

JOHNNY CAN WRITE: IDENTIFYING THE EPISTEMOLOGICAL LANGUAGE OF
UNDERGRADUATE WRITERS

By

MATTHEW JAY FRYE

A dissertation submitted in partial fulfillment of
the requirements for the degree of

DOCTOR OF PHILOSOPHY

WASHINGTON STATE UNIVERSITY
Department of English

MAY 2017

To the Faculty of Washington State University

The members of the Committee appointed to examine the dissertation of MATTHEW
JAY FRYE find it satisfactory and recommend that it be accepted.

Patricia Ericsson, Ph.D., Chair

Bill Condon, Ph.D.

Nancy Bell, Ph.D.

ACKNOWLEDGEMENT

This dissertation's extensive data collection and analysis process was made possible by a generous grant Samuel H. and Patricia W. Smith Teaching and Learning Endowment in 2015. The coders, the coding program, and travel to conferences to disseminate findings from this research would not have been possible without this support.

I owe a great thanks to my dissertation committee, who offered some much needed advice early on to pare this project down to something I could complete in the amount of time I had available. Thank you Dr. Ericsson for not only acting as PI on this project, but also in keeping me involved with department research as well. At every stage of this process, I was able to keep track of how these findings might connect with actual departmental and institutional practices. Thank you Dr. Condon for helping me think about long-term assessment efforts and the ways that smaller elements of this project could extend further at other institutions. And, thank you Dr. Bell for encouraging me to get involved with the larger field of applied linguistics – I don't think this dissertation quite bridges the gap from rhet/comp, but many of the conversations I try to engage with (or that were in my mind as I wrote) helped me keep a focus on replicability and generalizability from this data.

I also owe a big thank you to WSU's Writing Assessment Coordinators over the past five years: Dr. Diane Kelly-Riley (now at University of Idaho), Brooklyn Walter (now head of the Writing Center) and Dr. Xyan Neider. Dr. Kelly-Riley put me on the path to this study in her WPA course back in the Fall of 2012 by letting me dig into the Junior Writing Portfolio archives for the very first iteration of this study, in order to test some observations I had made as a placement exam reader in the years prior. During Brooklyn's term as Assessment Coordinator, our conversations during timed writing readings helped me refine my thoughts on what students were producing under

those conditions. And, ever since Dr. Neider took on the position, we have had quite a few conversations on the value of improving the systematization of writing assessment.

I also owe a large thank you to the English Department and Writing Program at WSU. I wanted my research to stay local and to contribute to conversations about writing and assessment here because of both departments' engagement with the student experience at WSU. I have gotten the opportunity to work with students from a wide variety of majors and teach courses ranging from the first to the final semesters students were enrolled here (occasionally getting the same individuals on both ends of the spectrum). Much of that experience has contributed to my own domain knowledge for reading and understanding the work produced here, and it drove my interest in understanding how the general education curriculum contributes to epistemological change overall.

And, I need to thank my wife, Nadia, and my family for putting up with a Missing Matt for the last few years. Despite all of the time spent with this data and the apparatus supporting it, I've received nothing but support in the process, even when the only dinner-time conversation I could contribute was an analysis of the epistemological moves someone had just made.

And, a big thank you to the testers and coders who helped me process all of this data (in no particular order): Lucy Johnson, Lacy Hope, Richard Snyder, Elijah Coleman, Kate Watts, Matt Homer, Drew Roberts, Mark Triana, Kara Falknor, Miriam Fernandez, Cynthia Zavala, Jordan Engelke, Kevin Parra, and Alexia Skoulikari. We coded over 30,000 statements and there are still a few left over. And, thank you to Bryan Barrows, who helped get the coding program into a format that others could use. I absolutely could not have done this without you all!

