Consumers and Makers: Exploring Opposing Paradigms of Millennial College Readiness

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Dedication

This thesis is dedicated to my wife, Heather Jackson, and to our daughters Cecilia and Josephine.

To Cecilia: When I began this doctorate, you were just six months old. Now, as I prepare to graduate, you are dreaming of your first days in kindergarten. Your charm, your kindness, your silliness, and your spirit have been ever-present reminders to me of why I set upon this path, and these qualities will prove invaluable as you begin your own journey of learning.

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Abstract

The political and technological circumstances of the past two decades have culminated in opposing epistemic paradigms of college readiness, where millennial students' conceptual understanding of "learning" is both narrowed to meet the demands of school systems bound to accountability and amplified by a rapidly evolving digital world. The researcher theorized that students situated within these paradigms may have developed dispositions toward the purpose of learning as primarily either consumption-oriented (consumers) or creation-oriented (makers). This study hypothesized that correlations existed among these consumer/maker dispositions and millennial college students' epistemic beliefs and key learning skills. The researcher developed an original survey instrument that was provided to a sample of 625 first year students (primarily 18-19 years of age) at a Midwestern liberal arts university. Quantitative, statistical analyses of responses were completed to develop constructs, understand variables, and determine the nature of relationships between variables. The results of these analyses found that respondents were 3-to-28-times more likely to demonstrate consumer dispositions than maker dispositions. The data supported the hypothesis of this study: statistically significant, positive correlations were present in 13 out of 24 instances, suggesting that as one approached the likelihood of having a maker disposition, one was also more likely to exhibit sophistication of epistemic beliefs and to have initiated or developed key learning skills through both high school experiences and the use of information-communication technologies.

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Chapter 1

Introduction

Background of the Study

The story of the U.S. public education system from 1989 to today is the story of the interplay between policy and curriculum in service of accountability. While accountability as a concept is inherently broad, Loeb and Figlio (2011) provide a useful definition for the purposes of this writing when they note that "accountability involves using administrative data-based mechanisms aimed at increasing student achievement" (p. 384). Measuring student achievement is a rationally sound practice, yet a distinction must be made here as to measure within the context of accountability carries with it the additional emphasis on *increasing* student achievement. Gunzenhauser (2003) argues that decades of this process have culminated in a default philosophy of education that "places inordinate value on the scores achieved on high-stakes tests, rather than on the achievement that the scores are meant to represent" (p. 51). Consequently, "the default philosophy underlying high-stakes testing is a philosophy of education in which tests designed to be part of a system of accountability drive the curriculum, limit instructional innovation, and keep educators from establishing their own priorities and visions" (p. 52). The agenda of accountability within educational policies and initiatives has acted upon the pedagogy, curriculum, and instruction experienced by an entire generation of students (Groen, 2012; Gunzenhauser, 2003; King & Zucker, 2005), but what is less clear is how this agenda has informed these students' own "default philosophies" of knowledge and learning, and to what end.

Success in accountability has been equated with (and justified by) the goal of

producing citizens who would insure America's continued global primacy (Bush, 1990;

U.S. Department of Education, 2010). The language and rhetoric used to articulate this

goal has shifted under various political administrations; in its current incarnation, the goal

is understood as producing students who are College and Career Ready (U.S. Department

of Education, 2010). Despite having been on the receiving end of decades of policies

emphasizing accountability in developing readiness for their post-secondary experiences,

large numbers of millennial students are still not prepared to academically thrive in

higher education and struggle to reach benchmarks indicative of college readiness on

measures such as the SAT, ACT, and NAEP (College Board, 2016; The Nation's Report

Card, 2013; Zinshteyn, 2015). Accountability's emphasis on measuring student

achievement has had the side-effects of shifting school attention to that which will be

assessed on high-stakes testing, narrowing curriculum and instructional emphasis to

tested subjects, and prioritizing easily-improved areas of instruction (King & Zucker,

2005; Loeb & Figlio, 2011). Research by Brown and Conley (2007) indicates that the

learning skills and practices developed by many students in navigating this K-12

curriculum is incompatibly aligned with the skills college faculty prefer among their

students and view as necessary to thrive in higher education. The policies and initiatives

explicitly intended to create the next generation of active American ingenuity,

innovation, and competition may have instead implicitly conditioned students to develop

a dispositional perspective wherein they are passive consumers of knowledge - a

disposition which is increasingly at odds with skills necessary to navigate both higher

education (Conley, 2014) and a technologically, semiotically evolving world (Kress, 2005; U.S. Department of Education, 2016).

The same 27-year time-span of these accountability initiatives has also seen unprecedented growth in the development and use of information-communication technology (ICT), dramatically altering not only humanity's social interactions, but also facilitating the shift from an industrial society to a knowledge society (Bereiter, 2002). In a knowledge society, abstract concepts "such as theories, numbers, and designs should be accepted as real things outside the mind – as conceptual artifacts – with which people may develop relationships" (Berieter, 2002, p 179). This is a philosophical shift away from knowledge as a static commodity to be owned and toward knowledge as a malleable matter with which to be engaged. Because ICT allows for individuals to act upon conceptual artifacts, it creates space, opportunity, and context to do "knowledge work…work that creates or adds value" to conceptual artifacts (Bereiter, 2002, p. 181). This process is inherently constructivist in nature, as "...knowledge is attained when people come together to exchange ideas, articulate their problems from their own perspectives, and construct meanings that make sense to them. It is a process of inquiry and creation…." (Gordon, 2008, para. 10). What is unique about the learning experiences of many millennials is not strictly that they had more abundant access to technology than the generations before them, but rather that the predominant technologies of their era have created spaces and contexts where individuals can choose to act on, transform, and share information – to do knowledge work. In this context, information is not governed by accountability policies and prescribed by a given curriculum, but rather

determined by the goals of the individual's search (Kress, 2005). Because of this shift, individuals are afforded agency as they seek "not knowledge but information; in this new semiotic world, it is the *readers who fashion their own knowledge*" [emphasis mine] (Kress, 2005, p. 10). As a result, information-communication technology affords opportunities for users to actively design intentional learning experiences of their own making and to do knowledge work – a kind of work that is much closer in alignment to the espoused expectations and goals of higher education faculty than the work students may have been tasked with by the curriculums of accountability culture (Brown & Conley, 2007; Groen, 2012).

Consequently, millennial students have grown up alongside two opposing epistemic realities, yet the extent to which these realities have shaped student dispositions toward knowledge and learning is unknown. The reality created by accountability policies and initiatives suggests that knowledge is a static commodity, prescribed by authority. Assessments are used to determine whether a student possesses a body of knowledge or whether they do not. Learning within this context, then, is the consumption of content with intent to repeat or replicate it to demonstrate proficiency toward a pre-existing standard – to show "ownership" of commodity. As a result, this may result in what this study will later define as a "consumer" disposition.

Meanwhile the reality created by information-communication technology would indicate that knowledge is dynamic, malleable, and participatory; those with ICT access can continually choose to act upon conceptual artifacts and information in ways which are bound only by the limitations of technology and the goals of the individual. This act

of choosing puts the learner in an active position to employ a variety of cognitive skills in order to intentionally engage with conceptual artifacts and to do knowledge work. This may result in what this study will later define as a "maker" disposition.

Both dispositions reflect diverging perspectives for students regarding the *purpose of learning*. It is presently unknown if these dispositions then also correlate to students' beliefs regarding the *process of learning*. Beliefs within this context are tremendously powerful, as they "are generally concerned with the issues, phenomena and cognitive schemas that individuals consider correct, [and they] affect all the decisions individuals make and all the behaviors they exhibit throughout their life" (Akturk, 2014, p. 428). Consequently, the beliefs one holds regarding the nature of knowledge – one's epistemological or epistemic beliefs – have tangible impact upon one's concept of, and personal approaches to, learning. Schommer (1990, 1998) proposed that a spectrum of student epistemic beliefs exist within a series of subsets, understood collectively through four factors (subsets and factors are presented later in Table 1.2) and ranging from naïve to sophisticated. Schommer's findings determined that students whose beliefs skewed toward naivety in these factors faced greater barriers in processing information, integrating knowledge, accurately assessing their own comprehension, and critically interpreting information (1990) – all of which are behaviors, skills, techniques, and strategies necessary to thrive in higher education (Conley, 2014).

Furthermore, research by Conley (2014) indicates that college faculty view students who possess beliefs which Schommer would classify as naïve to be at a disadvantage when tasked with college-level coursework; it can be inferred, then, that

college courses are more likely to require students to employ learning behaviors and

skills that are aligned with (or the result of) possessing more sophisticated epistemic

beliefs. Conley (2014) provides a model for understanding what these learning behaviors

and skills are within the context of college readiness, which he presents specifically as

"key cognitive strategies" and "key learning skills and techniques." If dispositions

address the *purpose* of learning, and beliefs address the *process* of learning, then the

skills listed in Table 1.0 are intended to address *practices* of learning:

Table 1.0
Key Skills in the Context of College Readiness

Key Cognitive Strategies	Key Learning Skills and Techniques
Problem formulation (hypothesizing and strategizing exploration of problems)	Ownership of learning • Goal setting • Persistence • Self-awareness
Research (identifying, collecting, and discerning information sources and data)	• Motivation • Help seeking • Progress monitoring • Self-efficacy
Interpretation (analyzing and evaluating relevant findings, trends, and evidence)	
Communication (organizing and constructing insights coherently)	Learning techniques • Time management • Study skills • Test-taking skills
Precision and Accuracy (monitoring and confirming standards and accuracy in conventions and tasks)	• Note-taking skills • Memorization/recall • Strategic reading • Collaborative learning • Technology

Note. Adapted from Conley (2014).

It is critical to note that these "key skills" not only echo the expectations of college

faculty – according to the U.S. Department of Education (2016), they *also* mirror the

skills necessary to thrive within the epistemic reality, knowledge society created by ICT.

In other words, the approaches to learning effectively in higher education are similar to

the approaches to effectively doing knowledge work with ICT.   These practices require

the student to be active and intentional in approaching their learning as knowledge work.

For the purpose of this writing, the behaviors, strategies, skills, and techniques listed in

Table 1.0 will be referred to as "key skills."

Statement of the Problem, Purpose of the Study, Hypothesis, and Research

Questions

By virtue of the opposing epistemic paradigms brought about by the political and

technological circumstances of the era they were born into, students now entering higher

education may have been placed in a state of cognitive dissonance where their conceptual

understanding of "learning" is both narrowed to meet the demands of school systems

bound to accountability (Gunzenhauser, 2003) and amplified by a rapidly evolving digital

world (Bereiter, 2002). We know that many students struggle to meet the demands and

expectations of college readiness (Brown & Conley, 2007; College Board, 2016; Conley,

2014; The Nation's Report Card, 2013; Zinshteyn, 2015), but we have yet to

acknowledge that the dispositions students bring to the *purpose* of learning, the beliefs

they hold about the *process* of learning, and the skills they use in the *practice* of learning

have been situated within this dissonance. The purpose of this study was to acknowledge

the unique historical and technological paradigms experienced by millennial students and

to identify these students' dispositions, beliefs, and skills as they now enter higher

education. This study hypothesized that correlations existed among dispositions

(purpose), beliefs (process), and skills (practice). The following questions guided the

research:

1. To what extent do millennial students exhibit dispositions regarding the purpose of learning along a spectrum of "consumer" to "maker"?

2. Do millennial students exhibit beliefs regarding the process of learning in alignment more with "naïve" or "sophisticated" perspectives (Schommer, 1998)?

3. To what extent (if any) did millennial students' high school experiences formally include the practice of developing "key skills" (Table 1.0)?

4. To what extent (if any) have millennial students' independent, informal experiences with information-communication technology included the practice of developing "key skills" (Table 1.0)?

5. Do correlations exist among disposition (Question 1), epistemic beliefs, (Question 2) and the location(s) of key skill development (Questions 3 and 4)?

Operational Definitions of Terms

The paradigms this study sought to acknowledge occurred throughout the lifetime of what is commonly known as the millennial generation. For the purpose of this study, the researcher used documentation from the U.S. Census Bureau (2015) in defining millennials as individuals born between the years 1982 and 2000.

The researcher developed a new construct in order to operationalize student disposition as a variable within this study. After surveying a wide range of literature (see Chapter 2), the researcher developed a series of categorical and interval questions regarding the purpose of learning within the contexts of "consumer" to "maker." For the purpose of this study, a consumer disposition indicates tendencies toward viewing the purpose of learning as consumption-oriented, where an individual learns primarily as an

act of compliance to "secure ownership" of an outcome. For the purpose of this study, a

maker disposition indicates tendencies toward viewing the purpose of learning as

creation-oriented, where an individual learns primarily as an act of self-driven discovery

to "generate" an outcome. Participants were asked both factual questions as well as

attitudinal questions to determine dispositions. Factual responses scored to consumer

dispositions reflected passive usage of technology (e.g., media consumption as opposed

to content creation), while consumer attitudinal responses indicated belief that the

purpose of learning is consumption-oriented (e.g., the primary goal of college being

employment preparation). Factual responses scored to maker dispositions reflected

active usage of technology (e.g., using social media as an accountability tool in

establishing and pursuing goals), and maker attitudinal responses indicated belief that the

purpose of learning is creation/making-oriented (e.g., the primary goals of college being

intellectual growth and contribution to an academic field). Table 1.1 provides examples

of statements that are reflective of these constructs:

Table 1.1
Examples of Consumer and Maker Statements

Disposition	Sample Statements Reflective of Disposition
Consumer	"My time is better spent learning material that I know will be tested on than learning material that might never be graded."
	"The number one purpose of learning in college is to own the information I will need in the job market."
Maker	"I would rather propose, design, and complete a final project of my own creation than take a multiple choice final exam."
	"My main belief regarding grades in college is that my grades are less important than what I can do with the material that I learn."

To develop the consumer-maker construct, the researcher measured this definition
through four different approaches: conditional categorical questions, conditional interval
questions, non-conditional categorical questions, and non-conditional interval questions.
This multi-faceted tactic provided four approaches upon which to view this construct,
providing greater nuance in understanding it as a possible characteristic of millennial
students.

In order to operationalize student belief as a variable within this study, the researcher
adapted Schommer's Epistemological Questionnaire (1998). This instrument measured
beliefs across a series of subsets collected into a spectrum of four factors, as presented
below in Table 1.2:

Table 1.2
Four Factors of Epistemic Beliefs with Subsets

Factor	Description of Ranges of Belief
Certainty of Knowledge	"Can range from the belief that knowledge is fact to the belief that knowledge is continually changing."
Simple Knowledge	"Can range from the belief that knowledge is made up of isolated bits of information to the belief that knowledge is complex."
	Additional subsets: Avoidance of ambiguity, tendency to seek single answers, tendency to avoid integration, dependence upon authority.
Quick Learning	"Can range from the belief that learning happens fast or not at all to the belief that learning is a gradual process that takes time."
	Additional subset: Criticism of authority.
Fixed Ability	"Can range from the belief that the ability to learn is fixed to the belief that people can learn how to learn."
	Additional subsets: Can/cannot learn how to learn, relationship of success to hard work, learning upon first attempt, innate ability.

Note. Quoted summarization by Nist-Olîejnik & Holschuh, 2009.

Schommer's model used the terms "naïve" and "sophisticated" as a construct to represent
the end-points for the spectrum across which students hold epistemological beliefs. In the

context of this research, "naïve" is not intended to be loaded with negative meaning, nor is "sophisticated" intended to be loaded with privileged or preferred meaning. Schommer's findings (1990) determined that students whose beliefs skewed toward naivety faced greater barriers in processing information, integrating knowledge, accurately assessing their own comprehension, and critically interpreting information; students with sophisticated beliefs did not.

In order to operationalize learning practices as a variable within this study, the researcher adapted Conley's (2014) model of college readiness, specifically the "key cognitive strategies" and "key learning skills and techniques" (see Table 1.0). This model addresses the expectations of college faculty regarding the rigor of higher education coursework, but these skills are also necessary to successfully participate in, and engage with, information-communication technology in order to do knowledge work (U.S. Department of Education, 2016). For the purpose of this research, the tactics listed within this model will be referred to as "key skills."

The hypothesis of this study proposed that correlations would exist among dispositions, beliefs, and skills.

Assumptions and Limitations

- This study assumed that millennial students have experienced unique paradigms impacting their educational experiences overtly, through the educational accountability policies and initiatives which shaped their school experiences, and covertly, through the rapid development and ubiquity of information-communication technologies.

- The study assumed that student success in university-level academics and intentional use of information-communication technology were both examples of "knowledge work" (Bereiter, 2002), that they both require equally sophisticated cognitive skills (Brown & Conley, 2007; Conley, 2014; U.S. Department of Education, 2016), and that these skills were best articulated through Conley's (2014) model (see Table 1.0).

- The study was limited to researching a sample of first-year students at a small, Midwestern liberal arts university.

Summary

Students entering higher education have had educational accountability policies and developing information-communication technologies systemically acting upon them their entire lives. Both systems carry increasingly opposing answers to the perennial question of "what knowledge is of most worth?" (Guldbrandsen, 2013, p. 10). This study intended to address a significant gap in the literature of college readiness by acknowledging the diverging paradigms that millennial students' learning experiences have been situated in. The results of this study will also allow us to revisit both the explicit and implicit curriculum of college readiness in a way that more closely mirrors the needs of our students.

In the next chapter the researcher will explore a twenty-seven-year timeline of political and technological influence upon our cultural understandings of learning and establish how this timeline serves as the context upon which millennials' dispositions, beliefs, and skills regarding learning have been built.

Chapter 2

Review of the Literature

The notion of accountability has been a driving force in educational policy at both the state and federal levels for decades. While accountability as a concept is inherently broad, Loeb and Figlio (2011) provide a useful definition for the purposes of this writing when they note that "accountability involves using administrative data-based mechanisms aimed at increasing student achievement" (p. 384). Measuring student achievement is a rationally sound practice, yet a distinction must be made here as to measure within the context of accountability carries with it the additional emphasis on *increasing* student achievement. Because of this agenda, educational policies and initiatives that advocated and implemented accountability practices have had an inevitable impact upon the pedagogy, curriculum, and instruction experienced by an entire generation of students.

