills that challenge core beliefs and foster appreciation and

understanding. It also means pedagogy and practice need regular evaluation so the standards remain on par with social and civic needs. This understanding grounds information literacy as a social construct, and if we treat it as such, we must be willing to make pedagogical and programmatic changes that students in our society need to be successful beyond college.

Appendices

Appendix A: Research and Data Collection Timeline

Research Task	Timeframe
Review each of the Higher Education Accrediting Bodies; Collect and Analyze Policies	Fall 2019
Conduct search for top rated colleges and universities accredited by the Higher Education Commission and Middle States	Fall 2019
Review the General Education Program Requirements at top rated universities; review course descriptions that satisfy general education program requirements.	Fall 2019
Literature Review	Spring 2020
Collect Syllabi of Core Courses from undergraduate Information Science Programs at the University of Maryland, College Park; Pennsylvania State University, the University of Michigan; Michigan State University, the University of Illinois, Urbana Champaign; the University of Wisconsin; Indiana University	June - July 2021
Code mission statements, program outcomes, course descriptions, and course objectives/ outcomes from the core course syllabi from the information science programs at the University of Maryland, College Park; Pennsylvania State University, the University of Michigan; Michigan State University, the University of Illinois, Urbana Champaign; the University of Wisconsin; Indiana University	June – July 2021
Analyze and Evaluate Data	January, 2022

Appendix B – Course Descriptions and Outcomes for Pennsylvania State University's Information Science and Technology Program

IST 110S, Section 003: Information, People, & Technology

Description
The use, analysis and design of information systems and technologies to organize, coordinate, and inform human enterprises. IST 110 provides an introduction to basic concepts of Information Society, computing and information systems principles, and the social implications of information and information technology. This course presents the ideas and problems that make information and communication technology professionals the drivers of hope in the 21st Century. The goals of this course are to introduce students to the demands and opportunities of information and communications technologies, the associated careers and, make them better users of the information devices they use every day. The mission is to deliver an action-oriented course that engages students to learn by doing, participate in forming and solving problems embedded in professionally-relevant and realistically messy scenarios, detect errors and recover from them, and be involved in reading, studying, and locating materials that support these actions. Students will accomplish this by participating in team-based learning.

Objectives
Upon completion of this course, students will be able to:

- Describe how digital data is stored, transmitted, and retrieved
- Create a narrative of how some specific information was transformed into knowledge
- Describe how information and communications technologies organize, coordinate, and inform human enterprises
- Predict how information and communication technologies can improve the quality of human life through their impact on individuals, communities, markets, cultures, and society
- Evaluate whether IT applications can meet human needs, facilitate rapid adaptation, and encourage creativity
- Describe the distinctive features of an IST education to future employers and their recruiters
- Anticipate the expectations they will face in IST courses and the intellectual and technical skills necessary to meet them

IST 210 Section 002: Organization of Data

Course Description

As the database management software becomes one of the critical components in modern IT applications and systems, a solid understanding of the fundamental knowledge on the design and management of "data" is required for virtually any IT professionals. In a business setting, such IT professionals should be able to talk to the clients to derive right requirements for database applications, ask the right questions about the nature of their entities and in-between relationships in their business scenarios, analyze and develop an effective and robust design to address business constraints, and react to the existing database designs as new needs arise. Solid understanding of the underlying data models and design issues in data applications is also critical for SRA students to ensure secure access to and intelligent analysis of data in complex business settings. Modern IT professionals should be able to guide a company in the best use of the diverse database-related technologies and applications toward the "Big Data" era.

As such, IST 210 aims to prepare IST and SRA students for obtaining fundamental understanding on the database concepts and practical skills to analyze and implement a well-defined database design. In particular, IST 210 provides an introduction to physical database design, data modeling, relational model, logical database design, SQL query language, and instructor's choices on database applications and advanced concepts. Students will learn to use a real-world commercial or open-source database management system, too. Upon taking IST 210, students should be able to understand the implications and future directions of databases and database technologies.

Course Objectives

- Understand the importance of data, databases, and database management
- Understand the Relational Model
- Understand Data Modeling
- Understand logical Database design
- Understand SQL Query Language
- Design and implement a database

IST220 Networking and Telecommunications

Course Description

IST 220 is an introduction to digital networking and telecommunications and their applications in information systems. It is a required core course for four-year Information Sciences and Technology degrees, and is a critical part of the curriculum. Its objective is to provide the students with a basic understanding of the working of digital networks and the ability to apply this knowledge to specific applications and situations.