JOHNNY CAN WRITE: IDENTIFYING THE EPISTEMOLOGICAL LANGUAGE OF UNDERGRADUATE WRITERS

Abstract

by Matthew Jay Frye, Ph.D.
Washington State University
May 2017

Chair: Patricia Ericsson

This dissertation examines the epistemological moves made by Washington State University undergraduates in their general education course writing and during two impromptu writing assessment exams administered by the WSU writing program. It builds from previous interview-based research on epistemological change (e. g. Perry, 1998; Baxter Magolda & King, 2012), applying the framework of conceptual change theory to the changes in knowledge use undergraduates demonstrate in their writing. To mark knowledge use and measure change, a coding schema was developed based on the researcher's experience with undergraduate writing, on Marcia Baxter Magolda's theory of self-authorship and Nigel Harwood's research on the functions of academic citations. Coders – themselves composition instructors and expert readers of student writing – were recruited to process over 600 pieces of student writing, yielding over 31,000 coded statements. This study found that in the first two years of the undergraduate experience, epistemological growth occurs in limited ways. While the broader sources of knowledge (e.g. the self, external authorities, internalized knowledge) preferred upon entering college seem to also be the preferred sources in the junior year, subtle qualitative changes can be observed in the authority students demonstrate over that knowledge, such that external authorities or internalized knowledge are used to extend larger arguments, rather than simply demonstrate that a piece of knowledge exists.

Keywords: conceptual change, undergraduate writing, epistemology

TABLE OF CONTENTS

ACKNOWLEDGEMENT.....	iii
ABSTRACT	v
LIST OF FIGURES.....	x
LIST OF TABLES.....	xi
CHAPTER 1: JOHNNY CAN THINK: EXAMINING EPISTEMOLOGY AND EVIDENCE USE IN UNDERGRADUATE WRITING.....	1
INTRODUCTION.....	1
THEORETICAL FOUNDATION	4
<i>Jean Piaget’s Cognitive Development Model.....</i>	<i>4</i>
<i>Conceptual Change Theory.....</i>	<i>10</i>
<i>Perry and Muis et al.: Domain-Generality vs. Domain-Specificity.....</i>	<i>13</i>
THEORETICAL FRAMEWORK	16
<i>Stephen Toulmin’s Structure of Practical Arguments</i>	<i>17</i>
<i>Harwood’s Functions of Citations</i>	<i>20</i>
<i>Marvia Baxter Magolda’s Theory of Self-Authorship: An Improvement on Perry’s Scheme.....</i>	<i>21</i>
<i>Theoretical Takeaways and Resulting Assumptions.....</i>	<i>24</i>
AND WHY SHOULD WE CARE?	24
A MINOR CONCLUSION AND LOOK AHEAD	27
CHAPTER 2: LIKE THAT ONE, ONLY DIFFERENT: JUSTIFYING A NEW TAKE ON AN OLD RESEARCH METHOD	31
METHODOLOGY.....	31
CONTEXT AND PARTICIPANTS	31
<i>Student Writing: Thousands of Pages of Honest Thought.....</i>	<i>32</i>

<i>Participant Demographics</i>	33
<i>Instrument and Coding</i>	40
ANALYSIS	68
CODES AND CONNECTION TO RESEARCH QUESTIONS	69
CAN AN INDIVIDUAL’S EPISTEMOLOGICAL CHANGE BE OBSERVED IN THE WRITING PRODUCED DURING THE NORMAL PROCESS OF THE COLLEGE EXPERIENCE?	69
DO THE CHANGES SUPPORT CLAIMS THAT COLLEGE STUDENTS COME TO THINK OF KNOWLEDGE AS CONSTRUCTED AND RELATIVE RATHER THAN ABSOLUTE AND INDEPENDENT FROM THE KNOWER?	69
FINALLY, TO WHAT DEGREE CAN THESE CHANGES BE IDENTIFIED, TRACKED AND MEASURED?	69
CHAPTER 3: REPRESENTING THE NORM? AGGREGATE DATA ON STUDENT WRITING	
CHARACTERISTICS	71
INTRODUCTION	71
OVERVIEW OF GENERAL FINDINGS	72
PAIRED DATA	75
PLACEMENT EXAM AND JUNIOR WRITING PORTFOLIO IMPROMPTU WRITING PAIRS: STUDENTS WHO RECEIVED SAME PROMPT	76
DISCIPLINARY EPISTEMOLOGIES	77
CONCLUSION: WHAT SHOULD WE EXPECT?	79
CHAPTER 4: MEETING EXPECTATIONS: EXAMINING THE DETAILS OF INDIVIDUAL WRITING	
.....	80
INTRODUCTION	80
GROWTH ACROSS THE BOARD	80
GROWTH BY DOCUMENTS PRODUCED	82
TOP LENGTH QUINTILE.....	83