We see the fixation on student achievement and measurable outcomes begin to take forefront in policy discussions at the Charlottesville Education Summit of 1989, when then-president George H.W. Bush and a number of the country's governors met and established national education goals (Vinovskis, 1999). Bush would articulate these goals to the nation just four months later in his State of the Union Address:

> Real improvement in our schools is not simply a matter of spending more: It's a matter of asking more -- expecting more -- of our schools, our teachers, of our kids, of our parents, and ourselves. And that's why tonight I am announcing America's education goals, goals developed with enormous cooperation from the Nation's Governors…By the year 2000…we are going to make sure our schools'

diplomas mean something. In critical subjects -- at the 4th, 8th, and 12th grades --

we must assess our students' performance. By the year 2000, U.S. students must

be first in the world in math and science achievement. Every American adult

must be a skilled, literate worker and citizen. (Bush, 1990)

The logic at play here is significant, as is the intended date of results: both implied that

the economic competiveness of what is now commonly known as the "millennial

generation" of American citizenry was dependent upon reaching set academic standards,

thus making assessment of student efforts to meet standards inevitably necessary. This

desire to ensure that "diplomas mean something" would essentially set off a chain

reaction of educational initiatives seen throughout the 1990's and 2000's – initiatives

which would define the purposes of education for the entire generation of millennial

students now entering and engaging in higher education.

Bush would follow the summit with America 2000, a "long-term national strategy

(not a federal program)" which specifically both called for, and offered methods to

develop, "better and more accountable schools" (U.S. Department of Education, 1991).

Bill Clinton (himself a key player in the Charlottesville Summit) would continue the

trajectory toward accountability throughout his presidency, as his administration

"borrowed ideas" from Bush and crafted the Goals 2000: Educate America Act of 1994

(Klein, 2014). Notably, Goals 2000 included within its purpose both developing a range

of student performance standards as well as assessment measures (Civic Impulse, 2016).

Also in 1994, the Clinton administration provided guidance in reauthorizing the

Elementary and Secondary Education Act (ESEA), known formally as the Improving

America's Schools Act of 1994 (IASA). Using Goals 2000 as its framework, the IASA

would "ensure greater accountability through the use of state assessments that measure

students' progress toward new state standards" (Riley, 1995), bringing the rhetoric of

accountability, assessment, and standardization into the context of definitive federal

education policy. Neither America 2000, Goals 2000, nor the IASA would go so far as to

impose an official system of accountability as federal policy upon states, yet their

emphases on standards-based education had inevitable impact upon what would be

learned in many U.S. classrooms, and how accountability for that learning would be

measured, assessed, and judged. Given that the majority of students entering higher

education for the first time as freshmen are 18 years-old (Pryor, Hurtado, Saenz, Santos,

and Korn, 2007), one can safely conclude that most millennial-generation college

freshmen have lived with their K-12 educational experiences situated within the culture

and expectations of accountability policies and initiatives.

  The accountability movement arguably reached its zenith in the first decade of the

2000's, after the second Bush administration signed the No Child Left Behind Act

(NCLB) into law in 2002. The magnitude of NCLB cannot be understated; it was the

"largest single expansion of federal authority into state and local decisions in the history

of the country" (Elmore, 2004, p. 2); prior to NCLB, the federal government was

advocating – at times strongly – for standards and accountability, but a line had been

drawn between state and federal authority in implementing such a system. With NCLB,

in order to receive federal education funding, states were overtly required to assess

students at multiple points in their K-12 experiences via large-scale testing, to establish

terms of proficiency in subject areas, and to use assessments as measurements of progress toward proficiency "toward an ultimate goal of 100% proficiency in 2014" (Loeb & Figlio, 2011, p. 385). It is critical to note that NCLB did not impose federally-developed academic content standards. What NCLB did was to manufacture a scenario wherein states were responsible for determining academic content standards and for measuring the progress of their students in reaching those standards – all of which occurred within a context that rewarded federal funding to those schools that were successful in becoming proficient while punishing those that were not.

What resulted were inconsistencies amongst states and, in some instances, a *lowering* of academic standards. In 2010, the U.S. Department of Education explained this fall-out in "College and Career Ready Students":

Under the current version of ESEA [here referring to NCLB], virtually every state has developed not only its own content standards and assessments aligned to those standards, but also its own definition of proficiency. Because of this lack of uniformity, students with the same actual achievement levels could be considered "proficient" in one state, but may not be in another. Comparing states' performance on the yardstick of the National Assessment of Educational Progress (NAEP)…reveals that states have significantly different definitions of proficiency…By comparing the NAEP scale equivalent of each state's standards from 2005 to 2007, researchers documented that in states with a significant change in their NAEP scale equivalent, *standards mostly became easier*. [emphasis mine] (p. 4-5)

The same document provides perhaps the most striking example of this inconsistency, wherein "89 percent of [Mississippi's] fourth-graders were proficient in reading in 2004–05, compared with only 50 percent in Massachusetts. Yet, on the…NAEP, Massachusetts has the highest fourth-grade reading score in the nation; Mississippi ranks next to last" (p. 4). It is a staggering outcome, but when viewed with the benefit of hindsight, almost logically inevitable.

In 2010, the Obama administration would use these inconsistencies as a justifying agent in "A Blueprint for Reform: Reauthorizing the Elementary and Secondary Education Act." The document lists the administration's four primary education goals, one of which includes "Implementing college- and career-ready standards and developing improved assessments aligned with those standards" (p. 3). The rationale here is simple: NCLB created a system of accountability, but this system could be duped by lowering standards in proficiency state-by-state. To rectify this, proficiency standards needed to be made as uniform as possible among states, and this uniformity could be held under the umbrella goal of College and Career Readiness (CCR).

It should be noted that the "Blueprint for Reform" came a year after President Obama signed the American Recovery and Reinvestment Act, a provision of which was the Race to the Top (RTTT) "contest" among states. According to the Race to the Top Program Executive Summary (U.S. Department of Education, 2009), included in this Act was "$4.35 billion for the Race to the Top Fund, a competitive grant program designed to encourage and reward states that are creating the conditions for education innovation and reform" (p. 2). States applying for RTTT were provided a variety of criteria, which they

then quite literally were awarded points for achieving; the states awarded the most points

increased their candidacy for a portion of the $4.35 billion.

Race to the Top tasked states with "earning" the program's funding by complying

with federally created criteria, and one of these criteria included "adopting common

standards" (U.S. Department of Education, 2009, p. 7). The National Governors

Association and the Council of Chief State School Officers would lead the charge in this

adoption process, eventually developing the K-12 Common Core State Standards (CCSS)

("Frequently Asked Questions", para. 2). The Obama administration acknowledged this

in "A Blueprint for Reform" (2010):

> Following the lead of the nation's governors, we're calling on all states to develop
>
> and adopt standards in English language arts and mathematics that build toward
>
> college-and-career-readiness by the time students graduate from high school.
>
> States may choose to upgrade their existing standards or work together with other
>
> states to develop and adopt common, state-developed standards. (p. 3).

As of this writing, forty-two states have fully adopted these standards ("Standards in

Your State", para. 1); to teach in 84% of America's public K-12 classrooms is to teach

the curriculum of Common Core State Standards, the stated goals of which are to produce

college-and-career-ready students.

The story of the U.S. public education system from 1989 to today is the story of

the interplay between policy and curriculum in service of accountability. Given that the

majority of students entering higher education for the first time as freshmen are 18 years-

old (Pryor, Hurtado, Saenz, Santos, and Korn, 2007), one can safely conclude that most

millennial-generation college freshmen have lived with their K-12 educational

experiences situated within the culture and expectations of accountability. At nearly

every stage, from Bush's (1990) emphasis on being "first in the world" to Obama's

remarks (U.S. Department of Education, 2010) that "countries that out-educate us today

will out-compete us tomorrow," success in accountability has been equated with (or

justified by) producing citizens who would further American interests in global

competition. A quarter-century of educational policy has now culminated in our current

era's rhetorical stance in insuring American global primacy by tasking schools with

producing college (and career) ready students. Meanwhile, this emphasis on measuring

student achievement in service of competition has had the side-effects of shifting school

attention to that which will be tested, narrowing curriculum and instructional emphasis to

tested subjects, prioritizing easily-improved area of instruction (Loeb & Figlio, 2011),

and generally "flattening" knowledge to that which is static, prescribed, and easily

accounted for at a massive scale.

Ironically, this flattening phenomenon runs counter to development of the more

dynamic, sophisticated cognitive skills often required to succeed in higher education

(Conley, 2007). Despite being on the receiving end of decades of policies emphasizing

accountability in developing readiness for their post-secondary experiences, large

numbers of millennial students are still not prepared to academically thrive in higher

education. The College Board noted that among the students who took their SAT exam

in 2014, only 42% received scores that reached the benchmark indicating readiness for

college, and that this figure "has remained virtually unchanged over time" (2016, para.

2). These findings are not exclusive to students who took the SAT, as only 40% of

students taking the 2014 ACT reached three (or all four) of their college ready

benchmarks and, strikingly, 33% of ACT test-takers reached no benchmarks at all

(Zinshteyn, 2015). Among students who took the 2013 NAEP, only 39% reached college

readiness benchmarks in math and only 38% in reading (The Nation's Report Card,

2013). These circumstances combine to create an odd scenario for millennial college

freshmen: because of their historical circumstances they have taken many standardized

exams, for purposes that they do not understand (Zilberberg, Anderson, Swerdzewski,

Finney, & Marsh, 2012), to measure skills that are actually incompatibly aligned to the

very institutions they were "readied" for (Brown & Conley, 2007).

It should be noted that the readiness benchmarks stated by the SAT, ACT, and

NAEP are rarely, if ever, taken into consideration by college admissions offices. Instead,

college readiness in this context is most commonly understood by "high school courses

taken and grades received along with scores on national tests" (Conley, 2007). Both are

effective measures of content knowledge, yet students who are admitted to college may

be surprised to discover that the skillset they developed to consume and repeat content

knowledge in the K-12 context of education-as-accountability does not actually serve

them well in higher education. Conley (2014) explored this phenomenon by interviewing

over four-hundred college faculty members at multiple US universities, and his findings

were especially compelling:

> Faculty…stated emphatically that this prerequisite content knowledge was not the
>
> most important measure of success in their courses. With near unanimity, they

stressed in no uncertain terms on campus after campus that students needed to

know what to do with the content they were learning….Repeating information

alone was not sufficient. Faculty noted time and time again that otherwise well-

prepared students could not grapple with a task or problem that asked them to go

beyond what they had been taught literally. Students struggled to make

inferences, interpret inconsistent or novel data, posit multiple explanations of a

phenomenon, generate an original thesis and explore it, or extrapolate from a

given set of information to a new and novel setting (p. 33).

It is here that we begin to see the true fall-out of over 20 years of educational policy on

millennial students' epistemic reality. As curriculum and pedagogy steadily became

more-and-more beholden to the outcomes of high-stakes accountability assessments, an

entire generation's experience of school itself was defined accordingly. Consequently,

their conceptions of knowledge, understanding, and learning have been flattened, stalling

out in tiers of "less sophisticated cognitive functioning" (Conley, 2014); they are well

versed in receiving and replicating information, but when tasked with going beyond this

into more challenging territory - as they must in order to succeed in higher education -

students struggle. Policies and initiatives explicitly intended to create the next generation

of active American ingenuity, innovation, and competition have instead implicitly

conditioned students to be passive consumers.

Interestingly, this flattening process has occurred within the same historical era

that information-communication technologies (ICT) have grown exponentially; in fact,

nearly every landmark year for education accountability features a parallel milestone in

ICT. Consider the following: the Charlottesville Education Summit started the nation on the path to accountability in 1989 – that very year, Tim Berners-Lee began the World Wide Web; Goals 2000 and IASA came about in 1994, meanwhile Jerry Yang and David Filo created the first commonly used search engine, Yahoo; in the early 2000's No Child Left Behind was being created and implemented just as Wikipedia, Skype, LinkedIn, Twitter, and the iPhone launched; in 2009 Obama enacted policy that would lead to Common Core State Standards, while the global number of Facebook users reached 150 million - an equivalent population to the eighth largest nation on earth (Pew Research Center, 2014; Zuckerberg, 2009). As educational policy was flattening knowledge and learning, ICT was amplifying it tremendously.

During the above time-frame, educational policy-makers were not passive in responding to changes in technology. In fact, from 1995 to 2005, over $40 billion dollars was spent on both the technological infrastructure of American public schools and training teachers to navigate technology (Culp, Honey, & Mandinach, 2005). What is striking is that technology policies, especially those prior to 1997, were centralized around the concept of accessibility and operated under the logic that mere "physical access to hardware and internet connectivity" would initiate "widespread and effective use of educational technology" (Culp, et. all 2005). It is easy to grasp why access alone did not evolve into wide-scale, effective use when one again considers the over-riding power of accountability. As Lankshear and Knobel (2003) observe, "since educational ends are directed by curriculum, and technologies are 'mere' tools, the task of integrating new technologies into learning is often realized by adapting them to familiar routines" (p.

31). So long as the technology of teaching is beholden to curriculum, and curriculum is beholden to large-scale, standardized assessment, teaching with technology (formally) will be understood only through its impact upon those assessments. Consequently, "making learners 'technologically literate' is largely reduced to teaching them how to 'drive' the new technologies" (Lankshear and Knobel, 2003, p. 31). Access to technology itself, even within a formal learning environment, does not necessarily push students beyond a passive, consumer role.

The misperception that access to technology is equivalent to technological literacy is one that continually surfaces when discussing millennial students. Prensky (2001) famously described this generation as "digital natives" – individuals who grew up alongside the "arrival and rapid dissemination of digital technology" and consequently were thought to possess a vast skill set in navigating and understanding ICT simply because of its ubiquity in both the background and forefront of their lives. Further research and scrutiny has revealed the digital native label and its implications that all millennials possess innate digital skills to be vastly oversimplified (Mills, 2010), yet inherent within the logic of this label is a kernel of truth best articulated by Kress (2003):

> The world of communication is not standing still. The communicational world of children now in school is both utterly unremarkable to them and yet it looks entirely different to that which the school imagines and for which it still, hesitantly and ever more insecurely, attempts to prepare them. All of us already inhabit that new world. (p. 16)

As Kress describes, this "new world" is one where multimodal forms of communication (via technology) provide individuals with *opportunity for agency* in making meaning. In other words, what is unique about the learning experiences of many millennials is not that they had more abundant access to technology than the generations before them, but rather that the predominant technologies of their era have created spaces where individuals can choose to act on, transform, and share information. In this context, information is not governed by accountability policies and prescribed by a given curriculum but rather determined by the goals of the individual's search; because of this shift, individuals are afforded agency as they seek "not knowledge but information; in this new semiotic world, it is the *readers who fashion their own knowledge*" [emphasis mine] (Kress, 2005, p. 10). Consequently, information-communication technology affords opportunity for users to actively design intentional learning experiences of their own making.

This individualized, intentional ownership of knowledge creation is reminiscent of the findings described earlier from Conley (2014) regarding the qualities college faculty members were seeking in their students: faculty ultimately were describing individuals who could actively "make" rather than passively "consume". In fact, Conley concludes that student ownership of learning is central to the "key learning skills and techniques" which define college readiness. This ownership and self-direction holds equal weight in determining readiness as an individual's skillset in "key cognitive strategies" such as problem formulation (hypothesizing and strategizing exploration of problems), research (identifying, collecting, and discerning information sources and data), interpretation (analyzing and evaluating relevant findings, trends, and evidence),

communication (organizing and constructing insights coherently), and precision and accuracy (monitoring and confirming standards and accuracy in conventions and tasks) (Conley, 2014). Lankshear and Knobel (2003) note that "To participate effectively and productively in any literate practice," such as the mindsets and practices described here, "people must be socialized into it" (p. 11), yet Conley's findings indicate that "these more demanding tasks…are not generally developed very consistently in a typical secondary school education" (p. 57). Conley's findings suggest that formal education has not provided the social spaces for students to cultivate the learning skills, techniques, and cognitive strategies necessary for success in higher education; however, the semiotic, self-directed spaces of ICT may prove to be where students are socially engaging in and practicing these "key skills."

To reiterate an earlier point, access to technology does not immediately result in active, engaged, sophisticated use. The Office of Educational Technology for the U.S. Department of Education establishes this well in their National Education Technology Plan (2016) by use of the term "digital use divide," a phrase that articulates the "disparity between students who use technology to create, design, build, explore, and collaborate and those who simply use technology to consume media passively" (p. 18). Notice that, by this measure, those who are on the positive side of the digital use divide are using many of the very same cognitive skills to navigate ICT as Conley's research among college faculty members had determined to be of critical import to thrive in higher education. In both instances we see distinctly different "user experiences" between those who are active versus those who are passive.

The past twenty-seven years have brought with them a clear trajectory in educational policies guided by accountability practices; these same years have also included dynamic cultural shifts brought about by the rapid development of information-communication technologies. The learning experiences of millennial students have been situated within the contexts of both of these phenomena where their dispositions regarding the purpose of learning have been overtly and covertly informed.

In order to operationalize student disposition as a variable within this study, the researcher developed the consumer-maker construct. For the purpose of this study, a consumer disposition indicates tendencies toward viewing the purpose of learning as consumption-oriented, where an individual learns primarily as an act of passive compliance to secure "ownership" of an outcome. For the purpose of this study, a maker disposition indicates tendencies toward viewing the purpose of learning as creation-oriented, where an individual learns primarily as an act of self-driven discovery to "generate" an outcome. With this construct in place, the researcher proposed the first question guiding this endeavor:

1. To what extent do millennial students exhibit dispositions regarding the purpose of learning along a spectrum of "consumer" to "maker"?

Both dispositions, consumer and maker, may provide initial context for determining what students view the purpose of learning to be, which may then have informed their beliefs about what the purposes of learning and knowledge itself are. Beliefs within this context are tremendously powerful, as they "are generally concerned with the issues, phenomena and cognitive schemas that individuals consider correct, [and they] affect all

the decisions individuals make and all the behaviors they exhibit throughout their life"

(Akturk, 2014, p. 428). Consequently, the beliefs one holds regarding the process of

learning and the nature of knowledge – one's epistemological or epistemic beliefs – have

tangible impact upon one's concept of, and personal approaches to, learning.

Schommer's Epistemological Questionnaire (1998) measures student epistemic beliefs

exist across a spectrum of four factors, ranging from naïve to sophisticated perspectives

(Nist-Olîejnik and Holschuh, 2009, p. 88):

1. Certainty of Knowledge: Can range from the belief that knowledge is fact to the
   belief that knowledge is continually changing.

2. Simple Knowledge: Can range from the belief that knowledge is made up of
   isolated bits of information to the belief that knowledge is complex.

3. Quick Learning: Can range from the belief that learning happens fast or not at all
   to the belief that learning is a gradual process that takes time.

4. Fixed Ability: Can range from the belief that the ability to learn is fixed to the
   belief that people can learn how to learn.

Schommer's findings on epistemic beliefs determined that students whose beliefs skewed

toward naivety faced greater barriers in processing information, integrating knowledge,

accurately assessing their own comprehension, and critically interpreting information

(1990). This study employed Schommer's model in order to establish the second

research question:

2. Do millennial students exhibit beliefs regarding the process of learning in
   alignment more with "naïve" or "sophisticated" perspectives (Schommer, 1998)?