Course Objectives

Upon completion of this course, each student should be able to:

Identify benefits and applications of computer networks;
Recognize key components of data communications and their roles in supporting data communications; Plan, design, and build appropriate wired or wireless networks in given application contexts;
Evaluate and analyze organizational network architecture; and
Assess new telecommunications or network technologies and related applications.

IST 230 Language, Logic, and Discrete Mathematics Syllabus

Course Description

Introduction to formal languages, mathematical logic, and discrete mathematics, with applications to information sciences and technology.

Course Objectives

- At the end of this course students will be able to:
- Differentiate between discrete and continuous phenomena
- Discuss the importance of discrete mathematics to information sciences and technology
- Think abstractly
- Use logically valid forms of argument
- Recognize invalid forms of argument
- Discuss various methods of proof
- Prove and apply simple theorems in discrete mathematics
- Think recursively
- Use recursion to represent sequences and to solve basic problems in computing and mathematics
- Apply combinatorics to relevant problems in IST
- Solve simple problems in discrete probability
- Discuss the definition and characteristics of functions
- Discuss the basic concepts of set theory
- Prove and apply simple set theoretic results
- Discuss basic concepts of number theory and prove some simple theorems
- Discuss basic concepts of relations
- Explain the connections between the mathematical theory of relations and modern database technology
- Discuss the basic definitions and results of graph theory
- Discuss the definition and importance of trees

- Apply graphs and trees to solve basic problems relevant to IST
- Discuss the definition and importance of Formal Languages and Regular Expressions

IST 301: Information and Organizations

Description

Information technology systems support organizations by linking the individuals within them to facilitate (1) communication, (2) decision making, and (3) coordination. Information technology systems are designed by evaluating the culture of the organization and understanding the flow of tasks between individuals and between functional areas. Within the IT system design, it is important to consider what the various stakeholders within the organization need of the system, including how they want to interact with the system and how their work is supported by the system.

In today's complex and interconnected world where global commerce is supported by globally distributed work, IT systems and knowledge workers are increasingly expected to be able to coordinate activities across organizations.

In IST 301, Information and Organizations, students will learn the basic principles of organizational design, including the various ways an organization can be structured, the importance of culture in determining underlying rules and values for the organization, and the relationship of tasks and information flows as they support decision making and activities. Students will also gain a better appreciation for the importance of diversity within the organization, as well as explore the role that organizational ethics plays in the operations of the organization.

From an IT systems design perspective, students will learn how IT systems can support individuals, teams, and distributed work. Students will explore the way that information collected in one part of the organization can be combined with information collected elsewhere to inform the organization's employees and decision-makers.

Objectives

- Upon successful completion of IST 301, students will be to accomplish the following:
- Organizational Strategy and Enterprise Architecture – Students will understand how organizational strategy drives business processes and technology decisions.

Organizational Structure – Students will be able to analyze the organizational structure of a variety of organizations based on the characteristics of organizational design, information processing, and information flow.

- Organizational Culture – Students will be able to analyze an organization's culture, including underlying rules, values, and norms regarding power and politics, gender and diversity, and global differences. Organizational Ethics – Students will be able to identify ethical issues underlying a given situation. Organizational Decision Making – Students will be able to identify relevant stakeholders and anticipate the types of information needed to support organizational tasks and decision-making at multiple levels in the organizational structure.
- Distributed Work – Students will be able to describe the difference between individual work and distributed work, including tasks, decision making, and information needs.

IST 331: Foundations of Human-Centered Design: User and System Principles

Description:

This course provides a focused introduction to one of the most complicated parts of information systems design: users and the contexts in which they live, work, and play. This course provides a balance between theory and practice, which are tightly intertwined in this area. Students will learn how to use social science theories about human capabilities and group behavior to predict whether an information system will be usable and useful. Students will also gain skills in designing and evaluating information systems that meet the needs of a target audience. The format of the class may include lectures, readings, in-class or online discussions, projects, or case studies. Assessment of student performance may include short assignments, quizzes, exams, or in-depth projects.