<i>Growth at the Bookends</i>	85
<i>Domain Authority in Coursework</i>	92
<i>Growth in Impromptu Writing, Display of Authority in Coursework</i>	100
MIDDLE LENGTH QUINTILE	100
<i>Epistemological Stability and Disciplinary Amateurs</i>	101
<i>What Does This Tell Us?</i>	107
BOTTOM LENGTH QUINTILE	108
<i>A Convenience Sample of Convenience Samples?</i>	108
<i>Authority and Domain Identity?</i>	115
IS THERE GROWTH?	117
QUALITIES OF EVIDENCE USED	118
A CONCLUSION	119
CHAPTER 5: WHAT DO I DO ON MONDAY?: APPLICATIONS AND IMPLICATIONS OF THE DATA	122
INTRODUCTION	122
AN IMPLICATION FOR PEDAGOGY: WE OUGHT PROMOTE EPISTEMOLOGICAL AWARENESS	122
PEDAGOGICAL APPLICATIONS: MARKING THE WAY	124
ADMINISTRATIVE IMPLICATIONS AND APPLICATION: GENERAL EDUCATION AS TOURISM	127
CHAPTER 6 UNEXPECTED EXPECTATIONS: CONCLUDING THOUGHTS ON A PROJECT THAT EVOLVED WITH EVERY DATA POINT	132
INTRODUCTION; OR, “WHITHER DUMPTRUCK?”	132
BIG CONCLUSIONS	133
GROWTH: IT’S PART OF THE PROCESS	133
IMPLICATIONS: PEDAGOGICAL	135
IMPLICATIONS: ADMINISTRATIVE	136

CONTRIBUTION TO WID/WAC SCHOLARSHIP	138
FUTURE WORK.....	139
LIMITATIONS.....	139
EXPANSION	140
APPENDIX A: INDIVIDUAL STUDENT EVIDENCE USE	142
TOP QUINTILE.....	142
MIDDLE QUINTILE.....	157
BOTTOM QUINTILE	172
APPENDIX B: STUDENTS RECEIVING THE SAME PROMPT FOR PLACEMENT AND JUNIOR	
TIMED WRITINGS.....	180
REFERENCES	184

LIST OF FIGURES

Figure 1: Brief Outline of Toulmin Framework.....	19
Figure 2: Screenshot of the Coder program, Claim/Other Codes	41
Figure 3: Screenshot of Coder Program, Evidence with Citation Codes	41
Figure 4: Screenshot of Coder Program, Evidence without Citation Codes	42
Figure 5: Sample of Author-Commented Work	126

LIST OF TABLES

Table 1: Artifact Completion by Academic Career Length	35
Table 2: Comparison of Placement Examination Results, This Data Set vs. All WSU 2006-2012..	36
Table 3: Comparison of Junior Writing Portfolio Results, This Data Set vs. All WSU 2009-2015	37
Table 4: Population by College	39
Table 5: Harwood's Citation Functions (2010, p. 305)	50
Table 6: Average t-Units per Document	73
Table 7: Overall Average Number of Statements by Type.....	75
Table 8: Populations by Major Domain Type	78
Table 9: Proportions of Statement Types from Placement to Junior Exam.....	81
Table 10: Students in Top Quintile of Coded Units.....	85
Table 11: Students in the Middle Quintile of Coded Units	101
Table 12: Students in the Bottom Quintile of Coded Units.....	108

Chapter 1:

Johnny Can Think: Examining Epistemology and Evidence Use in Undergraduate Writing

Dumptruck: i think I'm gunna respeck to all frost

Keerah: why's that? just asking . . .

Dumptruck: cuz i feel it better to be 100 percent something cuz the stats are way better

Keerah: what statz are better?

Dumptruck: 100 percent crit increase

Keerah: ah. how are you figuring out all this stuff?

Dumptruck: WoWhead stat thing

Keerah: did you look it up?

Dumptruck: and i was inspecting other mages in org [Orgrimmar, an in-game city]

Keerah: WoW – how did looking at other mages help you figure that out?