The ability to process, integrate, assess, and interpret information mirror the skills, techniques, and strategies necessary to thrive in both higher education (Conley, 2014) and our ICT-rich culture (U.S. Department of Education, 2016). The researcher operationalized Conley's "Four Keys to College Readiness" model (Conley, 2014) by focusing specifically on the "Key Cognitive Strategies" and "Key Learning Skills and Techniques." This allowed the researcher to establish a collection of learning practices that is possessed by successful college students and desired among college faculty (Conley, 2014). Furthermore, these skills run parallel to those the U.S. Department of Education has indicated to be critical in navigating new technologies (2016). For the purpose of this research, this collection is referred to as "key skills" (see Table 1.0). In order to explore the diverging paradigms discussed in this study, the researcher asked:

3. To what extent (if any) did millennial students' high school experiences formally include the practice of developing "key skills" (Table 1.0)?

4. To what extent (if any) have millennial students' independent, informal experiences with information-communication technology included the practice of developing "key skills" (Table 1.0)?

This study hypothesized that correlations exist among millennial students' dispositions, beliefs, and skills as conceptually articulated in this section and in Chapter 3 of this study. To determine the nature of these correlations, the researcher's final question states:

5. Do correlations exist among disposition (Question 1), epistemic beliefs, (Question 2) and the location(s) of key skill development (Questions 3 and 4)?

The conclusion reached through this hypothesis may allow us to better grasp how the seemingly-opposing political and technological paradigms of the millennial era have informed the dispositions these students bring to the *purpose* of learning, the beliefs they hold about the *process* of learning, and the skills they use in the *practice* of learning.

The following chapters will provide a description of how this study went about answering these research questions and testing this hypothesis, as well as an explanation of the study's findings and a discussion of its implications.

Chapter 3

Methodology

The purpose of this study is to acknowledge the unique historical and

technological paradigms experienced by millennial students and to identify these

students' dispositions, beliefs, and skills as they now enter higher education. This study

hypothesized that correlations existed among dispositions (purpose), beliefs (process),

and skills (practice). Table 3.0 states the questions guiding the research as well as

shortened names for reference:

Table 3.0
Research Questions and Shortened Names

Shortened Names		Research Question
RQ 1	1.	To what extent do millennial students exhibit dispositions regarding the purpose of learning along a spectrum of "consumer" to "maker"?
RQ 2	2.	Do millennial students exhibit beliefs regarding the process of learning in alignment more with "naïve" or "sophisticated" perspectives (Schommer, 1998)?
RQ 3	3.	To what extent (if any) did millennial students' high school experiences formally include the practice of developing "key skills" (Table 1.0)?
RQ 4	4.	To what extent (if any) have millennial students' independent, informal experiences with information-communication technology included the practice of developing "key skills" (Table 1.0)?
RQ 5	5.	Do correlations exist among disposition (RQ 1), epistemic beliefs, (RQ 2) and the location(s) of key skill development (RQs 3 and 4)?

Study Setting and Participants

This study took place at a 4-year comprehensive regional university located on the

shores of Lake Superior, with a total enrollment of just over 11,000 students.   The

population studied were first-year students who were enrolled in an introductory

freshman orientation seminar course during the fall semester of 2016. This seminar acts

to provide students with the resources and skills necessary in transitioning to university life. Enrollment in the seminar is required of first-year students in 4 out of 5 colleges within the university: the equivalent of approximately 63% of the first-year student population. The researcher served as a guest lecturer in 26 sections of the seminar during the Fall 2016 semester. The first 15-20 minutes of this lecture consisted of providing students the opportunity to complete an online survey instrument developed by the researcher using Qualtrics. The remaining 35-30 minutes of the lecture covered a variety of learning strategies topics relevant to first year students including metacognition, time management, etc.

A convenience sample of 625 first-year students was given the option to participate in the study. Barlett, Kortlick, and Higgins (2001) indicate that 96 participants would be the minimum required sample size for a study such as this. Of the initial 625, 84% opted to participate in the research and began the survey. These participants were then asked a series of demographic questions to establish if they should be included in this study. Respondents who attended grades K-12 primarily outside the United States, respondents whose age was 17 or younger, and respondents whose age was 36 or older were all excluded from the study as their demographic circumstances put them outside the scope of the intended research goals. The final number of students included in the data analysis of this study was 490. The demographic characteristics of study participants can be found in Tables 3.1 – 3.7:

Table 3.1
Demographics of Research Participants: *Identified Gender*

Variable	N	%
Female	271	55.3%
Male	213	43.5%
Gender non-conforming / Genderqueer / Non-binary	4	0.8%
Other / Identification not listed	1	0.2%
Prefer not to respond	1	0.2%

Note. N = 490

Table 3.2
Demographics of Research Participants: *Year of Birth*

Variable	N	%
1998	291	59.4%
1997	189	38.6%
1996	7	1.4%
1995	3	0.6%

Note. N = 490.

Table 3.3
Demographics of Research Participants: *Enrollment in College by Major*

Variable	N	%
College of Education and Human Service Professions	120	24.5%
College of Liberal Arts	152	31.0%
School of Business and Economics	189	38.6%
School of Fine Arts	5	1.0%
College of Science and Engineering	21	4.3%
No response	3	0.6%

Note. N = 490. Names of colleges and schools adapted to protect student privacy.

Table 3.4

Demographics of Research Participants: *Self-reported Confidence in Major*

Variable	N	%
Very confident.	83	16.9%
Confident.	181	36.9%
Uncertain	62	12.7%
Very uncertain.	25	5.1%
Undeclared / Undecided on Major	139	28.4%

Note. N = 490.

Table 3.5

Demographics of Research Participants: *Types of College Equivalent Courses Completed Prior to Enrollment at University*

Variable	N	%
Completed one (or more) Advanced Placement course(s)	257	52.4%
Completed one (or more) International Baccalaureate course(s)	29	5.9%
Completed one (or more) College in the Schools course(s)	179	36.5%
Completed one (or more) high school course(s) that was also issued college credit.	129	26.3%
Completed one (or more) college course(s) at another college or university.	61	12.4%
Did not complete any college equivalent courses.	76	15.5%

Note. N = 490. Percentage totals do not equal 100% as respondents could appear in more than one category.

Table 3.6

*Demographics of Research Participants: Number of College Equivalent Courses
Completed Prior to Enrollment at University. Variable Name: Demo A*

Variable	N	%
0	76	15.5%
1	70	14.3%
2	74	15.1%
3	65	13.3%
4	51	10.4%
5	44	9.0%
6	32	6.5%
7	16	3.3%
8	20	4.1%
9	7	1.4%
10 or more	34	6.9%

Note. N = 489. Mean = 3.48, Median = 3, Mode = 0. SD = 2.903.

Table 3.7

*Demographics of Research Participants: Number of Information-Communication
Technologies Used. Variable Name: Demo B*

Variable	N	%
0	1	0.2%
1	0	0%
2	1	0.2%
3	1	0.2%
4	5	1.0%
5	8	1.6%
6	26	5.3%
7	52	10.6%
8	86	17.6%
9	106	21.6%
10	104	21.1%
11	73	14.9%
12	27	5.5%
13	0	0%

Note. N = 490. Mean = 8.97, Median = 9, Mode = 9. SD = 1.801.

Based on these data we see that the sample included over 11% more females than

males, and that the majority of respondents were between the ages of 18-19 years old.

The sample was distributed across all five colleges at the university, with greatest

representation in the School of Business.

Over one-quarter of respondents were undeclared in their major field of study. For

students who were declared, over half reported feeling "confident" or "very confident" in

their choice of major. The average number of college equivalent courses taken prior to enrollment at the university was 3.5 (SD = 2.9); however, 15% of the sample had not completed any college equivalent-coursework prior to their enrollment at the university. The demographic information regarding college equivalent courses found in Table 3.6 was also used for analysis in this research and is referred to later in the study as "Demo A."

The sample reported being very experienced in using information-communication technologies. Respondents used, on average, about 9 out of the 13 technologies measured within the study. Over 41% of the sample reported using 10 or more of these technologies. The demographic information regarding college equivalent courses found in Table 3.7 was also used for analysis in this research and is referred to later in the study as "Demo B."

Procedures

This research used an online survey instrument built with Qualtrics that collected demographic data as well as data pertaining to two frequency counts in relationship with four main sets of variables, as illustrated in Table 3.8:

Table 3.8
Frequency Counts and Research Variables

	First frequency count.	Second frequency count.	First set of variables. Research question 1	Second set of variables. Research question 2	Third set of variables. Research question 3	Fourth set of variables. Research question 4
Description	Social media / website accounts.	Technology tools used prior to attending UMD.	Student dispositions: consumer and maker.	Student epistemic beliefs: naïve and sophisticated.	High school experience did / did not develop key skills.	ICT experience did / did not develop key skills.
Range of variables	0-7 media/website accounts	0-6 technology tools used	1A. Conditional categorical	2A. Certainty of Knowledge	3A. Conditional interval	4A. Conditional interval
			1B. Conditional interval	2B. Simple Knowledge	3B. Non-conditional interval	4B. Non-conditional interval
			1C. Non-conditional categorical	2C. Quick Learning		
			1D. Non-conditional interval	2D. Fixed Ability		

Notes. Frequency counts later combiner into single variable: Demo B. Third set of variables later combined into single variable: 3C. Fourth set of variables later combined into single variable: 4C.

Both frequency counts documented participants' experiences with ICT. The first frequency count inquired about what social media/website accounts participants possessed. Conditional follow-up questions pertaining to the first, third, and fourth sets of variables were then asked based upon participant response. The second frequency count inquired about participant usage of technology tools prior to attending the university. Conditional follow-up questions were then asked to determine both context of usage (e.g. Did you mainly use Google Docs because it was a school requirement?) and connection between usage and the first, third, and fourth sets of variables. The frequency

counts were later combined into a single variable for analysis, represented in Table 3.7 and reported later in this document as "Demo B".

The first set of variables was designed to measure student dispositions regarding the purpose of learning as "consumer" or "maker." The researcher developed original questions in order to operationalize student dispositions. These questions were both conditional and non-conditional in nature, and both categorical and interval by design.

Participants were asked categorical, factual questions (*ex: Finish the following statement with the option that closest reflects your life: I mainly use Facebook... (A) To read about the lives of my friends or family. (B) As a public space to share content I have created. (C) To engage in discussions on topics I care about. (D) As a way to pass time.*) as well as interval, attitudinal questions (*ex: To what extent do you agree with the following statement: My time is better spent learning material that I know will be tested on than learning material that might never be graded*). Categorical, factual responses scored to "consumer" dispositions reflected passive usage of technology (e.g. media consumption as opposed to content creation) and interval, attitudinal questions scored to "consumer" dispositions indicated belief that the purpose of learning is consumption-oriented (e.g. the goal of college-level learning being career preparation). Categorical, factual responses scored to "maker" dispositions reflected active usage of technology (e.g. using social media as an accountability tool in establishing and pursuing goals) and interval, attitudinal questions scored to "maker" dispositions indicated belief that the purpose of learning is creation/making-oriented (e.g. the goal of college-level learning being intellectual growth and contribution to an academic field).

There were 9 non-conditional questions asked of all respondents (4 categorical, 5 interval). Conditional questions were asked based upon usage of social media and/or technology tools (1 categorical and 1 interval question per instance of usage). This is illustrated in Table 3.9:

Table 3.9
Number of Questions Asked for RQ 1 based upon Demo B

Demo B. Number of ICTs used.	1A. Conditional categorical questions asked	1B. Conditional interval questions asked	1C. Non-conditional categorical questions asked	1D. Non-conditional interval questions asked	Total measurements
0	0	0	4	5	9
1	1	1	4	5	11
2	2	2	4	5	13
3	3	3	4	5	15
4	4	4	4	5	17
5	5	5	4	5	19
6	6	6	4	5	21
7	7	7	4	5	23
8	8	8	4	5	25
9	9	9	4	5	27
10	10	10	4	5	29
11	11	11	4	5	31
12	12	12	4	5	33
13	13	13	4	5	35

Table 3.10 illustrates how these questions were then initially scored:

Table 3.10
Initial Scoring System for RQ 1 Variables

	1A. Conditional categorical questions	1B. Conditional interval questions	1C. Non-conditional categorical questions	1D. Non-conditional interval questions
Scoring system per question.	1 = Consumer, 2 = Maker	Closer to 1 = Consumer Closer to 5 = Maker	1 = Consumer, 2 = Maker	Closer to 1 = Consumer Closer to 5 = Maker
Scoring method.	Mean outcome: Add responses, divide by Demo B.	Mean outcome: Add responses, divide by Demo B.	Mean outcome: Add responses, divide by number of questions asked.	Mean outcome: Add responses, divide by number of questions asked.

Because this study was exploratory, and in order to avoid potential for bias, the

researcher sought expert consultation (I. Han, personal communication, March 23, 2017)

to operationally define the results of this scoring system and include a possible third

outcome for participants: "moderates." The definition of these results is available in

Table 3.11:

Table 3.11
Defining Ranges for RQ 1 Variables

Category	1A. Conditional categorical questions	1B. Conditional interval questions	1C. Non-conditional categorical questions	1D. Non-conditional interval questions
"Consumers"	Mean score of 1-1.33	Mean score of <2.6	Mean score of 1-1.33	Mean score of <2.6
"Moderates"	Mean score of 1.34-1.67	Mean score of 2.6-3.49	Mean score of 1.34-1.67	Mean score of 2.6-3.49
"Makers"	Mean score of 1.68-2	Mean score of >3.49	Mean score of 1.68-2	Mean score of >3.49

After these ranges were determined, a single-trait-multimethod matrix (Trochim, 2006)

was developed in order to establish convergent validity of the construct. A Cronbach

Alpha internal consistency reliability coefficient was also tested for, and is provided at

the end of this chapter in Table 3.19. The result of this outcome is presented in the next

chapter as Table 4.1.

The second variable measured whether student beliefs regarding the process of

learning aligned more with "naïve" or "sophisticated" perspectives. The researcher was

given permission to use and adapt existing instrumentation from Schommer (1998) in

assessing this variable. Schommer's original instrument contained 63 interval, attitudinal

questions. Due to concerns over the time needed for participants to complete the survey,

the researcher sought expert consultation (L. Brice, personal communication, June 22,

2016) and reduced this to 31 questions. These 31 questions were distributed across

Schommer's four factors (1998), and each respondent then received a mean score for

each factor. The number of questions asked for each factor of this variable can be seen in

Table 3.12:

Table 3.12
Number of Questions Measuring Four Factors of Epistemic Beliefs

Factor	Number of questions
2A. Certainty of Knowledge	4
2B. Simple Knowledge	10
2C. Quick Learning	7
2D. Fixed Ability	10

For consistency within the study, the researcher sought expert consultation (I. Han,

personal communication, March 23, 2017) to expand the operational definition of the

results and include a possible third outcome for participants: "neutral beliefs". The

definition of these results is available in Table 3.13:

Table 3.13
Defining Ranges for RQ 2 Variables

	2A. Certainty of Knowledge	2B. Simple Knowledge	2C. Quick Learning	2D. Fixed Ability
"Naïve beliefs"	Mean score of <2.6	Mean score of <2.6	Mean score of <2.6	Mean score of <2.6
"Neutral beliefs"	Mean score of 2.6-3.49	Mean score of 2.6-3.49	Mean score of 2.6-3.49	Mean score of 2.6-3.49
"Sophisticated beliefs"	Mean score of >3.49	Mean score of >3.49	Mean score of >3.49	Mean score of >3.49

After these ranges were determined, a single-trait-multimethod matrix (Trochim, 2006) was developed in order to establish validity of the construct. The result of this outcome is presented in the next chapter as Table 4.4. A Cronbach Alpha internal consistency reliability coefficient was also tested for, and is provided at the end of this chapter in Table 3.19.

In order to measure the third and fourth sets of variables, the researcher operationalized Conley's "Four Keys to College Readiness" model (Conley, 2014) by focusing specifically on the "Key Cognitive Strategies" and "Key Learning Skills and Techniques." This allowed the researcher to establish a collection of learning practices that is possessed by successful college students and desired among college faculty (Conley, 2014). Furthermore, these skills run parallel to those the U.S. Department of Education has indicated to be critical in navigating new technologies (2016). For the purpose of this research, this collection is referred to as "key skills" (see Table 1.0). Respondents were asked a series of conditional questions related to variable sets three and four based upon the first frequency count established earlier (Table 3.8). For example, if a participant indicated that he or she had a Twitter account, this participant was then asked a follow-up questions to determine if he or she was using Twitter in a way that developed his or her key skills, as well as a question intended to determine if

he/she believed his/her use of social media strengthened this skill or if it was cultivated

through experience in school. Later in the survey each "key skill" was explicitly defined

for the participant, who was then asked interval, attitudinal questions regarding how well

they believed their assignments *inside* of school developed each skill as well as interval,

attitudinal questions regarding how well they believe their use of technology *outside* of

school developed each skill. This is illustrated in Tables 3.14 and 3.15:

Table 3.14
Number of Questions Asked Based Upon ICT Usage for RQ 3 Variables

Number of social media/website accounts used.	3A. Conditional interval questions asked	3B. Non-conditional interval questions asked	Total measurements
0	0	8	8
1	1	8	9
2	2	8	10
3	3	8	11
4	4	8	12
5	5	8	13
6	6	8	14
7	7	8	15

Table 3.15
Number of Questions Asked Based Upon ICT Usage for RQ 4 Variables

Number of social media/website accounts used.	4A. Conditional interval questions asked	4B. Non-conditional interval questions asked	Total measurements
0	0	9	9
1	1	9	10
2	2	9	11
3	3	9	12
4	4	9	13
5	5	9	14
6	6	9	15
7	7	9	16

Table 3.16 illustrates how these sets of variables were then scored:

Table 3.16
Scoring System for RQ 3 and RQ 4

	3A. Third Set: Conditional interval questions	3B. Third Set: Non-conditional interval questions	4A. Fourth Set: Conditional interval questions	4B. Fourth Set: Non-conditional interval questions
Scoring system per question.	Closer to 1 = High school experiences have not developed key skills	Closer to 1 = High school experiences have not developed key skills	Closer to 1 = ICT experiences have not developed key skills	Closer to 1 = ICT experiences have not developed key skills
	Closer to 5 = High school experiences have developed key skills	Closer to 5 = High school experiences have developed key skills	Closer to 5 = ICT experiences have developed key skills	Closer to 5 = ICT experiences have developed key skills
Scoring method: Step 1	Add responses, divide by number of social media/website accounts used.	Add responses, divide by number of questions asked.	Add responses, divide by number of social media/website accounts used.	Add responses, divide by number of questions asked.
Scoring method: Step 2	Because 3A and 3B use the same scale, their combined mean score was then calculated into a new variable: 3C.		Because 4A and 4B use the same scale, their combined mean score was then calculated into a new variable: 4C.	