Course Objectives:

- The Need For and Role of Usability
- Characteristics of Individual Users
- Characteristics of Groups of Users
- The Design Process of Systems
- Task Analysis and User Studies
- Instructors Choice

IST 440W – Information Sciences and Technology Integration and Problem Solving

Course Description

This course is the undergraduate capstone for Information Sciences and Technology majors in the Baccalaureate degree. It requires students to work collaboratively in teams of 4-6 students, with each team comprised of students from more than one option and, if possible, more than one campus. Each team is given a significant real-world problem or issue in which information technology is part of the solution. Teams will be expected to manage the project effectively and to communicate its results clearly to a variety of audiences within an organization. Major topics include: review of problem-based and case-based learning; overview of project management practices; assessment of organizational and technical issues posed by the scenario; development and testing of work plans and analysis of options; communication within the group; communication within a management environment; and presentation of results to a variety of audiences inside and outside the organization.

IST students need to understand the organizational and social contexts in which technology functions. Indeed, many technology problems are multi-dimensional--they have an economic dimension, a legal dimension, a human resources dimension, and so on. This course will require students to analyze, evaluate, and test alternative solutions and to weigh their advantages and disadvantages for the organization.

Course Objectives

1. Use systems theory to analyze IT-based challenges of people, software and hardware.
2. Identify methods of organizing work to aid in IT development and integration.
3. Compare and contrast different forms of information systems and development approaches.
4. Develop project management, analytical and technical skills to develop system integration plans and complete data integration tasks.
5. In conjunction with a team, develop and complete an appropriate information technology project.

Appendix C – Course Descriptions, and Objectives for the University of Wisconsin, Madison's Undergraduate Certificate in Digital Studies

LIS 201 The Information Society

Introduction and Course Learning Outcomes

We live in an information-rich world. We have easy access to the Internet, which allows us to access and share information across national and geographic borders almost instantaneously. We communicate in a variety of networked media, about a variety of subjects, with a variety of people, and for a variety of purposes. Information communication technologies (ICTs) grow increasingly "smart" and can do more work that humans used to do. We often hear that online access to information and ICTs are the foundation of our current "Information Society." The implication is that *information* – its proliferation, accessibility, use, control, and ownership – are a fundamental feature of the human experience. But… so what?

Well, several things. ICTs have profound implications for human behavior and well-being. They may alter the way societies function. Ways in which ICTs are deployed affect how people exercise fundamental rights, such as free expression (for good and ill); and challenge longstanding social values, such as privacy. In other words, the flow of information and ICTs *reflect* and *affect* things of value and are therefore morally important for us to consider.

With that in mind, there are three key objectives for this course.
1. Students will understand important moral, political, social, and historical contexts of information technologies.
2. Students will be able to critically evaluate important moral, political, social, and historical questions that arise in the context of information technologies.
3. Students will be able to research, analyze, and discuss complex issues and arguments surrounding important moral, political, social, and historical questions as they pertain to information and ICTs.

LIS 202: Information Divides and Differences in a Multicultural Society
Course Description
This course explores the impact of and barriers to access to information on the lives of low income ethnic/racial minority communities in the United States. The course provides an introduction to contemporary information society from a sociological perspective. In this course we will explore issues relating to information inequalities, differences or "digital divides" in the US with particular

attention to underrepresented groups in the Northern Midwest including African-American, Hmong, Latino/a and Native American. Information inequalities include disparities in awareness of, ownership of, access to, and use of various information and communication technologies for the purposes of health, education, economic development and social expression. Through this exploration we will examine traditional and online institutions that create or channel information to communities of interest including community centers, schools, libraries, and medical clinics. Skills covered will include application of theoretical frameworks; critique and discussion of academic debates; use of databases to locate information related to demographics in the Upper Midwest.

Course Learning Objectives.

Students will…

Demonstrate understanding of key critical issues related to information divides connected with race, ethnicity and socioeconomic status.

Gather data related to information divides using available databases; analyze this data in relation to debates and socio-cultural theories.

Use information and theory presented in the course to reflect on personal experiences and understandings of information divides.

LIS301: Information Literacies in Online Spaces

Course Description: This course explores information and digital literacies needed by today's online consumers and producers. To investigate this topic, we complete several case studies: misinformation, YouTube, hashtag activism, and podcasting. The course engages students in key debates and research related to information and digital literacies, relates concepts covered in the other FIG courses to students' own experiences, and develops digital literacies. Together with the other two FIG courses, this FIG prepares students with reading, writing and analytical skills that will be useful across the humanities and social sciences. Past students have gone on to major in Journalism, Communication Arts, Economics and Computer Sciences.