Keerah: it's awesome – you gotta tell me!

Dumptruck: the talent thing when u inspect

Keerah: yeah - and it told you what?

Dumptruck: there pvp and talent and gear bracket

Dumptruck: the talent tree they chose

Keerah: but that just tells you what they have, how did you know it was good?

Dumptruck: u read what the talent gives them

Keerah: and some of the ones you inspected had the features you wanted?

Dumptruck: like if u spend 1 talent of a 5 talent move it only 1/5 as good as spending all 5 in it

Keerah: but how do you know it's a good place to spend all five?

Keerah: (have 4 points to spend right now because I can't decide)

Dumptruck: on WoWhead there a talent tree to spend talents so u don't waste yours and have to pay g's [gold, the in-game currency]

Dumptruck: and it free

Keerah: is it like a model that you can play with then?

Dumptruck: yup

Dumptruck: i wouldn't survive without WoW head

Keerah: how the heck did you find that - all i've used is the worldofwarcraft.com site

Dumptruck: we talked about it in class and with KJ [pseudonym]

Dumptruck: WoWhead is my lil baby

*Conversation between World of Warcraft
players (Steinkuebler & King, 2009, p. 52)*

Introduction

The opening vignette of this chapter could easily have been one of a thousand other examples that led to this dissertation – an excerpt from the student writing that I will discuss in later chapters, an account of casual comparisons of musical albums between friends, descriptions of heated arguments regarding austerity movements from family get-togethers, or my own inner dialogue every time I decide what toothpaste to buy. What's important is the fact that an argument is

made and supported in some way, though this support may not always appear in with a citation or some other warrant (Toulmin, 1958). I chose this exchange in particular for several reasons. First, the subject matter is less politically and emotionally charged than some of my alternatives, and I'd like to start this on a light note. Second, although I look particularly at undergraduate writing in this dissertation, anyone supporting a claim or argument must make the same rhetorical choices as the students whose writing I examine.

For instance, in the example above, Dumptruck explains his desire to “respeck [sic]” (re-specialize) his character to be more like other, more successful characters he has observed. Keerah (played by a researcher in Steinkuehler’s study) asks “how [he is] figuring out all this stuff,” essentially asking him to support the decision to change his playing experience in a fundamental way, a decision based so far on only a promise of better performance. Dumptruck’s response is to pull from two sources of knowledge: initially, he inspected more advanced characters of his adventuring class, relying on demonstrations from what he perceives as more expert others (cf. Bandura, 1971); and secondly, he tests possible decisions with an online tool designed for the game.¹ While this example is used to support Steinkuehler's argument that games like *World of Warcraft* produce “scientific habits of mind” (Steinkuehler & King, 2009), it also shows an individual relying on three types of evidence to support his reasoning: (1) experts’ prior decisions, (2) a proxy tool for actually advancing his character along a particular route, and (3) an appeal to the value of in-game currency versus the time spent playing the game along a different track of choices, as he could easily have

¹ Steinkuehler and other researchers produced several studies using online role-playing games to examine whether such games produced “scientific habits of mind” (Steinkuehler & King, 2009; Steinkuehler & Duncan, 2008; Simkins & Steinkuehler, 2008). In 2009, *WoWHead* was one of many tools that allowed players to examine the effects of various choices they could make in their characters’ development, and at the time, such tools were not advertised widely through the game itself. (Contemporary *World of Warcraft* is a very different game, and it now includes many of these tools within the game client itself.) Instead, players would discover them through word of mouth, as others explained why a particular specialization or choice was better than an alternative, citing *WoWHead* and other tools as proxies of empirical support.

spent massive amounts of currency simply testing different skill combinations through trial and error.

Ultimately, the form of Dumptruck's argument to Keerah is the focus of this dissertation, not the content. The types of evidence writers use to support their claims provide insight into what the writer believes is good evidence (e.g. Dumptruck "feels" it's better to maximize one area of performance for a single statistic gain) and what the writer believes his/her audience believes is good evidence (e.g. Dumptruck names the *WoWHead* tool as his reference, while expert others are only named as "other mages in org;" note that by this time, many such tools were available to players, but *WoWHead* was regarded as the best). This is particularly important for those writers gaining entry and legitimacy in a new discourse community (see Gee, 1999; Lave & Wenger, 1991). This dissertation assumes that changes in the types of evidence used to support arguments indicate not only an individual's growing legitimacy in a particular community (Lave & Wenger, 1991), but also changes in the individual's personal epistemology (cf. Muis et al., 2012; Baxter Magolda & King, 2012; Perry, 1998).