Again, the exploratory nature of this study and its constructs led to the researcher seeking

expert consultation (I. Han, personal communication, March 23, 2017) to operationally

define the results of this scoring system and include a possible third outcome for

participants: "key skills initiated." The defining ranges of these results is available in

Table 3.17:

Table 3.17

Defining Ranges for RQ 3 and RQ 4 Variables

	3C. Key skills in high school experience	4C. Key skills in ICT experience
Key skills not developed	Mean score of <2.6	Mean score of <2.6
Key skills initiated	Mean score of 2.6-3.49	Mean score of 2.6-3.49
Key skills developed	Mean score of >3.49	Mean score of >3.49

After these ranges were determined, a single-trait-multimethod matrix (Trochim, 2006)

was developed in order to establish validity of the construct. The result of this outcome

is presented in the next chapter as Table 4.7. A Cronbach Alpha internal consistency

reliability coefficient was also tested for, and is provided at the end of this chapter in

Table 3.19.

Methods of Analyses

After all data were collected in Qualtrics, they were then exported into Excel for

organizational purposes and SPSS for statistical analysis. Because this research was

exploratory in nature, descriptive statistics (frequencies, mean, median, and mode) were

used to develop constructs and understand variables. Bivariate correlational analysis was

used to determine validity of constructs and relationships between variables.

The first set of variables (1A, 1B, 1C, and 1D - see Table 3.8) can be thought of

as four separate approaches designed to view develop a construct used in addressing RQ

1, which asked:

1. To what extent do millennial students exhibit dispositions regarding the purpose

    of learning along a spectrum of "consumer" to "maker"?

Table 3.10 detailed the scoring methodology for this set of variables. After these scores

were established, three sets of ranges were used in defining "consumers," "moderates,"

and "makers" (Table 3.11). Using four different methods of measurement allowed the researcher to explore this concept from four different approaches. Bivariate analysis was undertaken to determine if these approaches correlated with one another (see next chapter, Table 4.1) in order to establish evidence of the construct's conceptual legitimacy.

Research questions two, three, and four were addressed by the second, third, and fourth sets of variables (see Table 3.8), and were designed so that mean scores could be established for each variable. For the second set of variables, a lower mean score represents naïve epistemic beliefs while a higher mean score represents sophisticated epistemic beliefs. For the third and fourth sets of variables, a lower mean score indicates that experiences with high school / ICT (respectively) did not develop key skills whereas a higher mean score indicates that experiences with these entities did develop key skills.

The researcher's fifth and final question (RQ 5) sought to establish if correlations existed among disposition (RQ 1), epistemic beliefs (RQ 2), and/or the location(s) of key skill development (RQs 3 and 4). Bivariate analysis was used to determine what correlation, if any, existed between each approach used in RQ 1 with the sets of variables used to understand RQs 2, 3, and 4. Tables 3.18 provides an illustration of this design (this analysis is completed and presented chapter 4, Table 4.9):

Table 3.18
Analysis Design Model for RQ 5, First Step: Correlations Among Each RQ 1 Approach and RQs 2, 3, and 4

	2A	2B	2C	2D	3C	4C	Total
1A							
1B							
1C							
1D							

Notes. If a significant, positive correlation is present, the blocks above will say "Yes." If no correlation is present, the spaces will be left blank. For outcome of model with this study, see Table 4.9.

Reliability and Validity

To determine reliability and internal consistency of the consumer-maker construct and instrumentation developed for this study, a pilot test-retest was completed. Correlational analyses were completed, resulting in a reliability range of $r = .145$ to $r = 1.00$. The mean reliability was $r = .590$. The sample size of the test/retest population was 8, and sized of responses on items varied between 3 to 8 (due to the conditional nature of items). Further reliability was established by testing for a Cronbach Alpha internal consistency reliability coefficient of the full-size study. These coefficients are presented in Table 3.19:

Table 3.19
Cronbach Alpha Internal Consistency Reliability Coefficients for Measures

	RQ 1	RQ 2	RQ 3	RQ 4
Cronbach	.720	.683	.663	.669
N of items	42	31	21	22

Validity of the constructs measured in this study was determined through three approaches. First, the construct validity was evaluated and established by content experts who served on the committee of the study. Second, face validity was evaluated and established by participants of the pilot study. Third, convergent single-trait-multimethod matrixes (Trochim, 2006) are provided in the next chapter (Tables 4.1, 4.4, and 4.7).

Chapter 4

Results

The purpose of this study was to acknowledge the unique historical and technological paradigms experienced by millennial students and to identify these students' dispositions, beliefs, and skills as they now enter higher education. This study hypothesized that correlations exist among dispositions (purpose), beliefs (process), and skills (practice). The first question guiding the research asked:

1. To what extent do millennial students exhibit dispositions regarding the purpose of learning along a spectrum of "consumer" to "maker"?

Table 3.9 detailed the scoring methodology for the set of variables addressing this question. It is helpful to think of this set of variables as four separate approaches with which to explore the research question. After these scores were established, three sets of ranges were used in defining "consumers," "moderates," and "makers" (Table 3.11). Distribution of the sample across these definitions are shown in Table 4.0:

Table 4.0
Sample Distribution Across RQ 1 Variables. Percentages of Sample Dispositions as Consumers, Moderates, or Makers

Variable	Consumers		Moderates		Makers		No Response	
	N	%	N	%	N	%	N	%
1A. Conditional categorical	254	51.8%	220	44.9%	15	3.1%	1	0.2%
1B. Conditional interval	116	23.7%	336	68.6%	37	7.6%	1	0.2%
1C. Non-conditional categorical	406	82.9%	68	13.9%	14	2.9%	2	0.4%
1D. Non-conditional interval	232	47.3%	241	49.2%	16	3.3%	1	0.2%

Note. N = 490.

Bivariate analysis was then undertaken to determine if these approaches correlated with one another. Table 4.1 shows the outcome of this analysis, determining the presence of correlations among RQ 1 variables:

Table 4.1
Bivariate Analysis of RQ 1 Variables

Variable		1A	1B	1C	1D
1A. Conditional categorical	r	-			
1B. Conditional interval	r	.251**	-		
	N	489			
1C. Non-conditional categorical	r	.201**	.116*	-	
	N	487	487		
1D. Non-conditional interval	r	.162**	.176**	.266**	-
	N	488	488	487	

Notes. ** p < .01, * p < .05.

The results of the analyses presented in Tables 4.0 and 4.1 indicate that participants were far more likely to exhibit dispositions of "consumers" or "moderates" than "makers" across all four variables of measurement. Furthermore, all four measurement variables show statistically significant positive correlation to one-another and were greater than or equal to r = .12. Therefore, as a respondent's disposition approached toward maker in one measurement, this disposition was statistically likely to also approach across all four measurements, thus supporting the conceptualization of this construct. It is important to note that the likelihood of this disposition being "maker" was very small; the implications of this finding will be discussed further in Chapter 5.

The second question guiding the research asked:

2. Do millennial students exhibit beliefs regarding the process of learning in
   alignment more with "naïve" or "sophisticated" perspectives (Schommer, 1998)?

Mean scores were established for these variables and are presented in Table 4.2.

Table 4.2
Descriptive Statistics for RQ 2 Results

		2A. Certainty of Knowledge	2B. Simple Knowledge	2C. Quick Learning	2D. Fixed Ability
	Valid	483	483	483	482
	No Response	7	7	7	8
Mean		3.222	2.917	3.472	3.646
Median		3.250	2.900	3.429	3.600
Mode		3.250	3.000	3.43	4.600
Std. Dev.		0.550	0.395	0.343	0.432

Note. N = 490.

A more nuanced method of defining these variables (see Table 3.13) based on the range

of scores was then implemented. The outcome for this method is provided in Table 4.3:

Table 4.3
*Sample Distribution Across RQ 2 Variables. Percentages of Sample Beliefs as Naïve,
Neutral, or Sophisticated*

Variable	Naïve Beliefs		Neutral Beliefs		Sophisticated Beliefs		No Response	
	N	%	N	%	N	%	N	%
2A. Certainty of Knowledge	71	14.5%	232	47.3%	180	36.7%	7	1.4%
2B. Simple Knowledge	74	15.1%	370	75.5%	39	7.9%	7	1.4%
2C. Quick Learning	4	0.8%	260	53.0%	219	44.7%	7	1.4%
2D. Fixed Ability	3	0.6%	143	29.2%	336	68.6%	8	1.6%

Note. N = 490.

The result of the analyses in Table 4.2 shows that the mean responses across all

four variables of epistemic belief were within the range of "neutral" to "sophisticated."

Table 4.3 provides more detail in understanding the study sample. Here, variable 2A

shows the most even distribution of beliefs among the sample. Variable 2B has the

majority of "neutral" responses, representing over 75% of the sample. Variables 2C and

2D each show results of less than 1% in "naïve" beliefs, and each provide the largest

populations of "sophisticated" beliefs. Bivariate analysis was then undertaken to

determine if these variables correlated with one another:

Table 4.4
Bivariate Analysis of Variables of RQ 2 Variables

Variables		2A.	2B.	2C.	2D.
2A. Certainty of Knowledge	r	-			
2B. Simple Knowledge	r	.065	-		
	N	483			
2C. Quick Learning	r	.249**	.171**	-	
	N	483	483		
2D. Fixed Ability	r	.174**	.303**	.432**	-
	N	482	482	482	

Note. ** p < .01.

The results of the correlational analysis presented in Table 4.4 show that 5 out of 6

correlations were statistically significant and were greater than or equal to r = .17. The

correlations between 2A and 2B was as low as r = .065 and not significant. The beliefs a

respondent exhibited in one measurement was therefore statistically likely to be their

beliefs across all four measurements.

The third and fourth questions guiding the research asked:

3. To what extent (if any) did millennial students' high school experiences formally

    include the practice of developing "key skills" (Table 1.0)?

4. To what extent (if any) have millennial students' independent, informal experiences with information-communication technology included the practice of developing "key skills" (Table 1.0)?

The scoring system developed to assess these variables was presented in Table 3.16. The results of this system are provided in Table 4.5:

Table 4.5
Descriptive Statistics for RQ 3 and RQ 4 Results

		3C.	4C.
	Valid	483	486
	No Response	7	4
Mean		3.234	2.782
Median		3.250	2.793
Mode		3.000	2.980
Std. Dev.		0.439	0.474

Note. N = 490.

As with the second research question, a more nuanced method of defining these variables (see Table 3.17) based on the range of scores was then implemented. The outcome for this method is provided in Table 4.6:

Table 4.6
Sample Distribution Across RQ 3 and RQ 4 Variables. Percentages of Key Skills Not Developed, Initiated, or Developed by Context

Variable	Key Skills not developed		Key Skills initiated		Key Skills developed		No Response	
	N	%	N	%	N	%	N	%
3C: Key skills in high-school experience	26	5.3%	327	66.7%	130	26.5%	7	1.4%
4C: Key skills in ICT experience	124	25.3%	334	68.2%	28	5.7%	4	0.8%

Note. N = 490.

The result of the analyses in Table 4.5 show that the mean responses across both variables were within the middle range of "key skills initiated." Table 4.6 provides more detail in understanding the study sample. Here, the middle range is consistent and largest across variables, yet we see an inversion of the populations for whom "key skills"

were/were not developed. One-fourth of respondents reported that their high school

experiences developed their key skills, while one-fourth of respondents reported that their

experiences with technology did not. Bivariate analysis was then undertaken to

determine if these variables correlated with one another:

Table 4.7
Bivariate Analysis of RQ 3 and RQ 4

		3C.	4C.
3C: Key skills in high-school experience	r	-	
4C: Key skills in ICT experience	r	.524**	-
	N	482	

Note. ** p < .01. N = 482.

The result of the correlational analysis presented in Table 4.7 shows a statistically

significant, positive correlation of r = .524. As the likelihood of a respondent reporting

that their high school experience developed their key skills increased, so too did the

likelihood of that same respondent reporting that their ICT experience developed their

key skills.

The final question guiding this research asked:

5. Do correlations exist among disposition (RQ 1), epistemic beliefs, (RQ 2) and the

location(s) of key skill development (RQ 3 and RQ 4)?

Bivariate analyses were completed to determine the presence or absence of these

correlations. These analyses are presented in Table 4.8:

Table 4.8
RQ 5 Correlations Across Variables for RQs 1, 2, 3, 4

		1A	1B	1C	1D	2A	2B	2C	2D	3C	4C
1A	r	-									
1B	r	.251**	-								
	N	489	489								
1C	r	.201**	.116*	-							
	N	487	487	488							
1D	r	.162**	.176**	.266**	-						
	N	488	488	487	489						
2A	r	.152**	.052	.057	.069	-					
	N	482	482	481	482	483					
2B	r	.054	.029	.184**	.266**	.065	-				
	N	482	482	481	482	483	483				
2C	r	.310**	.105*	.094*	.102*	.249**	.171**	-			
	N	482	482	481	482	483	483	483			
2D	r	.177**	.065	.056	.022	.174**	.303**	.432**	-		
	N	481	481	480	481	482	482	482	482		
3C	r	.135**	.518**	.062	.009	.049	-.063	.035	.142**	-	
	N	483	483	482	482	477	477	477	476	483	
4C	r	.221**	.530**	.103*	.068	.045	-.08	.077	.025	.524**	-
	N	485	485	484	485	480	480	480	479	482	486

Notes. ** $p < .01$, * $p < .05$.

The results of the correlational analyses presented in Table 4.8 show that 26 out of 45 correlations were statistically, positively significant in range between $r = .094$ and $r = .530$. Having already established that correlations existed among RQ 1 variables, the

researcher then used the designed model of analysis (Table 3.18) to indicate the presence

of correlations intended address RQ 5. This is presented in Table 4.9:

Table 4.9
RQ 5 Analysis, First Step: Presence of Correlations Among Each RQ 1 Approach and RQs 2, 3, and 4

	2A	2B	2C	2D	3C	4C	Total
1A	Yes		Yes	Yes	Yes	Yes	5/6, 83.3%
1B			Yes		Yes	Yes	3/6, 50.0%
1C		Yes	Yes			Yes	3/6, 50.0%
1D		Yes	Yes				2/6, 33.3%

Notes. If a significant, positive correlation is present, the blocks above will say "Yes." If no correlation is present, the spaces will be left blank.

This design model indicates that statistically significant, positive correlations are present

in 13 out of 24 instances, ranging from r = .094 to r = .530.

The exploratory nature of the study allowed the researcher to use four differing

approaches to understand student dispositions as consumers, moderates, or makers. The

most correlations to other research variables existed when using the approach of

conditional, categorical questions (1A). The fewest correlations to other research

variables were present when using non-conditional, interval questions (1D); this

difference is notable to consider, as non-conditional interval questions are the most

common method used in quantitative research (I. Han, personal communication, March

23, 2017). Using four approaches to explore these dispositions as a construct proved to

be shrewd, as this method allowed for greater evidence of the existence of the construct

than had a single approach been used exclusively. It is important to recall that Table 4.1

showed all four approaches (1A, 1B, 1C, and 1D) as significantly, positively correlated

with one another. This means that as scores increased in one approach, they also

increased across the three other approaches. Tables 4.8 and 4.9 help us to understand the implications of these dispositions further:

- As conditional categorical disposition scores increased (toward maker), respondents scores in beliefs also increased (toward sophisticated) for certainty of knowledge, quick learning, and fixed ability. Respondents were more likely to have initiated or developed key skills in both high school and ICT usage. This approach has unique correlations to certainty of knowledge and fixed ability. Using this measure resulted in the second-largest percentage of "Consumers" (51.8%) second-smallest percentage of "Makers" (3.1%).

- As conditional interval disposition scores increased (toward maker), respondents scores in beliefs also increased (toward sophisticated) for quick learning. Respondents were more likely to have initiated or developed key skills in both high school and ICT usage. Using this measure resulted in the smallest percentage of "Consumers" (23.7%) and the largest percentage of "Makers" (7.6%).

- As non-conditional categorical scores increased (toward maker), respondents scores in beliefs also increased (toward sophisticated) for simple knowledge and quick learning. Respondents were more likely to have initiated or developed key skills in ICT usage. Using this measure resulted in the largest percentage of "Consumers" (82.9%) smallest percentage of "Makers" (2.9%).

- As non-conditional interval scores increased (toward maker), respondents scores in beliefs also increased (toward sophisticated) for simple knowledge and quick learning. This approach is the only one to not have any correlation to initiation or

development of key skills through either high school or ICT usage. Using this measure resulted in the second-smallest percentage of "Consumers" (47.3%) second-largest percentage of "Makers" (3.3%).

- As evidenced in Table 4.8, there was positive, significant correlation in only 1 out of 8 possible relationships between RQ 2 and RQs 3 & 4. As beliefs in fixed ability increased (toward sophistication), so too did the likelihood of respondents initiating or developing key skills in high school. No significant correlations exist between respondents' epistemic beliefs and development of key skills through ICT usage.

Additional Findings

Additional analyses were completed to determine if the number of college courses taken prior to enrollment at the university (Table 3.6, "Demo A") and the amount of ICT a respondent engages with (Table 3.7, "Demo B") had any correlational relationship with a respondent's dispositions (RQ 1), epistemic beliefs (RQ 2), or development of key skills (RQs 3 and 4). Bivariate analysis of these results is presented here in Table 4.10:

Table 4.10
Correlations of Selected Demographic Data to RQs 1, 2, 3, and 4

		1A	1B	1C	1D	2A	2B	2C	2D	3C	4C	Demo A	Demo B
Demo A	r	.073	.114*	.06	-.005	.126**	.142**	.089	.263**	.186**	.091*	-	
	N	488	488	487	488	482	482	482	481	482	485	489	
Demo B	r	.264**	.034	.108*	.008	.089	.033	.176**	.124**	.104*	.559**	.055	-
	N	489	489	488	489	483	483	483	482	483	486	489	

Notes. ** $p < .01$, * $p < .05$.