Course Learning Outcomes

Students will…

Demonstrate an awareness and understanding of major issues and concepts related to information literacies in online spaces.

Locate, interpret and evaluate empirical research related to information and digital literacies.

Articulate different viewpoints in debates concerning information literacies in online spaces.

Demonstrate awareness of and ways to address social inequalities as represented in online spaces.

Communicate effectively through written reports and discussion.

LIS 350: History and Future of Books

Course Description

This course is framed by a question about what books are, what books have been, and what books might be: past, present, and future. We live in a moment of rapid media evolution, and yet we have seen the book endure as a form. Academic fields including book history, digital humanities, media studies, and even human computer interaction (to name only a few) all have something at stake in the form of the book – not to mention industry-oriented interests in e-readers, book retail, publishing – and likewise this course will approach the book from a number of perspectives. Our primary goal is to understand the book as an active technology that shapes peoples, perceptions, and cultures rather than as a passive receptacle of them. This course also meets the requirements for Comm B, which means we will also be thinking about our own written and spoken productions by way of this material.

Course Goals

Students will

- Develop understanding of essential questions of book history, media, and information studies.
- Develop critical reading skills, including analysis of form, content, and historical context
- Make productive use of library resources in the humanities, including research of primary and secondary
- Gain basic experience with processes of making books and print by hand
- Practice preparatory writing strategies, including drafting, proofreading, revising, and peer review
- Practice skilled use of thesis, argument, evidence, organization, style, mechanics, and awareness of audience in both written work and class discussion
- Practice skilled oral performance in both informal and formal presentations

LIS351: Introduction to Digital Information

Course Description and Structure

Students completing this course will earn three credit hours. One credit is the learning that takes place in at least 45 hours of learning activities, which include time in lectures or class meetings, in person or online, labs, exams, presentations,

tutorials, reading, writing, studying, preparation for any of these activities, and any other learning activities.

This course has no pre- or co-requisites.

This course introduces you to current technologies and policy issues associated with digital information, with an emphasis on information-organization technologies. The course prepares you to handle information-organization and information-access challenges in your field of interest. You will become familiar with current approaches for organizing and describing digital information such that both people and computers can leverage it. You will learn how the Internet shapes access to and use of digital information, and you will use information technology to solve problems and help people.

Course Objectives

Technical
- Understand on a basic level what digital information is and how it is circulated over networks
- Design a basic relational database
- Construct simple one-table SELECT queries in SQL
- Be able to build a basic web page with HTML and CSS
- Protect personal security and privacy in online contexts

Usability and Accessibility of Information
- Understand why website usability is important; be able to perform basic usability tests
- Understand why website accessibility is important; be able to perform basic accessibility tests

Information Policy
- Apply the basics of United States copyright law, particularly as it relates to digital information
- Navigate common and challenging privacy, information-security, and intellectual property issues, legally and ethically
- Respond thoughtfully and critically to current policy flashpoints in digital information such as Big Data and online surveillance

Digital Studies Certificate Knowledge & Skills Learning Goals
- To understand key theories and concepts related to digital studies and the historical context surrounding the creation of digital technologies
- To gain familiarity with methods, concepts and tools needed to research and evaluate information related to digital studies
- To think critically about how digital technologies work and their impact on society

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- To be able to create strategic communication content and self-expression using digital tools
- To understand the professional and ethical principles related to the field of digital studies

Code & Power (LIS 500)

An examination of the politics, economy, and culture of computing through Intersectionality and Critical Race Theory.

Information School & The Department of African Cultural Studies

Course description

In this online course, students analyze and critique economic, sociocultural and structural mechanisms related to racial and gender disparities in the tech world, gaining practical and theoretical understanding of the means by which women and people of color negotiate conditions of exclusion or marginalization within computing. The course guides students in understanding their own attitudes and beliefs about themselves, others and computing, and empowers them to recognize and counter common and damaging attitudes and beliefs. As part of learning about the computing industries and exploring identity in relation to computing, students design, develop, and discuss interactive websites that employ web scripting.