The result of the correlational analyses in Table 4.10 shows that 12 out of 21 correlations were statistically, positively significant and were greater than or equal to $r = .091$. For the sake of consistency, Table 4.11 presents these findings in the simplified model used earlier in building Table 4.9:

Table 4.11
Selected Demographic Analysis: Presence of Correlations Among Demo A and RQs 1, 2, 3, & 4 and Demo B and RQs 1, 2, 3, & 4

	1A	1B	1C	1D	2A	2B	2C	2D	3C	4C	Total
Demo A		Yes			Yes	Yes		Yes	Yes	Yes	6/10, 60%
Demo B	Yes		Yes				Yes	Yes	Yes	Yes	6/10, 60%

Notes. If a significant, positive correlation is present, the blocks above will say "Yes." If no correlation is present, the spaces will be left blank.

The results in Tables 4.10 and 4.11 suggest that:

- As the number of pre-college courses taken by respondents increased, so too did their dispositions toward maker in 1/4 measures, their beliefs toward sophistication in 3/4 epistemic categories, and their initiation or development of key skills in both their high school experiences and experiences with ICT usage.

- As the number of information-communication technologies used by respondents increased, so too did their dispositions toward maker in 2/4 measures, their beliefs toward sophistication in 2/4 epistemic categories, and their initiation or development of key skills in both their high school experiences and experiences with ICT usage.

- There is no meaningful correlation between the number of pre-college courses taken by respondents and the number of information-communication technologies they used (r = .055).

Chapter 5

Discussion

This research endeavor was completed as an attempt to acknowledge how the learning experiences of millennial students have been situated within the seemingly opposing historical paradigms of accountability policies and information-communication technologies. The research questions measured millennial students' dispositions, beliefs, and skills regarding learning as they entered higher education. The researcher hypothesized that correlations existed among millennials' dispositions (regarding the purpose of learning), beliefs (regarding the process of learning), and skills (regarding the practice of learning). The first question guiding the research asked:

1. To what extent do millennial students exhibit dispositions regarding the purpose of learning along a spectrum of "consumer" to "maker"?

The researcher theorized that these dispositions existed after extensively reviewing the literature of educational policy and college readiness. Over two-and-a-half decades of educational policies and initiatives established a clear trajectory wherein the pedagogy and curriculum of the U.S. public school system were increasingly measured by the lens of accountability in their successfulness, with the most recent target of that success was established as producing graduates deemed to be "college ready" (Bush, 1990; Civic Impulse, 2016; Elmore, 2004; Klein, 2014; Loeb & Figlio, 2011; Riley, 1995; U.S. Department of Education, 1991, 2009, 2010; Vinovskis, 1999). However, data from measurements such as the SAT, ACT, and NAEP indicated that large portions of students may be entering higher education lacking the skills necessary to thrive (College Board,

2016; The Nation's Report Card, 2013; Zinshteyn, 2015). These indications are furthered

by the research of college readiness experts (Brown & Conley, 2007; Conley, 2014) who

have consistently showed that the skills students use in navigating the curriculum and

expectations of K-12 education are incompatibly aligned with the skills desired by

college faculty.

The researcher theorized that these policies and initiatives might provide context

for a "consumer" disposition among millennial students. For the purpose of this study, a

consumer disposition indicates tendencies toward viewing the purpose of learning as

consumption-oriented, where an individual learns primarily as an act of passive

compliance to secure "ownership" of an outcome. However, these policies and initiatives

were not the only forces in millennials' lives defining what the purposes of knowledge

and learning could be. This same historical era saw information-communication

technologies (ICT) grow exponentially. These technologies could be used to "create,

design, build, explore, and collaborate" (U.S. Department of Education, 2016) by users

who sought to "fashion their own knowledge" (Kress, 2005, p. 10). This contrary

phenomenon allowed the researcher to theorize that a contrary disposition may exist for

millennials as well: "makers." For the purpose of this study, a maker disposition

indicates tendencies toward viewing the purpose of learning as creation-oriented, where

an individual learns primarily as an act of self-driven discovery to "generate" an

outcome.

Taking these dispositions beyond theoretical notion and into operational construct

required strategic consideration in developing an exploratory instrument. The researcher

used four approaches to measure consumer-maker dispositions: conditional categorical questions, conditional interval questions, non-conditional categorical questions, and non-conditional interval questions. When paired with the robust sample size of the study (N = 490), these four approaches provided a much richer understanding of the construct than if one approach had been used exclusively. Furthermore, each approach significantly, positively correlated to all other approaches, providing greater credibility to the research findings. When used to understand the dispositions of millennial college students toward the purpose of learning, the consumer-maker construct stands.

The findings concluded that a very small portion of the research sample possessed maker dispositions. Of the four approaches used, the smallest portion of makers was 2.9% of the sample size; the largest, only 7.6%. In comparison, the smallest portion of consumers was 23.7%; the largest, 82.9%. Based upon these findings we can conclude that this sample of millennial students was much more likely to have dispositions wherein the purpose of learning was viewed as consumption-oriented rather than creation-oriented.

This study sought to understand consumers and makers as a construct and to determine how that construct manifested among millennial students. As Table 4.0 illustrated, by the most conservative analysis a millennial student was over 3 times more likely to be a consumer than a maker; by the most liberal analysis a student was over 28 times more likely to be a consumer than a maker. While one of those analyses may be quite larger than the other, it is critical to note again that all four approaches significantly, positively correlated with one another. In other words, as a respondent drew toward

having a maker disposition in one approach, he or she similarly drew toward maker

dispositions across all approaches. As one reviews the data, it becomes clear that large

portions of millennial students within this sample possessed the consumer disposition,

placing them at odds with the desires and expectations of college faculty (Conley, 2014)

and the on-going cultural shifts in how information and knowledge work (Bereiter, 2002;

Kress, 2005; U.S. Department of Education, 2016).

The maker disposition was a firm minority across all four dispositions. These

outcomes raise many questions as to how the educational policies that inform pedagogy

and curriculum may respond. The irony persists that, in attempting to ignite and maintain

American momentum in global competition by "readying" students for college,

educational policy has instead created circumstances that perpetuates consumer

dispositions.

In order to avoid researcher bias and to account for the exploratory nature of the

study, the scoring system allowed for a possible "middle" disposition to emerge, referred

to in this research as "moderates." Of the four approaches used, the smallest portion of

moderates was 13.9% of the sample size; the largest, 68.6%. The emergence of the

moderates provides one of the best opportunities for future research beyond the scope of

this study. It is presently unclear if those with moderate dispositions are an

amalgamation of consumer-and-maker dispositions, or if they are, in actuality, a third

disposition in-and-of-themselves. Moderates accounted for at least 44% of the samples in

three-out-of-four approaches used for this research question. Additional research focused

specifically on this population will be appropriate in further conceptually understanding the needs of millennial students.

This first research questions sought to understand student dispositions regarding the purpose learning, and its follow-up question implemented research by Schommer (1990, 1998) regarding the process of learning:

2. Do millennial students exhibit beliefs regarding the process of learning in alignment more with "naïve" or "sophisticated" perspectives (Schommer, 1998)?

The literature in the field of student development generally suggests that students arrive to higher education with beliefs that lean toward naivety or more simplistic thinking which then grow in sophistication as the students become acclimated to college-level thinking, expectations, and culture (Perry, 1968; Bizzell, 1984). The results of this research endeavor, however, came to different conclusions.

As seen in Table 4.2, the mean outcome for all four measures of epistemic beliefs hovered between 2.9 (SD = .395) and 3.6 (SD = .432). A more narrowed range was then used in order to better understand these results within the naïve-sophisticated construct and to again allow for a "middle" category: neutral beliefs.

The findings concluded that a very small portion of the research sample possessed naïve beliefs. Of the four components of belief measured, two components (quick learning and fixed ability) resulted in less than 1% of the sample demonstrating naivety. The other two components (certainty of knowledge and simple knowledge) had similarly small outcomes of naivety – just 14.5% and 15.1% respectively. As with the results for research question 1, an interesting trend emerged from the data wherein a large share of

the sample ended up in a middle population (here, neutral beliefs). Contrary to the results

of research question 1, which found a very small portion of the sample in its "highest"

tier of maker, the data on epistemic beliefs showed a robust proportion of the sample

(36.7-68.6%) provided "highest tier" responses of sophisticated beliefs in three-out-of-

four components.

This was initially something of an unexpected outcome. These findings are

inconsistent given the research of the field (Jehng, Johnson, & Anderson, 1993;

Schommer, 1990, 1998). One possibility for this inconsistency is that adapting

Schommer's instrument for this specific study by reducing the number of questions asked

for each factor resulted in skewed results. However, it is also worth considering the

possibility that this outcome may be reflective of the very diverging paradigms which this

research sought to acknowledge. Consider: the instrument created by Schommer and

adapted for this study was developed in 1998. Table 3.2 shows that 59.4% of the

respondents for this study were born that very year. Respondents would have been in

grades K-12 during the era of No Child Left Behind and Race to the Top, both of which

featured strong rhetorical emphasis on "college readiness" (Elmore, 2004; U.S.

Department of Education, 2009, 2010). Argryris and Schon (1974) articulate the

difference between espoused theories (how individuals articulate their beliefs) and

theories-in-use (the beliefs actually implemented by individuals).   The rhetoric

respondents experienced in their formal K-12 education settings may have influenced the

respondents to provide espoused theory responses indicating sophisticated beliefs that

differ from their actual theories-in-use. To determine if this is the case, intentionally

studying if these beliefs are espoused theories or theories-in-use would be an appropriate

avenue to explore in future research.

The third and fourth questions guiding this research sought to better understand

the skills millennial students will need to thrive in college-level learning and, more

specifically, if those skills were practiced and developed in their high school experiences

and/or their experiences using information-communication technology:

3. To what extent (if any) did millennial students' high school experiences formally
    include the practice of developing "key skills" (Table 1.0)?

4. To what extent (if any) have millennial students' independent, informal
    experiences with information-communication technology included the practice of
    developing "key skills" (Table 1.0)?

As with research question 2, the mean outcomes for research question 3 and research

question 4 were in the middle ranges of 3.2 (SD = .439) and 2.7 (SD = .474) respectively.

As seen in Table 4.7, these results had positive, significant correlation with one another;

as an individual increased in feeling that their skills were initiated or developed in high

school, they also felt their skills were initiated or developed in their use of ICT. Again, a

more narrowed range was used in order to better understand these results and to establish

a "middle" category: "key skills initiated." The rationale here is that these contexts may

have provided initial spaces in which to begin practicing key skills but not in developing

them fully. For research question 3, 66.7% of the sample were determined to be "key

skills initiated;" for research question 4, this category represented 68.2% of the sample,

as seen in Table 4.6. Interestingly, the outlier positions for these research questions are

nearly perfectly inverted: 26.5% of respondents felt that their high school experiences allowed them to develop key skills, while 25.3% of respondents felt that their use of ICT did not develop key skills.

It is critical when interpreting the results of research questions 3 and 4 to again recall that one context (research question 3) is guided by educational policies and initiatives in intentionally developing "college ready" students, while the other context (research question 4) has no such agenda; it is simply individuals independently and informally using information-communication technology for their own purposes. To that end, it is quite remarkable that the majority of respondents for both questions fell into the "key skills initiated" category. To have 66.7% of respondents report only initially developing their key skills in high school is quite problematic when one considers the time, effort, and resources dedicated to "college readiness" as an espoused theory guiding educational policy, pedagogy, and curriculum. Furthermore, a slightly larger percentage of respondents (68.2%) reported achieving the same level of key skill development from their *own independent actions*.

This raises many questions regarding the nature of "college ready" curriculum. While it is encouraging that 26.5% of respondents felt their high school experiences developed their key college readiness skills, a far larger portion (66.7%) felt that these skills were merely initiated. Remarkably, 5.3% felt that their high school experiences did not develop their key skills at all. It is appropriate, then, to propose further quantitative study to determine if/how these results translate to student success in higher education through traditional avenues (GPA, retention, etc.) as well as qualitative studies to

determine if/how the learning experiences of these individuals differed. These additional

studies may yield a richer insight into the impact of college ready curriculum upon

student's lived experiences.

Kress (2005) was quoted earlier in this study in emphasizing the point that ICT

allows users to fashion their own knowledge; the findings of research question 4 suggest

that his point is very true, and that many millennial students (68.2%) are independently

engaging with technology in ways that initiate the development of the key skills needed

in to thrive in higher education. Impressively, 5.7% reported developing these skills

robustly. Again, further quantitative study to determine if/how these results translate to

student success in higher education through traditional avenues (GPA, retention, etc.) will

be valuable in determining educational impact, but these results validate the effort of this

research to acknowledge information-communication technology as a very real paradigm

upon which student learning skills are situated.

The central hypothesis to this research endeavor was that correlations existed

among millennials' dispositions, beliefs, and skills. The fifth research question addressed

this directly:

5. Do correlations exist among disposition (RQ 1), epistemic beliefs, (RQ 2) and the

location(s) of key skill development (RQ 3 and RQ 4)?

To answer this question, the researcher set each measure of disposition in a place of

"primacy" to determine what implications might exist for consumers and makers across

beliefs and skills. Reviewing Tables 4.8 and 4.9 allows us to conclude that this

hypothesis is supported: positive, statistically significant correlations exist in 13 out of 24

(54.2%) instances. These findings suggest that as one approached the likelihood of

having a maker disposition, one was also more likely to exhibit sophistication of

epistemic beliefs and to have initiated or developed key learning skills through both high

school experiences and the use of information-communication technologies. This

likelihood fluctuates based upon the method used to measure disposition, but the positive

correlation across all of these methods suggests a consistency to this finding.

Furthermore, this likelihood was the lowest when measured by non-conditional interval

questions – the most traditional approach in quantitative research. The likelihood was

most common when measured by conditional categorical questions. Thus, it was worthy

of developing four different measurement approaches for this present study.

Discussion of Additional Findings

Additional analyses were completed to determine if meaningful correlations

existed between demographic data (specifically the amount of college courses completed

by respondents prior to university enrollment, referred to as "Demo A" and the amount of

information-communication technologies used by respondents, referred to as "Demo B")

and the three areas explored in this study: disposition, belief, and skills. Table 4.12

provides the results of this analysis. These demographic items were determined to be

worthy of analysis in this study as they can be associated with the opposing paradigms

this research sought to acknowledge.

Interestingly, there was no correlation between the demographic variables

themselves: no meaningful relationship ($r = .055$) can be seen between how much pre-

university college "experience" an individual has and how much ICT an individual uses.

As for the areas explored within the study, the greatest presence of correlations existed when addressing the notion of skills. Here, statistically significant, positive correlations were present across all variables. In other words, as the amount of pre-university college experience increased so too did an individual's development of key skills in both high school and through ICT, and the same can be said based upon an increase in the amount of ICT an individual uses. This suggests that taking pre-university college courses and using a wide range of ICTs are both valuable for individuals in terms of initiating and developing key college readiness skills.

When the number of pre-university college courses a respondent experienced increased, so did their sophistication in 3/4 epistemic beliefs and their likelihood toward maker disposition in 1/4 of its measures. Meanwhile, as the number of ICTs used increased so did sophistication in 2/4 epistemic beliefs and 2/4 measurements toward maker dispositions. Both demographics showed statistically significant, positive correlations in 6/10 measures, suggesting that increased experience in each of them had a direct impact on the dispositions, beliefs, and skills millennial students equate with learning. At the risk of oversimplifying, if these demographics are paired together a profile emerges of a student who is more likely to be a maker on 3/4 measures, has more sophisticated beliefs in 4/4 measures, and has initiated or developed key skills in both high school and through their use of ICT. However, it is important to remember that Table 3.6 shows that within this sample, 44.8% of respondents had <3 pre-university college courses, suggesting such a profile was far from the norm.

Limitations of Study

Because the population studied in this research was from the same university, the study was limited in demographic and geographic diversity. This study sought to better understand the experiences of millennial students, and replicating it at multiple universities across the United States would allow for refinement in instrument reliability and provide a richer data set for analyses.

Similarly, this study was exploratory in nature, seeking to develop a new instrument in order to determine the presence or absence of a theoretical construct. Using four approaches to understand the consumer-maker construct was pragmatic in this regard, but future studies may benefit from focusing on a singular approach so as to provide more definitive results. The results of this study suggest that conditional, categorical questions may be most effective in establishing correlations between the consumer-maker construct and the work of Schommer (1990, 1998) and Conley (2014), while non-conditional interval questions were least effective in this regard. This is an important distinction, as non-conditional interval questions are used commonly in quantitative research (I. Han, personal communication, March 23, 2017). Thus, the instrument developed for this study will benefit from additional nuance and adaptation in future incarnations, especially conditional categorical measures of consumer-maker disposition. Adaptation of the instrument will also be appropriate in addressing the surprising findings of RQ 2. If future studies can be adjusted so that the entirety of Schommer's original instrument is included, the results regarding beliefs for this study may become clearer.

The exploratory nature of the instrument also allowed the researcher to be less critical in terms of discerning the strength of correlations found in this study. All correlations presented in this study occurred at either $p < .01$ or $p < .05$, meaning that they are statistically sound. However, in quantitative analysis, the strength of correlations where r is .3 or less are often considered to be "low," correlations where r ranges between .4 and .6 are considered to be "moderate," and correlations with an r of .7 and larger are considered "high" (Shavelson, 1996). When reviewing the analyses of this study (specifically Tables 4.1, 4.4, 4.7, 4.8, and 4.10), we can see that all correlations occurred within the "low" or "moderate" strength ranges (although they were statistically significant). Additional testing of the instrument developed for this study and refinement of the theoretical, conceptual framework will be appropriate in responding to this limitation.

Implications

The implications of this study's hypothesis being supported become all the more compelling when viewed within the context of other study findings, specifically the first research question. The large number of respondents exhibited either consumer or moderate dispositions (23.7-82.9% and 13.9-68.6%, respectively), while only a small portion of the sample possessed maker dispositions. Makers accounted for only 2.9-to-7.6% of the sample, depending upon measurement. Following the logic of the literature presented in Chapter 2 and the outcomes of the study provided in Chapter 4, we see that this small selection of makers is more likely to have a disposition regarding the purpose of learning in closer alignment to the dispositions of college faculty (Brown & Conley,

2007; Conley, 2014), to have beliefs regarding the process of learning that reduce barriers

to their success (Jehng, et. all 1993; Schommer, 1990), and to practice the learning skills

which allow thriving in both higher education (Conley, 2014) and in the information-

communication technology rich world of a knowledge society (U.S. Department of

Education, 2016).

Perry's (1968) seminal work on college student development stated that

individuals first entered higher education with simplistic ways of thinking which then

gradually evolved through the process of socialization to college norms and exposure to

the pedagogies and curriculum of liberal education. Schommer's research (1990), as well

as work done by Jehng, et. all (1993), reached similar conclusions in that the level of

education attained by an individual increased the sophistication of their beliefs. While

these findings are encouraging, they are problematic for two reasons: first, all of this

research involved pre-millennial students, and as such, their circumstances are not

reflective of the students now entering higher education who have had their learning

experiences informed by the paradigms of accountability policy and technology described

earlier in this study. Second, Perry, Schommer, and Jehng, et. all's research took place

when college itself was more affordable. In considering the implications of this study, it

is appropriate to acknowledge a third paradigm upon which millennial students' learning

experiences have been situated: the rising cost and fiscal impact of obtaining a college

degree.