Course Objectives
- Analyze and critique experience of race and gender inequities with respect to computing
- Recognize and reduce the expression of conscious and unconscious biases
- Contribute actively to anti-bias in classrooms, workplaces, professional and social spaces
- Have an actionable mental model of the Internet and Web coding stacks
- Use relevant computing vocabulary and concepts to communicate with tech professionals
- Write PHP-based web pages that advance a social good

Appendix D: Course Descriptions and Objectives for University of Maryland's Bachelor of Science in Information Science Program

INST 201 – Introduction to Information Science

Learning Outcomes

Most individuals, organizations, and governments are quick to adopt new technologies, but rarely take the time to consider how that technology is shaping their behaviors and, conversely, how users shape the development of future technologies.

Successful completion of this course will give you the conceptual tools necessary to understand the social, political, and economic factors associated with a networked society. Issues will range from the theoretical (what is information and how do humans construct it?), to the cultural (how newer communication technologies are different from earlier distance-shrinking and knowledge-building technologies such as telephones), to the technical (what are the basic architectures of computing networks?). As a core course in the BSIS, this class will also provide you a knowledge- based foundation for future courses in information, technology, and policy.

After successfully completing this course you will be able to:
1. Demonstrate knowledge of fundamental concepts and ideas around the rise of the information society.
2. Demonstrate critical thinking in evaluating causal arguments regarding the relationship between technology and society, including analyzing major assertions, background assumptions, and explanatory evidence.
3. Explain how information & communication technologies (ICTs) shape national and global events.
4. Use information technologies to conduct research and to communicate effectively about ICTs.
5. Articulate how the historical events leading to the information society have shaped our modern-day use of ICTs.
6. Articulate ways technology use can be problematic, and how to harness technology for positive change.
7. Work collaboratively to create and disseminate information content broadly.

INST 311 – Information Organization

This is an introductory course examining the theories, concepts, and principles of information, information presentation and representation, organization, record

structures, description, and classification. Topics to be covered in this course include the methods and strategies to develop systems for storage, organization, and retrieval of information in a variety of organizational and institutional settings, as well as policy, ethical, and social implications of these systems.

Your Learning Outcomes
Upon successful completion of the course, you will be able to:

1. Describe and evaluate information organization systems
2. Select/compare suitable information organization systems, tools, and practices for specific contexts Identify, critically analyze, and discuss:
   a. Formal information representations, structures, and their properties
   b. Applications of classification principles and other standards for knowledge representation in information systems
   c. Social and ethical aspects of classification and policies governing information organization
3. Demonstrate ability to translate key concepts and practices across contexts
4. Develop basic familiarity with key standards and tools for information organization

INST 314 – Statistics for Information Science

Advances in hardware and software technologies have led to a rapid increase in the amount of data collected, with no end in sight. Decision making in the coming decades will depend, to an ever greater extent, on extracting meaning and knowledge from all that data. In this class we focus on one branch of statistics, inferential statistics, to help us reason about data. By gathering datasets, formulating proper statistical analysesand executing these analyses, information professionals play a significantrole in bridging the gap between raw data and decision making.

This course will introduce basic concepts in data analytics including studydesign, measure construction, data exploration, hypothesis testing, and statistical analysis. The course also provides an overview of commonly used data manipulation and analytic tools. Through homework assignments, projects, and in-class activities, you will practice working with these techniques and develop statistical reasoning skills.

Learning Objectives
After completing this course, you will be able to:

- Select and evaluate various types of data to use in decision making;
- Use prescriptive and descriptive analyses to reach defensible, data-driven conclusions;

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- Select and apply appropriate statistical methods;
- Use MS Excel and R for basic data manipulation and analysis;
- Critically evaluate data analyses and develop strategies for making better decisions.

INST326: Object-Oriented Programming for Information Science

Catalog Description

This course is an introduction to programming, emphasizing understanding and implementation of applications using object-oriented techniques. Topics to be covered include program design and testing as well as implementation of programs

Student Learning Outcomes

After finishing this course, students will be able to:

1. Explain OOP concepts, principles, and methods;

2. Design, program, and debug Python applications to solve non-trivial problems;

3. Test and assess the quality of object-oriented code;

4. Write clear and effective documentation;

5. Explain how programming is situated in and reflects social issues (e.g., racism, classism, or sexism) and describe actions that individuals or organizations are taking to counteract disparities or inequities.

INST 335 – Organizations, Management, and Teams

Overview

This broad course examines the principles, methods and types behind management, teams, and organizations, with an emphasis on motivation, problem solving, leadership, goal setting, and conflict resolution. This course examines the principles of managing team projects in organizations.

Learning Outcomes

Upon successful completion of this course, you should be able tounderstand and explain:

- Organizational fundamentals, such as organizational structures, mission statements and values, control, goals, objectives, and metrics.
- The roles of managers and leaders.
- Broad history of organizational and management theory.

- Team dynamics and performance.
- Project management basics.
- Organizational factors about platforms, the gig economy, etc.
- Principles, theories, and research on motivation, leadership, groups, personality and individual differences, organizational and national culture, communication, teamwork, creativity and innovation, conflictand negotiation, decision making, stress, and selection and hiring.

You should also be able to:
- Design a simple organization.
- Practice (and improve) communication and teamwork skills using therelevant knowledge learned in the class.
- Analyze and plan a simple project using project managementprinciples and tools.
- Apply the theories and principles from management, organizational behavior, industrial psychology, and project management to your ownwork and to specific real-world cases and examples.

INST 346 – Technologies, Infrastructure, and Architecture
Course Description

Examines the basic concepts of computer hardware, systems software, networking, client/server architectures, cloud computing, distributed systems, and high-performance computing as applied to information rich domains. Technology and architectures will be discussed within the contextsof solving social issues, supporting science, and conducting business operations. Current computing topics such as web environments, IoT, security, management, and policy will also be reviewed.

Learning Outcomes

After successfully completing this course you will be able to:
- Articulate major hardware, software and networking concepts and components that comprise current digital information infrastructure;
- Evaluate hardware, software, and network solutions for organizational needs;
- Identify emerging threats to information security and develop effective approaches to addressing those threats;
- Construct an infrastructure and architecture proposal to solve a real-

world problem related to solving social issues, supporting science, or conducting business operations;

INST 352 – Information User Needs and Assessment

Catalog Description: This course will focus on the use of information by individuals, including the theories, concepts, and principles of information, as well as user information behavior and mental models. Methods for determining information behavior and user needs, including accessibility issues, will be examined; strategies for using information technology to support individual users and their specific needs will be explored.

Student Learning Outcomes
Upon completion of the course, students will be able to:
- Describe key principles of information behavior and user needs;
- Articulate strengths and weaknesses of different methods, models, theories, and techniques for expressing and studying information needs, use and behavior;
- Examine the diverse information needs and behavior of different user groups;
- Identify various ways that information technology can be used to meet and evaluate user needs; and
- Determine appropriateness of techniques and methods for assessing the information needs and information behavior of different user groups.

INST 362 – User-Centered Design
Learning Outcomes

This course is an introduction to user experience, user-centered design, and user interface implementation methods in human-computer interaction (HCI). This course focuses on how HCI connects psychology, information systems, computer science, and human factors. Topics such as user needs, user behaviors, envisioning interfaces, and utilizing prototyping tools, with an emphasis on incorporating people in the design process from initial field observations to summative usability testing are discussed. This course will introduce you to the user-centered design process, focusing on practical methods for approaching a design problem, including how to understand users, research, design for user experience, and how to evaluate user interfaces. Also discussed are appropriate uses of storytelling, sketching, and communication of design ideas within a design team and to potential users. Assignments will culminate into a single, comprehensive portfolio project. There will also be additional assignments and exams to help you better understand the user-centered design process.

After successfully completing this course you will be able to:

- Articulate important historical, current and emerging trends, critical issues, and theoretical underpinnings of User Experience design.

- Articulate/apply major user experience research methods, such as user interviews, surveys, contextual analysis, diary studies, storyboarding, experience design, persona development, task description, sketching, video scenarios, use cases, and competitive analysis.

- Demonstrate the appropriate use of UX design artifacts such as flow diagrams, wire-framing, and paper prototypes.

- Apply data from UX evaluations to improve interfaces in iterative and user-centered design.

- Execute a design project from ideation to testing and iteration.

- Experience presenting design results in oral and written forms.

INST 490 – Integrated Capstone for Information Science

Course Description & Learning Outcomes

The Capstone in Information Science is the main practicum course in the Undergraduate Information Science (BSIS) program. It provides a platform for studentsto integrate and apply many of the concepts, methods, and tools they have learned throughout their BSIS program of study. Over the course of the semester, students collaborate in groups on a specific project that addresses an information problem or fulfills an information need.