Examining the time-frame between 1971 and 2016, and using 2016 dollars, we

see that the average cost of tuition, fees, and room and board at public four-year in-state

colleges has risen a dramatic 141% (College Board, 2017). College has historically been a costly endeavor, regardless of the era in which a student attended; however, increases in cost have only escalated the socio-economic risks students take should they enroll with dispositions, beliefs, or skills insufficient to the experience. When college was less dramatically expensive, there was similarly less cultural push to be "ready" upon arrival as a first-year student. These students could afford (both literally and figuratively) to experiment, innovate, and take risks in thinking and learning; college learning was intended to be the transformative process of a liberal education (Perry, 1968) rather than a commodity to be owned.

Shifts in the economic landscape have made college degree completion a major determinant in the future financial and employment options of millennial students. The Pew Research Center (2014) confirms this, noting:

On virtually every measure of economic well-being and career attainment - from personal earnings to job satisfaction to the share employed full time - young college graduates are outperforming their peers with less education. And when today's young adults are compared with previous generations, the disparity in economic outcomes between college graduates and those with a high school diploma or less formal schooling has never been greater in the modern era. (para. 1)

The bleak fiscal reality of not having a college degree has never been historically more significant. It is highly pragmatic, then, for students to see avoiding this stark circumstance as a defining rationale (if not the defining purpose) of higher education.

The rhetorical emphases from Presidents Bush (1990) through Obama (U.S. Department of Education, 2010) have bolstered this rationale, equating America's success in academics with its economic prosperity.

For students, the logic then follows that it is equally pragmatic to invest oneself fully in the espoused goals and practices of college readiness that now guide American public education. By perceiving large-scale assessments as related to their academic futures (Zilberberg, et. all, 2012), and their academic futures as harbingers of their socio-economic prospects, students shift their conception of what knowledge and learning is, how it is measured, and why it is valued, accordingly. This shift may account for the preponderance of consumer dispositions observed in this study and the shortcomings of students to reach college readiness benchmarks formally (College Board, 2016; The Nation's Report Card, 2013; Zinshteyn, 2015) and academically (Brown & Conley, 2007; Conley, 2014).

The irony persists that, in attempting to ignite and maintain American momentum in global competition by readying students for college, educational policies and initiatives have created circumstances that nurture consumer dispositions. The findings of this study suggest that systemic change will be necessary in order to divert the trajectory of this paradigm. Noted scholar and researcher James Paul Gee (2011) articulated one vision of such change succinctly:

> If you're not happy with how schools teach today, they teach that way because of the tests we have. So we've come to realize we're not going to change the paradigm of schooling and get deeper learning - learning for problem solving and

innovation - unless we change the tests and change the assessment, because they

drive the system.

If the driving force of a system is producing results antithetical to the goals of the system

(as the findings of this study suggest is happening to millennial students via the

curriculums designed for college readiness), it is logical to heed Gee's advice and revisit

our cultural and political expectations regarding how schools measure learning.

Developing maker dispositions will require rethinking the conceptual definitions (and

curricula) of college readiness presently advanced by our educational policies. To ignore

this reality at a time when the cost of college has never been higher is to jeopardize the

viability of higher education for students and institutions alike.

Further research will be necessary in exploring to what actual extent these

dispositions are a hindrance to student experiences in higher education, but the findings

of this study indicate that cultivating consumer dispositions has come at the expense of

developing the more robust key skills needed to succeed not only in college, but also in

the rapidly changing world of information-communication technology that we all inhabit.

To exist in this new world of knowledge work as more than a passive consumer, to not be

a cultural victim of the "digital use divide" (U.S. Department of Education, 2016),

requires a maker dispositions and an intentionally developed learning skillset. Without

these qualities, we risk perpetuating the "persistent myth of technology as a neutral and

progressive force in the world" (Stoddard, 2014). Current research into the volatile

perpetuation of conspiracies and misinformation online (Starbird, 2017) further illustrates

how critical developing maker dispositions is for our cultural interactions with

information beyond the classroom context as well.

Conclusion

Opposing paradigms are not a phenomenon limited to millennial students; they

have been a consistent trend in American education. In *My Pedagogic Creed*, John

Dewey (1897) explored the divergence between the paradigms of industrialization and

progressivism when he wrote:

> I believe that much of present education fails because it neglects this fundamental
>
> principle of the school as a form of community life. It conceives the school as a
>
> place where certain information is to be given, where certain lessons are to be
>
> learned, or where certain habits are to be formed. The value of these is conceived
>
> as lying largely in the remote future; the child must do these things for the sake of
>
> something else he is to do; they are mere preparation. As a result, they do not
>
> become a part of the life experience of the child and so are not truly educative.
>
> (para. 16)

Formal public education efforts in *our* present, by nature of their adherence to

accountability, still operate in the exact fashion Dewey described here for *his own*

industrial era. In both eras, educational efforts perpetuate a social promise to students

that compliance in school will prepare them for (primarily economic) success in the

future; in both eras, students were/are being readied for a "remote future." Yet unique to

the current era is the redefinition of "community life" resulting from the development of

information-communication technology. For millennials with ICT access, the "readying"

phenomenon experienced in school can occur parallel to direct engagement with
participatory communities arising from the learning goals of the individual (Kress, 2005).
Millennials can transcend the geographic and cultural boundaries of "community life" as
understood in Dewey's era in order to do "knowledge work" (Bereiter, 2002), creating or
acting upon conceptual artifacts based upon the whims of their personal learning goals.
This conceptual evolution of how one engages in community life "looks entirely different
to that which the school imagines and for which it still, hesitantly and ever more
insecurely, attempts to prepare them," yet "all of us already inhabit that new world"
(Kress, 2003. p. 16). If we acknowledge and accept this evolution of community life,
then we must also heed Dewey's concerns and find ways to evolve the concept of *school
as a form of community life,* or else we risk ignoring the life experiences of our students
in favor of perpetuating the process Dewey deemed "not truly educative" over 120 years
ago.

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Appendix A: IRB Approval Letter

The IRB: Human Subjects Committee determined that the referenced study is exempt from review under federal guidelines 45 CFR Part 46.101(b) category #2
SURVEYS/INTERVIEWS; STANDARDIZED EDUCATIONAL TESTS; OBSERVATION OF PUBLIC BEHAVIOR.
Study Number: 1609E95482
Principal Investigator: Matthew Jackson
Title(s):
Consumers and Makers: Exploring Opposing Paradigms of Millennial College Readiness

This e-mail confirmation is your official University of Minnesota HRPP notification of exemption from full committee review. You will not receive a hard copy or letter.

This secure electronic notification between password protected authentications has been deemed by the University of Minnesota to constitute a legal signature.

The study number above is assigned to your research. That number and the title of your study must be used in all communication with the IRB office.

Research that involves observation can be approved under this category without obtaining consent.

SURVEY OR INTERVIEW RESEARCH APPROVED AS EXEMPT UNDER THIS CATEGORY IS LIMITED TO ADULT SUBJECTS.

This exemption is valid for five years from the date of this correspondence and will be filed inactive at that time. You will receive a notification prior to inactivation. If this research will extend beyond five years, you must submit a new application to the IRB before the study's expiration date. Please inform the IRB when you intend to close this study.

Upon receipt of this email, you may begin your research. If you have questions, please call the IRB office at (612) 626-5654.

You may go to the View Completed section of eResearch Central at http://eresearch.umn.edu/ to view further details on your study.

The IRB wishes you success with this research.

Appendix B: IRB Consent Information Sheet

INFORMATION SHEET FOR RESEARCH
Consumers and Makers: Exploring Opposing Paradigms of Millennial College Readiness

You are invited to be in a research study of how your experiences with school and with technology have impacted your readiness for college. You were selected as a possible participant because you are currently a first year student at the [Name of institution research occurred], enrolled in [Name of first year seminar]. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

This study is being conducted by: Matthew Jackson, doctoral candidate in Education: Teaching and Learning.

Procedures:

If you agree to be in this study, we would ask you to do the following:
Complete an online survey of 60-100 questions (multiple choice and Likert scale). This survey will take approximately 15-20 minutes to complete. This survey will ask you questions about your experiences with technology and education, and how you feel these experiences have shaped your readiness for college. Sample questions below:

In my experience so far, learning has mainly meant...
a) Remembering b) Repeating c) Creating d) Researching

I spend more time using technology in a way that could be called "consuming", like watching Netflix, than in a way that could be called "making," like writing a blog post.
Strongly disagree - Disagree - Neither agree nor disagree - Agree - Strongly agree

Confidentiality:

The records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify you as a participant. Research records will be stored securely and only researchers will have access to the records. All information is collected in aggregate and your individual responses are anonymous.

Voluntary Nature of the Study:

Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with the [Name of institution research occurred] or have any impact upon your grade in [Name of first year seminar]. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

Contacts and Questions:

The researcher conducting this study is Matthew Jackson. You may ask any questions you have now. If you have questions later, you are encouraged to contact him at [Contact information provided]. Matthew Jackson's primary adviser is Lynn Brice. You may contact her at [Contact information provided].

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), you are encouraged to contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

You will be given a copy of this information to keep for your records.

Appendix C: Survey Instrument

1 With which gender do you identify?
- ○ Male
- ○ Female
- ○ Transgender
- ○ Gender non-conforming / Genderqueer / Non-binary
- ○ Other / Identification not listed here
- ○ Prefer not to respond

2 What year were you born?
- ○ 1999 or later
- ○ 1998
- ○ 1997
- ○ 1996
- ○ 1995
- ○ 1994
- ○ 1993
- ○ 1992
- ○ 1991
- ○ 1990
- ○ 1989
- ○ 1988
- ○ 1987
- ○ 1986
- ○ 1985
- ○ 1984
- ○ 1983
- ○ 1982
- ○ 1981
- ○ 1980
- ○ 1979 or earlier

If 1979 or earlier Is Selected, Then Skip To End of Survey

Display This Question:
    If What year were you born? 1999 or later Is Selected
    Or What year were you born? 1998 Is Selected

2-1 How old are you at the time of taking this survey?
- ○ I am 18 years old (or older).
- ○ I am 17 years old (or younger).

If I am 17 years old (or younger) Is Selected, Then Skip To End of Survey

3 Are you attending [Name of institution research occurred] as an international student?
- ○ No - I was born in the United States.
- ○ No - I was born outside the United States but I am a U.S. citizen.
- ○ Yes - I am currently in the United States primarily to attend college.

If Yes - I am currently in the... Is Selected, Then Skip To End of Survey

4 Was the majority of your education in grades K-8 (primary, elementary, and middle school) completed in the United States?

❍ Yes

❍ No

If No Is Selected, Then Skip To End of Survey

5 Was the majority of your education in grades 9-12 (high school) completed in the United States?

❍ Yes

❍ No

If No Is Selected, Then Skip To End of Survey

6 What is your current major?

○ Undeclared / Undecided
○ Accounting
○ American Indian Studies
○ Anthropology
○ Applied Physics
○ Art
○ Art Education K-12
○ Art History
○ Athletic Training
○ Biochemistry
○ Biology
○ Biomedical Sciences
○ Cell and Molecular Biology
○ Chemical Engineering
○ Chemistry
○ Chinese Area Studies
○ Civil Engineering
○ Communication
○ Communication Sciences and Disorders
○ Computer Information Systems
○ Computer Science
○ Criminology
○ Cultural Entrepreneurship
○ Economics
○ Electrical and Computer Engineering
○ Electrical Engineering
○ English
○ Entrepreneurship
○ Environment and Sustainability
○ Environmental and Outdoor Education
○ Environmental Science
○ Finance
○ Financial Markets Finance
○ Financial Planning
○ French Studies
○ Geographic Information Science
○ Geography
○ Geological Sciences
○ German Studies
○ Graphic Design and Marketing
○ Graphic Design
○ Health Care Management
○ Health Education
○ Hispanic Studies
○ History
○ Industrial Engineering

- ❍ Integrated Elementary and Special Education
- ❍ Interdisciplinary Studies
- ❍ International Studies
- ❍ Jazz Studies
- ❍ Journalism
- ❍ Latin American Area Studies
- ❍ Linguistics
- ❍ Management
- ❍ Management Information Systems
- ❍ Marketing Analytics
- ❍ Marketing and Graphic Design
- ❍ Marketing
- ❍ Mathematics
- ❍ Mechanical Engineering
- ❍ Music
- ❍ Music Education
- ❍ Ojibwe Elementary School Education
- ❍ Performance
- ❍ Philosophy
- ❍ Physical Education
- ❍ Physics
- ❍ Political Science
- ❍ Psychology
- ❍ Public Health Education and Promotion
- ❍ Social Work
- ❍ Sociology
- ❍ Statistics and Actuarial Science
- ❍ Studio Art
- ❍ Teaching Communication Arts and Literature
- ❍ Teaching Earth and Space Science
- ❍ Teaching French
- ❍ Teaching German
- ❍ Teaching Life Science
- ❍ Teaching Mathematics
- ❍ Teaching Physical Science
- ❍ Teaching Social Studies
- ❍ Teaching Spanish
- ❍ Theatre
- ❍ Theory and Composition
- ❍ Tribal Administration and Governance
- ❍ Unified Early Childhood Studies
- ❍ Urban and Regional Studies
- ❍ Women's Studies
- ❍ Women, Gender, and Sexuality Studies
- ❍ Writing Studies

6-1A What college are you currently enrolled in?
- ❍ College of Education and Human Service Professions
- ❍ College of Liberal Arts
- ❍ School of Business and Economics
- ❍ School of Fine Arts
- ❍ College of Science and Engineering

Display This Question:
    If What is your current major? Undeclared / Undecided Is Not Selected

6-1B How confident are you in your choice of major?
- ❍ a) Very confident. It is highly unlikely I will change majors.
- ❍ b) Confident. I believe this major is a good choice and it is unlikely I will change.
- ❍ c) Uncertain. This major will do for now but I am likely to change.
- ❍ d) Very uncertain. I completely intend to change from this major.

7 Prior to coming to [Name of institution research occurred], did you complete any courses which were considered college equivalent? Select all that apply.
- ❑ No - I did not complete any college equivalent courses.
- ❑ Yes - I completed one or more Advanced Placement (AP) courses (select even if you chose not to take AP exam).
- ❑ Yes - I completed one or more International Baccalaureate (IB) course.
- ❑ Yes - I completed one or more College in the Schools (CIS) courses.
- ❑ Yes - I completed one or more high school courses that were also issued college credit.
- ❑ Yes - I completed one or more college courses at another college or university.

Display This Question:
    If Prior to coming to [Name of institution research occurred], did you complete any courses which were considered college equivalent? No - I did not complete any college equivalent courses. Is Not Selected

7-1 What is the total number of courses (AP, IB, CIS, or other) you have completed which were considered college equivalent?
- ❍ 1
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5
- ❍ 6
- ❍ 7
- ❍ 8
- ❍ 9
- ❍ 10 or more

8 Do you have an account (username and password) for any of the following social media/websites?Select all that apply.

❑ No - I do not have an account for any of these.
❑ Twitter
❑ Facebook
❑ Pinterest
❑ Instagram
❑ Snapchat
❑ Reddit
❑ YouTube

If No - I do not have an accou... Is Selected, Then Skip To End of Block

Display This Question:
    If Do you have an account (username and password) for any of the following social media/websites? Select all that apply. Twitter Is Selected

8-1A Finish the following statement with the option that closest reflects your life: On an average day, I mainly use Twitter to...

❍ a) Stay up to date on news or current events.
❍ b) Read tweets written by my friends or by celebrities I admire.
❍ c) Share my opinion about topics I care about.
❍ d) Engage in conversations with others that couldn't happen in person.

8-1BCD To what extent do you agree with the following statements:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I have used Twitter to strategize or explore how to solve a problem	○	○	○	○	○
I am more likely to use Twitter as a tool to view what others have created than to create something of my own.	○	○	○	○	○
My use of Twitter has developed my communication skills more effectively than my experience completing academic tasks in high school.	○	○	○	○	○

8-2A Finish the following statement with the option that closest reflects your life: On an average day, I mainly use Facebook...

- ❍ a) To read about the lives of my friends or family.
- ❍ b) As a public space to share content I have created.
- ❍ c) To engage in discussions on topics I care about.
- ❍ d) As a way to pass time.

8-2BCD To what extent do you agree with the following statements:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I have used the "Groups" or "Communities" feature on Facebook in order to engage with others on a topic I care about.	❍	❍	❍	❍	❍
I believe that because anyone can use Facebook, the "real truth" about important topics gets lost in the crowd	❍	❍	❍	❍	❍
My use of Facebook has developed my information-analyzing skills more effectively than my experience completing academic tasks in high school.	❍	❍	❍	❍	❍

8-3A Finish the following statement with the option that closest reflects your life: On an average day, I mainly use Pinterest to...

❍ a) Pass time.

❍ b) Share content I have created myself.

❍ c) View content others have created that I find to be interesting.

❍ d) Collect ideas that I then implement or follow through with in my life.

8-3BCD To what extent do you agree with the following statements:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I have used Pinterest as a tool for setting a goal and following the goal through to achievement.	❍	❍	❍	❍	❍
I am more likely to use Pinterest as a tool to view content others have created than to share content I created myself.	❍	❍	❍	❍	❍
My use of Pinterest has developed my goal-setting skills more effectively than my experience completing academic tasks in high school.	❍	❍	❍	❍	❍

8-4A Finish the following statement with the option that closest reflects your life: On an average day, I mainly use Instagram to...

○ a) Pass time.
○ b) Share content I have created myself.
○ c) View content others have created that I find to be interesting.
○ d) Learn about places or cultures I may not otherwise interact with.

8-4BCD To what extent do you agree with the following statements:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Having an Instagram account has resulted in independently teaching myself basic photo editing skills.	○	○	○	○	○
I am more likely to use Instagram as a tool to view content others have created than to share content I created myself.	○	○	○	○	○
My use of Instagram has developed my self-awareness more effectively than my experience completing academic tasks in high school.	○	○	○	○	○

8-5A Finish the following statement with the option that closest reflects your life: On an average day, I mainly use Reddit to...

- ❍ a) Read the day's popular internet content.
- ❍ b) Follow news or current events happening in the world.
- ❍ c) Post to boards on topics I feel are important or useful.
- ❍ d) Seek opinions on how to solve problems or accomplish tasks.