Our goals are that your capstone project will:
- Be an authentic, real-world application (i.e., has "so what" value)
- Tell an information science story with interrelated technology, human, social,information elements
- Enable you to discuss your project's impact on people/society

Upon successful completion of the course, you will be able to:
- Identify and articulate a problem that can be addressed or a need that can befulfilled by making use of information and technology tools and methods within the field of Information Science.
- Identify the approaches, methods, tools and processes that can be used toaddress the problem or the need in question; and pick the most suitable solution mix given the requirements and constraints at hand.
- Develop and revise an action plan to address the problem or

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the need inquestion using the chosen solution mix.

- Implement and execute the action plan to address the problem or the need inquestion.
- Report the process and the outcomes of the intervention, critically evaluatingthe costs, the benefits, and the overall success level of the project.
- Explain how the project is situated in its broader social or organizationalcontext and reflects ethical and equity issues.
- Assess your own learning.
- Plan for ongoing professional and career development.
- Demonstrate professional skills that are necessary to function in informationscience-related job markets.

Appendix E: Course Descriptions and Objectives for University of Michigan

SI 206 – Data-Oriented Programming
COURSE DESCRIPTION

This course will focus on giving you a strong background in data-oriented programming, in the Python programming language. It is intended for students *who have completed an*

introductory programming course and are moving on to the next step in a data-oriented fashion.

- Learn how to use a terminal window to run a Python program locally on your computer
- Develop intermediate programming skills in Python
- Practice using basic data structures (lists, tuples, dictionaries)
- Introduce you to object-oriented programming: objects, classes, and inheritance
- Develop debugging and testing skills
- Develop experience using a distributed code repository (GitHub).
- Develop experience with using pattern matching (RegEx)
- Work with data from a variety of sources (files, web, spreadsheets, APIs, JSON,databases)
- Learn how to work with relational databases via SQL

SI 310 Information Environments and Work

Course Description: This course provides a foundation for information professionals interested in understanding psychological, economic, management and sociocultural perspectives of work in the post-industrial age coming to be known as the Fourth Industrial Revolution or Industry 4.0. In this course, you will learn to recognize and discuss the challenges associated with information environments and work in the post-industrial age along with their implications for organizations, the people who work for them, and other relevant stakeholders. Students will explore the design of information systems and their role in digital transformation of work and workplace. The course focuses on the importance of working at the frontier.
Course Objectives:
- Understand the basic theories that underlie work, workers, organizations and theprocesses they leverage to compete in an dynamic and unpredictable landscape.

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- Learn the activities associated with the development of information systems and understand how the work, workers, and organizations or both shaped and shape thedevelopment of information systems development.
- Recognize and discuss the challenges associated with the shift toward digital transformation and their implications for work, workers, organizations and other relevantstakeholders.

SI 339 Web Design

Course Description

This course provides practical and theoretical coverage to learning responsive, accessible front-end programming for Web Design. Topics covered include HTML5, CSS3, JavaScript, APIs, and the POUR design principles of accessible design. We will not be covering server-side development in this course.

Learning Objectives

The purpose of this course is to provide students with all necessary skills for building and deploying web sites as well as utilize existing software tools. The Learning Objectives for SI-339are to help students develop solid competency in:

- Understanding the interactions between web browsers and web servers using HypertextTransport Protocol (HTTP)
- Understanding the importance of standards-based practices in web development
- Understanding the importance of separating structure and semantics from presentation,as well as how this is accomplished in professional web development
- Creating web pages using Hypertext Markup Language (HTML5)
- Styling web pages using Cascading Style Sheets (CSS3)
- Using JavaScript for basic validation, interaction, and API integration.
- Using other software tools to augment and review the syntax, semantics, andaccessibility of your site.

Appendix F: Course Descriptions and Objectives for University of Illinois, Urbana Champaign

IS 101 Introduction to Information Science
Course Description

This course provides an introduction to the complex and emergent interdisciplinary field of information science, to the undergraduate major in Information Science offered by the iSchool at the University of Illinois, and to the wide array of emerging information-related professions. It offers both historical and contemporary context for understanding the role of information in society.

Student Learning Objectives
Upon successful completion of the course, students will:

- Understand the complex relationships between people, information, and technology as these pertain to information across its life cycle.
- Gain familiarity with the history, theory, methodologies, practices and professions associated with the field of information sciences;
- Be able to apply critical analytical skills to information problems.

IS 202: Social Aspects of Information Technology

Course Description
Explores the way in which information technologies have and are transforming society and how these affect a range of social, political and economic issues from the individual to societal levels.

Course Objectives
At the conclusion of the course, students will be able to:
- Understand the relationships among society, people, organizations, technology, and information
- Identify and critique the major interdisciplinary theories underpinning the provision of information technology
- Apply critical thinking to current information technology issues including digital media, surveillance, privacy, copyright, big data, algorithms, and the use of ICTs in the workplace
- Apply critical thinking, problem solving, and information fluency skills appropriate for the understanding the place of IT in a variety of settings and society more generally

IS 203 - Analytical Foundations for Information Problems.

Course Description
A survey of mathematical topics for students in information sciences. Provides an introduction to sets, relations, graphs, grammars, probability, and propositional and predicate logic. These topics relate to applications in information modeling, representation and expression.

Upon completion of this course, students will be able to:

1. Understand the definitions and uses of discrete and finite mathematical structures that are employed in information systems analysis, planning, and design.
2. Solve elementary problems involving sets, relations, graphs, and other structures.
3. Recognize and appreciate the roles played by mathematical objects in models of application domains.

Learning Objectives

1. Introduce mathematical structures and methods essential for understanding information systems.

2. Prepare students for further core and elective undergraduate coursework in information sciences.

Learning Outcomes

Upon completion of this course, students will be able to:

1. Understand the definitions and uses of discrete and finite mathematical structures that are employed in information systems analysis, planning, and design.

2. Solve elementary problems involving sets, relations, graphs, and other structures.

3. Recognize and appreciate the roles played by mathematical objects in models of application domains.

IS 204 - Research Design in the Information Sciences

Course Description
This course provides an introduction to different approaches to research in

the information sciences, including social science methods, data and text mining, design research, and others.Topics include philosophical and logical underpinnings of research, developing research questions, selecting research methods, conducting research ethically, and communicating findings clearly and effectively.

Course Objectives:
   Upon successful completion of the course, students will:
   - Understand various approaches to research in information sciences
   - Gain familiarity with research methods in information sciences includingqualitative, quantitative and interpretive methods
   - Understand requirements for communicating research findings clearly and effectively

IS 309 – Computers and Cultures

Course Description
Explores cultural ideas about computers, including hopes and fears about the effects of computers on our lives. Will analyze images of computers in fiction and movies. The course will also examine hackers, online subcultures, and other computer-related subcultures, and the integration of computers into various cultural practices.

Learning Objectives
Upon completion of this course, students will understand the effects of computers on our collective and individual lives, be able to analyze how computers are depicted in popular culture, and describe various computer-related subcultures. Topics include: history and human culture; the history of computers and the global Internet; "new media" and meaning; digital technology and the culture of education; new media and storytelling; comics and narrative art in the digital age; intellectual property, creative expression, and the concept of the remix; copying, curation, and collection of new media art; generation demographics and information technology; hackers, hacker culture, and hacktivism; Internet regulation history and controversies; Wikileaks, journalism, and government secrecy; "cyberspace" and the cyberpunk subculture.

Appendix G: Program Mission Statements

The University of Maryland, College Park: We improve lives and opportunities for people through information. With groundbreaking research and innovative academic programs, we strengthen information institutions, foster responsible information use, increase information reliability, and ensure equitable access to information. We harness data and technology for social, economic, and environmental good. We prepare the next generation of information professionals and thought leaders. We harness information for the benefit of all.

The University of Wisconsin, Madison: The mission of the Information School of the University of Wisconsin-Madison is to educate responsible leaders, critical thinkers, and creative innovators in the information professions who are adept in the creation, retrieval, use, and curation of information in all its forms, who are able to provide access to and understanding of information for all those who need or seek it, and who contribute to individual and collective knowledge, productivity, and well-being; create and disseminate research about past, present, and future information users and uses, the processes and technologies vital for information management and use, and the economies, cultures, and policies that affect information and access to it; contribute to the development of the faculties of information schools through a doctoral program built on interdisciplinary research and teaching excellence; and provide useful service to information professionals, the people of Wisconsin, and all information users.

The University of Michigan: We create and share knowledge so that people will use information – with technology – build a better world.

The University of Illinois, Urbana Champaign: The iSchool is dedicated to shaping the future of information through research, education, and engagement. Our mission is to lead the way in understanding the use of information in science, culture, society, commerce, and the diverse activities of our daily lives— that's how we, and you, can change the world.

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