8-5BCD To what extent do you agree with the following statements:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Effective Reddit users communicate in an organized, efficient manner and provide research and evidence for their claims. This statement reflects how I primarily use Reddit.	❍	❍	❍	❍	❍
I am more likely to use Reddit, as a tool to view content others have created than to share content I created myself.	❍	❍	❍	❍	❍
My use of Reddit has developed my information-analyzing skills more effectively than my experience completing academic tasks in high school.	❍	❍	❍	❍	❍

8-6A Finish the following statement with the option that closest reflects your life: On an average day, I mainly use YouTube to...
- ○ a) Share video content I have created.
- ○ b) Learn how to do things.
- ○ c) Watch content I find amusing or entertaining.
- ○ d) As a source of news about current events.

8-6BCD To what extent do you agree with the following statements:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
When faced with a minor problem, I frequently use YouTube as a resource to see if there is a simple solution.	○	○	○	○	○
I use YouTube almost exclusively in a way that could be considered as an "audience member."	○	○	○	○	○
My use of Youtube has developed my communication skills more effectively than my experience completing academic tasks in high school.	○	○	○	○	○

8-7A Finish the following statement with the option that closest reflects your life: On an average day,
I mainly use Snapchat to...

- ❍ a) Share content I have created myself in a story.
- ❍ b) View content made by my friends or by celebrities I admire
- ❍ c) Private message with friends for fun.
- ❍ d) Promote content I have posted in other forums (YouTube, Twitter, etc.)

8-7BCD To what extent do you agree with the following statements:

	Strongle Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Having a Snapchat account has resulted in independently teaching myself basic photo/video editing skills beyond the filters Snapchat provides.	❍	❍	❍	❍	❍
When I use Snapchat, I am more very intentional about being creative.	❍	❍	❍	❍	❍
My use of Snapchat has developed my communication skills more effectively than my experience completing academic tasks in high school.	❍	❍	❍	❍	❍

9 Prior to coming to [Name of institution research occurred], had you used any of the following tools?Select all that apply.

- ❏ None - I did not use any of these tools prior to attending UMD.
- ❏ Microsoft Office (Word, Powerpoint, Excel) and/or iWork (Pages, Keynote, Numbers)
- ❏ Google Docs
- ❏ Google Slides and/or Prezi
- ❏ Wikis (Wikipedia, Wikispaces, etc.)
- ❏ Blogging sites/programs (Wordpress, Blogger, Tumblr, etc.)
- ❏ Note-taking sites/programs (Evernote, OneNote, Google Keep, etc.)

If None - I did not use any of... Is Selected, Then Skip To End of Block

Display This Question:

If Prior to coming to [Name of institution research occurred], had you used any of the following tools?Select all that apply. Microsoft Office (Word, Powerpoint, Excel) and/or iWork (Pages, Keynote, Numbers) Is Selected

9-1A Did you mainly use Microsoft Office (Word, Powerpoint, Excel) and/or iWork (Pages, Keynote, Numbers) because it was a school requirement?

- ❍ a) Yes - my main use of Microsoft Office and/or iWork was because it was required by either my middle or high school.
- ❍ b) No - I have mainly used Microsoft Office and/or iWork because of my own independent interest or need.
- ❍ c) Both - my main use of Microsoft Office and/or iWork has been both because of school requirements and my own independent interest or need.

Display This Question:

If Prior to coming to [Name of institution research occurred], had you used any of the following tools?Select all that apply. Microsoft Office (Word, Powerpoint, Excel) and/or iWork (Pages, Keynote, Numbers) Is Selected

And Did you mainly use Microsoft Office (Word, Powerpoint, Excel) and/or iWork (Pages, Keynote, Numbers) because it was a school requirement? b) No - I have mainly used Microsoft Office and/or iWork because of my own independent interest or need. Is Selected

Or Did you mainly use Microsoft Office (Word, Powerpoint, Excel) and/or iWork (Pages, Keynote, Numbers) because it was a school requirement? c) Both - my main use of Microsoft Office and/or iWork has been both because of school requirements and my own independent interest or need. Is Selected

9-1B Finish the following statement with the option that closest reflects your life: Prior to coming to [Name of institution research occurred], I mainly used Microsoft Office and/or iWork...

- ❍ a) To independently complete homework assignments or tasks that were assigned to me.
- ❍ b) To write or create content for my own satisfaction.
- ❍ c) To play with technology and teach myself how to use it.
- ❍ d) Because that's what my classmates and I were required to do.

9-1C Finish the following statement with the option that closest reflects your life: Prior to coming to [Name of institution research occurred], I mainly used Microsoft Office and/or iWork...

○ a) To independently complete homework assignments or tasks that were assigned to me

○ b) To write or create content for my own satisfaction

○ c) To play with technology and teach myself how to use it

○ d) Because that's what my classmates and I were required to do.

9-1D To what extent do you agree with the following statement:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
There is little value in a high school student learning to use tools like Microsoft Office and/or iWork if those specific tools won't be required later by that student's college professors.	○	○	○	○	○

9-2A Did you mainly use Google Docs because it was a school requirement?
- a) Yes - my main use of Google Docs was because it was required by either my middle or high school.
- b) No - I have mainly used Google Docs because of my own independent interest or need.
- c) Both - my main use of Google Docs has been both because of school requirements and my own independent interest or need.

9-2B Finish the following statement with the option that closest reflects your life:Prior to coming to [Name of institution research occurred], I mainly used Google Docs to...
- a) Independently complete homework assignments or tasks that were assigned to me.
- b) Write or create content for my own satisfaction.
- c) Collaborate with others to complete homework assignments or tasks that were assigned to me
- d) Save money from purchasing other Word Processing software.

9-2C Finish the following statement with the option that closest reflects your life:Prior to coming to [Name of institution research occurred], I mainly used Google Docs...
- a) To independently complete homework assignments or tasks that were assigned to me
- b) To write or create content for my own satisfaction
- c) To collaborate with others to complete homework assignments or tasks that were assigned to me
- d) Because that's what my classmates and I were required to do.

9-2D To what extent do you agree with the following statement:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Google Docs allows multiple people to work on the same document and watch work be created in real time. This feature is mainly useful in schools because it allows teachers to make sure that students are staying on task and completing their assignments.	○	○	○	○	○

9-3A Did you mainly use Google Slides and/or Prezi because it was a school requirement?
- ❍ a) Yes - my main use of Google Slides and/or Prezi was because it was required by either my middle or high school.
- ❍ b) No - I have mainly used Google Slides and/or Prezi because of my own independent interest or need.
- ❍ c) Both - my main use of Google Slides and/or Prezi has been both because of school requirements and my own independent interest or need.

9-3B Finish the following statement with the option that closest reflects your life: Prior to coming to [Name of institution research occurred], I mainly used Google Slides and/or Prezi to...
- ❍ a) Make group projects tolerable or less annoying than they might be otherwise.
- ❍ b) Collaborate with others to create content for my own satisfaction.
- ❍ c) Collaborate with others to complete homework assignments or tasks that were assigned to me.
- ❍ d) Evenly divide work among group members.

9-3C Finish the following statement with the option that closest reflects your life: Prior to coming to [Name of institution research occurred], I mainly used Google Slides and/or Prezi to...
- ❍ a) Make group projects tolerable or less annoying than they might be otherwise.
- ❍ b) Collaborate with others to create content for my own satisfaction.
- ❍ c) Collaborate with others to complete homework assignments or tasks that were assigned to me.
- ❍ d) Evenly divide work among group members.

9-3D To what extent do you agree with the following statement:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Google Slides and/or Prezi are useful tools because if your presentation lacks "substance," you can make up for it with "style."	○	○	○	○	○

9-4A Did you mainly use Wikis (Wikipedia, Wikispaces, etc.) because it was a school requirement?

❍ a) Yes - my main use of Wikis was because it was required by either my middle or high school.

❍ b) No - I have mainly used Wikis because of my own independent interest or need.

❍ c) Both - my main use of Wikis has been both because of school requirements and my own independent interest or need.

9-4B Finish the following statement with the option that closest reflects your life: Prior to coming to [Name of institution research occurred], I mainly used Wikis (Wikipedia, Wikispaces, etc.)...

❍ a) To quickly look up facts.

❍ b) Because that's what my classmates and I were required to do.

❍ c) To engage with others about topics I find interesting.

❍ d) To serve as a starting point when I have been curious about a topic.

9-4C Finish the following statement with the option that closest reflects your life: Prior to coming to [Name of institution research occurred], I mainly used Wikis (Wikipedia, Wikispaces, etc.)...

❍ a) To quickly look up facts.

❍ b) Because that's what my classmates and I were required to do.

❍ c) To engage with others about topics I find interesting.

❍ d) To serve as a starting point when I have been curious about a topic.

If Prior to coming to [Name of institution research occurred], had you used any of the following tools?Select all that apply. Wikis (Wikipedia, Wikispaces, etc.) Is Selected

9-4D To what extent do you agree with the following statement:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am more likely to use Wikis (Wikipedia, Wikispaces, etc.) as a tool to view what others have created than to create something of my own	○	○	○	○	○

9-5A Did you mainly use blogging sites/programs (Wordpress, Blogger, Tumblr, etc.) because it was a school requirement?

❍ a) Yes - my main use of blogging sites/programs was because it was required by either my middle or high school.

❍ b) No - I have mainly used blogging sites/programs because of my own independent interest or need.

❍ c) Both - my main use of blogging sites/programs has been both because of school requirements and my own independent interest or need.

9-5B Finish the following statement with the option that closest reflects your life: Prior to coming to [Name of institution research occurred], I mainly used blogging sites/programs to...

❍ a) Frequently create content and engage with an audience in a publically viewable blog

❍ b) Create content occasionally, but eventually lose interest.

❍ c) Engage with fellow bloggers/users and discuss topics we found to be of interest

❍ d) Satisfy a requirement of my school, work, place of worship, athletic team, club, etc.

9-5C Finish the following statement with the option that closest reflects your life: Prior to coming to [Name of institution research occurred], I mainly used blogging sites/programs to...

❍ a) Frequently create content and engage with an audience in a publically viewable blog.

❍ b) Create content occasionally, but eventually lose interest.

❍ c) Engage with fellow bloggers/users and discuss topics we found to be of interest

❍ d) Satisfy a requirement of my school, work, place of worship, athletic team, club, etc.

If Prior to coming to [Name of institution research occurred], had you used any of the following tools? Select all that apply. Blogging sites/programs (Wordpress, Blogger, Tumblr, etc.) Is Selected

9-5D To what extent do you agree with the following statement:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
My use of blogging sites/programs has strengthened my attention toward precision and accuracy when communicating with an audience.	○	○	○	○	○

9-6A Did you mainly use note-taking sites/programs (Evernote, OneNote, Google Keep, etc.) because it was a school requirement?

❍ a) Yes - my main use of note-taking sites/programs was because it was required by either my middle or high school.

❍ b) No - I have mainly used note-taking sites/programs because of my own independent interest or need.

❍ c) Both - my main use of note-taking sites/programs has been both because of school requirements and my own independent interest or need.

9-6B Finish the following statement with the option that closest reflects your life: Prior to coming to [Name of institution research occurred], I mainly used note-taking sites/programs to...

❍ a) Record as much as I could from classes in order to prepare for tests.

❍ b) Keep a "to do" list of homework deadlines.

❍ c) Maintain self-awareness about my progress in achieving goals.

❍ d) Strategically review content from classes and identify areas I needed to learn more about.

9-6C Finish the following statement with the option that closest reflects your life: Prior to coming to [Name of institution research occurred], I mainly used note-taking sites/programs to...

❍ a) Record as much as I could from classes in order to prepare for tests.

❍ b) Keep a "to do" list of homework deadlines.

❍ c) Maintain self-awareness about my progress in achieving goals.

❍ d) Strategically review content from classes and identify areas I needed to learn more about.

9-6D To what extent do you agree with the following statement:

	Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
I am more likely to use note-taking sites/programs to record what other resources (teachers, textbooks, etc.) have said about a topic than to include my own thoughts on a topic.	○	○	○	○	○

10-ABCDE To what extent do you agree with the following statements:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
My time is better spent learning material that I know will be tested on than learning material that might never be graded.	○	○	○	○	○
The number one purpose of learning in college is to own the information I will need in the job market.	○	○	○	○	○
Technology changes; knowledge does not.	○	○	○	○	○
I would rather propose, design, and complete a final project of my own creation than take a multiple choice final exam.	○	○	○	○	○
I spend more time using technology in a way that could be called "consuming," like watching Netflix, than in a way that could be called "making," like writing a blog post.	○	○	○	○	○

11-Placeholder Finish the following statements with the option that closest reflects your life:

11 The main thing(s) I expect to learn in college is/are...
- ○ a) The skills I will need for the workforce.
- ○ b) How to effectively collaborate with others in completing work.
- ○ c) The "nuts and bolts" of a specific future job.
- ○ d) How to discover new information and contribute to my academic field.

12 My main belief regarding grades in college is that...
- ○ a) My grades are less important than what I can do with the material I learn.
- ○ b) My grades ought to reflect the effort and work I put in to reading and remembering material.
- ○ c) Instructors ought to be straightforward with what I need to do to earn an A, B, C, etc.
- ○ d) Instructors ought to expect me to be able to "go beyond" what they have taught me in class.

13 In my experience so far, learning has mainly meant...
- ○ a) Remembering
- ○ b) Repeating
- ○ c) Creating
- ○ d) Researching

14 In my experience so far, learning has mainly consisted of...
- ○ a) Interacting with others about topics that are important to me.
- ○ b) Preparing to take exams by memorizing material.
- ○ c) Completing some type of assessment (homework, tests, reports, etc.) to prove that I had read material.
- ○ d) Attempting to solve problems that had multiple possible solutions.

15-ABC To what extent do you agree with the following statements:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Throughout high school, I felt like I was the one "in charge" of my learning experience.	○	○	○	○	○
I frequently use technology to work with people I don't know in real life in order to complete goals (examples might include: MyFitnessPal, RunKeeper, GoodReads, World of Warcraft, Overwatch, etc.).	○	○	○	○	○
Over-all, I believe the ways I have used the internet and technology outside of high school did a better job at developing the skills I need in college than the assignments and tests I was required to complete inside of school.	○	○	○	○	○

16 Problem formulation skills (suggesting theories about and strategically exploring a problem) are necessary to succeed in college.

16-A I think that the assignments and tests I was required to complete inside of high school did a _____ job at developing my problem formulation skills.
- ❍ Very Good
- ❍ Good
- ❍ Neither Good nor Bad
- ❍ Bad
- ❍ Very Bad

16-B I think that the ways I used the internet and technology outside of high school did a _____ job at developing my problem formulation skills.
- ❍ Very Good
- ❍ Good
- ❍ Neither Good nor Bad
- ❍ Bad
- ❍ Very Bad

17 Research skills (identifying, collecting, and discerning information sources and data) are necessary to succeed in college.

17-A I think that the assignments and tests I was required to complete inside of high school did a _____ job at developing my research skills.
○ Very Good
○ Good
○ Neither Good nor Bad
○ Bad
○ Very Bad

17-B I think that the ways I used the internet and technology outside of high school did a _____ job at developing my research skills.
○ Very Good
○ Good
○ Neither Good nor Bad
○ Bad
○ Very Bad

18 Interpretation skills (analyzing and evaluating relevant findings, trends, and evidence) are necessary to succeed in college.

18-A I think that the assignments and tests I was required to complete inside of high school did a _____ job at developing my interpretation skills.
- ○ Very Good
- ○ Good
- ○ Neither Good nor Bad
- ○ Bad
- ○ Very Bad

18-B I think that the ways I used the internet and technology outside of high school did a _____ job at developing my interpretation skills.
- ○ Very Good
- ○ Good
- ○ Neither Good nor Bad
- ○ Bad
- ○ Very Bad

19 Communication skills (organizing and constructing insights coherently) are necessary to succeed in college.

19-A I think that the assignments and tests I was required to complete inside of high school did a _____ job at developing my communication skills.
- ❍ Very Good
- ❍ Good
- ❍ Neither Good nor Bad
- ❍ Bad
- ❍ Very Bad

19-B I think that the ways I used the internet and technology outside of high school did a _____ job at developing my communication skills.
- ❍ Very Good
- ❍ Good
- ❍ Neither Good nor Bad
- ❍ Bad
- ❍ Very Bad

20 Precision and accuracy skills (being sure work is correct and meets the expectations of the task) are necessary to succeed in college.

20-A I think that the assignments and tests I was required to complete inside of high school did a _____ job at developing my precision and accuracy skills.
- ❍ Very Good
- ❍ Good
- ❍ Neither Good nor Bad
- ❍ Bad
- ❍ Very Bad

20-B I think that the ways I used the internet and technology outside of high school did a _____ job at developing my precision and accuracy skills.
- ❍ Very Good
- ❍ Good
- ❍ Neither Good nor Bad
- ❍ Bad
- ❍ Very Bad

21 Ownership of learning (setting goals, monitoring your own progress, motivating yourself, seeking help when needed) is necessary to succeed in college.

21-A I think that the assignments and tests I was required to complete inside of high school did a _____ job at developing my ownership of learning.
- ❍ Very Good
- ❍ Good
- ❍ Neither Good nor Bad
- ❍ Bad
- ❍ Very Bad

21-B I think that the ways I used the internet and technology outside of high school did a _____ job at developing my ownership of learning.
- ❍ Very Good
- ❍ Good
- ❍ Neither Good nor Bad
- ❍ Bad
- ❍ Very Bad

22 Learning techniques (time management, test-taking skills, note-taking skills, reading strategically) are necessary to succeed in college.

22-A I think that the assignments and tests I was required to complete inside of high school did a _____ job at developing my learning techniques.
- ○ Very Good
- ○ Good
- ○ Neither Good nor Bad
- ○ Bad
- ○ Very Bad

22-B I think that the ways I used the internet and technology outside of high school did a _____ job at developing my learning techniques.
- ○ Very Good
- ○ Good
- ○ Neither Good nor Bad
- ○ Bad
- ○ Very Bad

23-ABCDE To what extent do you agree with the following statements:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
If you are ever going to be able to understand something, it will make sense to you the first time you hear it	○	○	○	○	○
For success in school, it's best not to ask too many questions.	○	○	○	○	○
How much a person gets out of school mostly depends on the quality of the teacher.	○	○	○	○	○
I often wonder how much my teachers really know.	○	○	○	○	○
The ability to learn is innate (in other words, you are born with-or-without it).	○	○	○	○	○

24-ABCDE To what extent do you agree with the following statements:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Successful students understand things quickly.	○	○	○	○	○
If scientists try hard enough, they can find the truth to almost anything.	○	○	○	○	○
I try my best to combine information across chapters or even across classes.	○	○	○	○	○
The most successful people have discovered how to improve their ability to learn.	○	○	○	○	○
Things are simpler than most professors would have you believe.	○	○	○	○	○

25-ABCDE To what extent do you agree with the following statements:

	Strongly Disagree	Disgree	Neither Agree nor Disagree	Agree	Strongly Agree
To me studying means getting the big ideas from the text, rather than details.	○	○	○	○	○
Going over and over a difficult textbook chapter usually won't help you understand it.	○	○	○	○	○
Scientists can ultimately get to the truth.	○	○	○	○	○
Students have a lot of control over how much they can get out of a textbook.	○	○	○	○	○
Everyone needs to learn how to learn.	○	○	○	○	○

26-ABCDE To what extent do you agree with the following statements:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Being a good student generally involves memorizing facts.	○	○	○	○	○
Wisdom is not knowing the answers, but knowing how to find the answers.	○	○	○	○	○
Truth is unchanging.	○	○	○	○	○
Whenever I encounter a difficult problem in life, I consult with my parents.	○	○	○	○	○
When I study, I look for the specific facts.	○	○	○	○	○

27-ABCDE To what extent do you agree with the following statements:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
If a person can't understand something within a short amount of time, they should keep on trying.	○	○	○	○	○
Sometimes you just have to accept answers from a teacher even though you don't understand them	○	○	○	○	○
If professors would stick more to the facts and do less theorizing, one could get more out of college.	○	○	○	○	○
It's a waste of time to work on problems which have no possibility of coming out with a clear cut answer.	○	○	○	○	○
Some people are born good learners, others are just stuck with limited ability.	○	○	○	○	○

28-ABCDEF To what extent do you agree with the following statements:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
The really smart students don't have to work hard to do well in school.	○	○	○	○	○
Working hard on a difficult problem for an extended period of time only pays off for really smart students.	○	○	○	○	○
Almost all the information you can learn from a textbook you will get during the first reading.	○	○	○	○	○
Students who are "average" in school will remain "average" for the rest of their lives.	○	○	○	○	○
Learning is a slow process of building up knowledge.	○	○	○	○	○
Today's facts may be tomorrow's fiction.	○	○	○	○	○

Appendix D: Presentation Slides from Dissertation Defense

4/17/17

Consumers and Makers:
Exploring Opposing Paradigms
of Millennial College Readiness

Matthew Jackson | Dissertation Defense | April, 2017

Spring, 2005 – Spring, 2017

Spring, 2005 – Spring, 2017

Summer, 2013

Educational Policy

Curriculum: Theory in Practice

Teaching and Learning in a Systems Context

Research Design

Professional experience: College readiness

Academic experience: Systemic forces

Research Interest: Student approaches to learning as situated in systemic paradigms

Systemic Paradigms of this Study

Educational Policy (Accountability)

Information-communication Technology (ICT)

4/17/17

Research Questions

1. To what extent do millennial students exhibit dispositions regarding the purpose of learning along a spectrum of "consumer" to "maker"?

2. Do millennial students exhibit beliefs regarding the process of learning in alignment more with "naïve" or "sophisticated" perspectives (Schommer, 1998)?

3. To what extent (if any) did millennial students' high school experiences formally include the practice of developing "key skills"?

4. To what extent (if any) have millennial students' independent, informal experiences with information-communication technology included the practice of developing "key skills"?

5. Do correlations exist among disposition (Question 1), epistemic beliefs, (Question 2) and the location(s) of key skill development (Questions 3 and 4)?

Research Method

Population | Method | Sample Size | Exclusions

Final N = 490

Data Analyses

Descriptive Statistics | Bivariate Correlational Analysis

Research Question 1

To what extent do millennial students exhibit dispositions regarding the purpose of learning along a spectrum of "consumer" to "maker"?

4/17/17

Slide 1

Charlottesville Education Summit 1989

"America 2000" 1991

Goals 2000: Educate America Act of 1994

Improving America's Schools Act of 1994

No Child Left Behind Act 2002

Race to the Top 2009

Blueprint for Reform 2010

Every Child Achieves Act 2015

Slide 2

The stated objective of this accountability has shifted under each political administration.

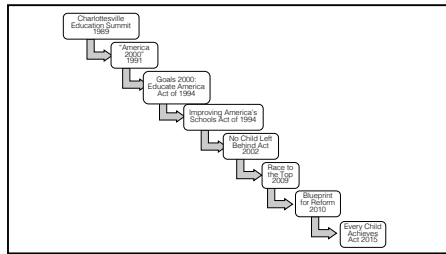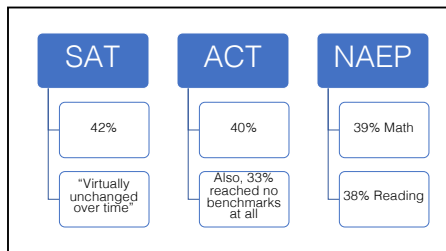Recently, the emphasis has centered on producing College and Career Ready students.

PRESIDENT BARACK OBAMA

Every child in America deserves a world-class education.

Today, more than ever, a world-class education is a prerequisite for success. America was once the best educated nation in the world. A generation ago, we led all nations in college completion, but today, 10 countries have passed us. It is not that their students are smarter than ours. It is that those countries are being smarter about how to educate their students. And the countries that out-educate us today will out-compete us tomorrow.

We must do better. Together, we must achieve a new goal, that by 2020, the United States will once again lead the world in college completion. We must raise the expectations for our students, for our schools, and for ourselves—this must be a national priority. We must ensure that every student graduates from high school well prepared for college and a career.

Slide 3

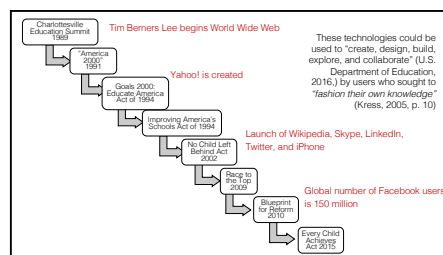| SAT	ACT	NAEP
42%	40%	39% Math
"Virtually unchanged over time"	Also, 33% reached no benchmarks at all	38% Reading

Slide 4

"Faculty…stated emphatically that this prerequisite content knowledge was not the most important measure of success in their courses.

With near unanimity, they stressed in no uncertain terms on campus after campus that students needed to know what to do with the content they were learning….

Repeating information alone was not sufficient. Faculty noted time and time again that otherwise well-prepared students could not grapple with a task or problem that asked them to go beyond what they had been taught literally." (Conley, 2014, p. 33).

Slide 5

My theory: accountability policies and initiatives might provide context for a "consumer" disposition among millennial students.

For the purpose of this study, a consumer disposition indicates tendencies toward viewing the purpose of learning as consumption-oriented, where an individual learns primarily as an act of passive compliance to secure "ownership" of an outcome.

Slide 6

Charlottesville Education Summit 1989

Tim Berners Lee begins World Wide Web

"America 2000" 1991

Yahoo! is created

Goals 2000: Educate America Act of 1994

Improving America's Schools Act of 1994

These technologies could be used to "create, design, build, explore, and collaborate" (U.S. Department of Education, 2016,) by users who sought to "fashion their own knowledge" (Kress, 2005, p. 10)

No Child Left Behind Act 2002

Launch of Wikipedia, Skype, LinkedIn, Twitter, and iPhone

Race to the Top 2009

Blueprint for Reform 2010

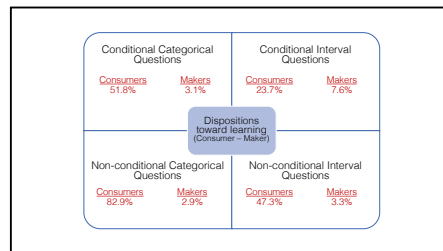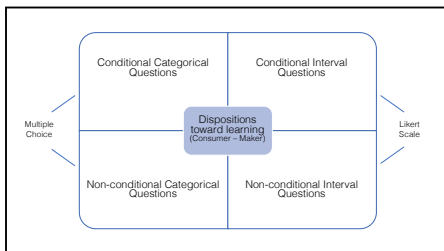Global number of Facebook users is 150 million

Every Child Achieves Act 2015

My theory: information-communication technology might provide context for a "maker" disposition among millennial students.

For the purpose of this study, a maker disposition indicates tendencies toward viewing the purpose of learning as creation-oriented, where an individual learns primarily as an act of self-driven discovery to "generate" an outcome.

Examples of Consumer and Maker Statements

Disposition	Sample Statements Reflective of Disposition
Consumer	"My time is better spent learning material that I know will be tested on than learning material that might never be graded."
	"The number one purpose of learning in college is to own the information I will need in the job market."
Maker	"I would rather propose, design, and complete a final project of my own creation than take a multiple choice final exam."
	"My main belief regarding grades in college is that my grades are less important than what I can do with the material that I learn."

Conditional Categorical Questions — Conditional Interval Questions

Dispositions toward learning (Consumer – Maker)

Multiple Choice — Likert Scale

Non-conditional Categorical Questions — Non-conditional Interval Questions

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Conditional Categorical Questions
Consumers 51.8% Makers 3.1%

Conditional Interval Questions
Consumers 23.7% Makers 7.6%

Dispositions toward learning (Consumer – Maker)

Non-conditional Categorical Questions
Consumers 82.9% Makers 2.9%

Non-conditional Interval Questions
Consumers 47.3% Makers 3.3%

RQ1: To what extent do millennial students exhibit dispositions regarding the purpose of learning along a spectrum of "consumer" to "maker"?

Smallest portion of consumers = 23.7%   Smallest portion of makers = 2.9%
Largest portion of consumers = 82.9%   Largest portion of makers = 7.6%

Conservative analysis: a millennial student was over 3 times more likely to be a consumer than a maker

Liberal analysis: a millennial student was over 28 times more likely to be a consumer than a maker.

Research Question 2

Do millennial students exhibit beliefs regarding the process of learning in alignment more with "naïve" or "sophisticated" perspectives (Schommer, 1998)?
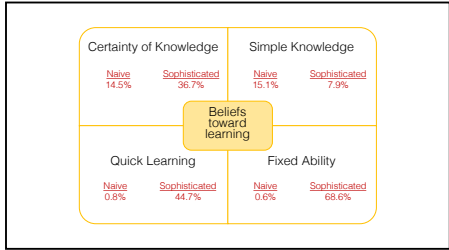
4/17/17

Epistemic Beliefs

Schommer (1990) proposed that a spectrum of student epistemic beliefs exist within a series of subsets, understood collectively through four factors and ranging from naïve to sophisticated.

Schommer's findings (1990, 1998) determined that students whose beliefs skewed toward naivety in these factors faced greater barriers in processing information, integrating knowledge, accurately assessing their own comprehension, and critically interpreting information.

Four Factors of Epistemic Beliefs with Subsets

Factor	Description of ranges of belief
Certainty of Knowledge	"Can range from the belief that knowledge is fact to the belief that knowledge is continually changing."
Simple Knowledge	"Can range from the belief that knowledge is made up of isolated bits of information to the belief that knowledge is complex."
	Additional subsets: Avoidance of ambiguity, tendency to seek single answers, tendency to avoid integration, dependence upon authority.
Quick Learning	"Can range from the belief that learning happens fast or not at all to the belief that learning is a gradual process that takes time."
	Additional subset: Criticism of authority.
Fixed Ability	"Can range from the belief that the ability to learn is fixed to the belief that people can learn how to learn."
	Additional subsets: Can/cannot learn how to learn, relationship of success to hard work, learning upon first attempt, innate ability.

Note. Quoted summarization by Nist-Ollejnik & Holschuh, 2009.

Certainty of Knowledge		Simple Knowledge	
Naïve 14.5%	Sophisticated 36.7%	Naïve 15.1%	Sophisticated 7.9%

Beliefs toward learning

| Quick Learning		Fixed Ability	
Naïve 0.8%	Sophisticated 44.7%	Naïve 0.6%	Sophisticated 68.6%

RQ2: Do millennial students exhibit beliefs regarding the process of learning in alignment more with "naïve" or "sophisticated" perspectives (Schommer, 1998)?

Quick Learning: <1% naive   Certainty of Knowledge: 14.5% naive
Fixed Ability: <1% naive   Simple Knowledge: 15.1% naive

An unexpected outcome, given the research of the field (Schommer, 1990; Schommer, 1998; Jehng, Johnson, & Anderson, 1993).

Appropriate avenue to explore in further research.
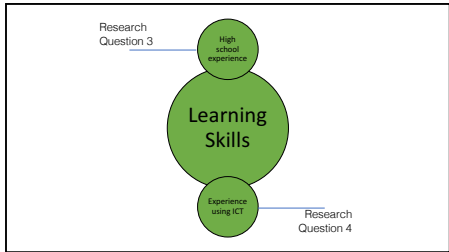
Research Question 3 — High school experience

Learning Skills

Experience using ICT — Research Question 4
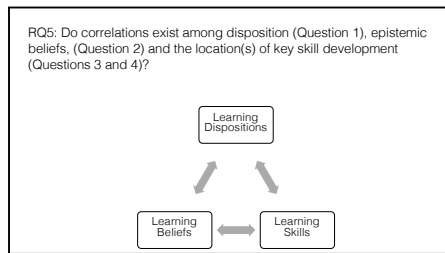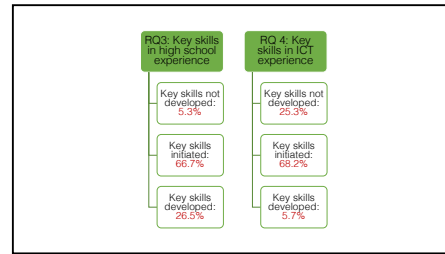

Research Questions 3 and 4

3. To what extent (if any) did millennial students' high school experiences formally include the practice of developing "key skills"?

4. To what extent (if any) have millennial students' independent, informal experiences with information-communication technology included the practice of developing "key skills"?

4/17/17

Slide 1: Key Skills

Key Skills

Key Cognitive Strategies	Key Learning Skills and Techniques
Problem formulation (hypothesizing and strategizing exploration of problems)	Ownership of Learning • Goal setting • Persistence
Research (identifying, collecting, and discerning information sources and data)	• Self-awareness • Motivation • Help seeking
Interpretation (analyzing and evaluating relevant findings, trends, and evidence)	• Progress monitoring • Self-efficacy
Communication (organizing and constructing insights coherently)	Learning techniques • Time management • Study skills
Precision and Accuracy (monitoring and confirming standards and accuracy in conventions and tasks)	• Test-taking skills • Note-taking skills • Memorization/recall • Strategic reading • Collaborative learning • Technology

Note. Adapted from Conley (2014).

Slide 2:

RQ3: Key skills in high school experience
- Key skills not developed: 5.3%
- Key skills initiated: 66.7%
- Key skills developed: 26.5%

RQ 4: Key skills in ICT experience
- Key skills not developed: 25.3%
- Key skills initiated: 68.2%
- Key skills developed: 5.7%

Slide 3:

RQ5: Do correlations exist among disposition (Question 1), epistemic beliefs, (Question 2) and the location(s) of key skill development (Questions 3 and 4)?

Learning Dispositions

Learning Beliefs ↔ Learning Skills

Slide 4:

Statistically significant, positive correlations are present in 13 out of 24 instances (54.2%), ranging from r = .094 to r = .530

	Certainty of Knowledge	Simple Knowledge	Quick Learning	Fixed Ability	High school skill dev.	ICT skill dev.
Cond. Categorical	✔		✔	✔	✔	✔
Cond. Interval			✔		✔	✔
Non-cond. Categorical		✔	✔			✔
Non-cond. Interval		✔	✔			

(RQ 2: Naïve – Sophisticated Beliefs / RQ 3 / RQ 4; RQ1: Consumer – Maker Dispositions)

Slide 5: Exploratory Finding: Instrument Effectiveness

	Certainty of Know.	Simple Know.	Quick Learning	Fixed Ability	High school skill dev.	ICT skill dev.	Total Correlations	Cons %	Maker %
Cond. Categorical	✔		✔	✔	✔	✔	5/6: ~83%	51.8%	3.1%
Cond. Interval			✔		✔	✔			
Non-cond. Categorical		✔	✔			✔			
Non-cond. Interval		✔	✔				2/6 ~ 33%	47.3%	3.3%

Slide 6:

Research Hypothesis: Correlations would exist among variables

Findings Support Hypothesis: Statistically significant, positive correlations existed in 13 out of 24 instances (54.2%).

	Certainty of Know.	Simple Know.	Quick Learning	Fixed Ability	High school skill dev.	ICT skill dev.	Total Correlations	Cons %	Maker %
Cond. Categorical	✔		✔	✔	✔	✔	5/6: ~83%	51.8%	3.1%
Cond. Interval			✔		✔	✔	3/6: 50%	23.7%	7.6%
Non-cond. Categorical		✔	✔			✔	3/6: 50%	82.9%	2.9%
Non-cond. Interval		✔	✔				2/6 ~ 33%	47.3%	3.3%

4/17/17

Research Hypothesis:
Correlations would exist among variables

As an individual increased in his or her likelihood to have a maker disposition, he or she was…

✓more likely to increase in the sophistication of his or her epistemic beliefs

✓more likely to have initiated or developed key skills formally in the context of high school experiences

✓more likely to have initiated or developed key skills informally in the context of using information-communication technologies

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What the study told us about **this population** of first year students…
• More likely (3-28 x) to have a consumer disposition toward the purpose of learning (view learning as passive compliance to secure "ownership" of an outcome).

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What the study told us about **this population** of first year students…
• More likely (3-28 x) to have a consumer disposition toward the purpose of learning (view learning as passive compliance to secure "ownership" of an outcome).

• More likely to have sophisticated epistemic beliefs regarding the process of learning.

• Only 26.5% believe their high school experiences developed the key skills they will need to thrive in higher education.

What the study told us about **this population** of first year students…
• More likely (3-28 x) to have a consumer disposition toward the purpose of learning (view learning as passive compliance to secure "ownership" of an outcome).

• More likely to have sophisticated epistemic beliefs regarding the process of learning.

• Only 26.5% believe their high school experiences developed the key skills they will need to thrive in higher education.

• Over 68% believe their key skills have been initiated using information-communication technology, and 6% believe that their use of ICT developed their key skills.

Initial areas for future research
• Understanding the "moderates."

Initial areas for future research

• Understanding the "moderates."

• Statistical analysis between these research findings and traditional measures of success in higher education (GPA, retention, etc.).

Initial areas for future research

• Understanding the "moderates."

• Statistical analysis between these research findings and traditional measures of success in higher education (GPA, retention, etc.).

• Qualitative analysis exploring these research findings within the context of students' learning experiences.

The exploration has just begun…