Rather than attempt to trace cause and effect in an individual's personal epistemology, my primary purpose is to chart changes demonstrated in writing over time. Although Dumptruck clearly values both the guidance of expert others and the data from *WoWHead* when deciding what action to take, it is impossible to say whether he valued expert guidance and proxy manipulation prior to playing *World of Warcraft*, or whether his earlier inclinations would have placed the greatest value on direct observation (i.e. spending in-game currency to continually respecialize his character and test out new skill combinations). Likewise, a student's earliest writing at a university may consistently favor the words of perceived experts—via citations and direct reference to individuals the writer trusts—as evidence for claims, while a dissertation may favor the individual's own logical proofs or

empirical data. Without further questioning of individual students, it is not possible to claim that a program of study changed the individual's personal epistemology, though large enough numbers may suggest that students become more comfortable displaying a given epistemology in some setting.² This dissertation examines student writing, attempting to do that charting by examining the ways evidence is used by individual students over the first few years in college.

Theoretical Foundation

Personal epistemology research is not new. Many prominent researchers in the field and fields adjacent to it identify Thomas Kuhn's 1962 *The Structure of Scientific Revolutions* (1970) as a recent starting point for studying shifts in epistemology (cf. Perry, 1998; Vosniadou & Brewer, 1992), while others point to the work of Jean Piaget as grounds for studying epistemological change along common trajectories (cf. Vosniadou & Brewer, 1987; see also Hofer & Pintrich, 1997). The field of conceptual change research – largely initiated by Strike, Posner, Hewson and Gerzog (1982) – has combined the two strands to better understand the mental processes experienced by learners as they cope with new knowledge and develop more sophisticated understandings of various phenomena.

Jean Piaget's Cognitive Development Model

Piaget spent much of the twentieth century creating a model of cognitive development, which seeks to explain many of the cognitive shifts individuals undergo from infancy through early adulthood. Each major stage contains smaller steps describing an individual's shifts from one mode of thought to another. This study is concerned with the final, major stage proposed by cognitive psychologists shortly after his death: a post-formal-operational "stage," largely assumed to occur

² Kłaczynski and Lavalée (2005) and Muis, Bendixen and Haerle (2006) discuss domain specific epistemologies, which expand the notion of personal epistemology from a general intellectual foundation to one dependent upon particular fields: an individual may have positivist beliefs about knowledge in the sciences (such that there are certain physical truths to the universe that humans only describe through math), while believing that knowledge in history or art is socially constructed (believing, for instance, that history is "written by the victors"). Students may demonstrate this by performing different epistemologies for courses in different disciplines.

during the late teens and early twenties. Advocates of this “stage” tend to work from an assumption that there is no developmental endpoint for humans (Commons, Richards & Armon, 1984). Because a developmental framework implies a common endpoint, particularly in the sense that development is described as a journey or a building towards something, much of the research following a suggestion of a post–formal-operations stage (or range of stages) built from other models of reasoning, such as dialectical models (Basseches, 1984) or Systems Theory (Koplowitz, 1984). Perry’s work (1998) presaged this conversation, suggesting the metaphor of “growth” to indicate that any movement between stages (whether we might call it “up” or “down” a developmental range) is always a move toward greater cognitive complexity and ability (p. 48-51).

Piaget’s model is accretive, and individuals are assumed experience all stages in order. This is largely due to the conceptual models represented by each stage: in order to understand concrete operational mental models (e.g. the pouring of water from a tall, thin glass into a short, wide glass does not change the amount of water), an individual must have sensorimotor conceptual frames (e.g. that glasses can be full of stuff, stuff can be water, and stuff falls out of glasses when they are turned upside down). Changing stages does not require that all prior mental models be abandoned; instead, it merely indicates a capacity to use a different sort of reasoning; indeed, prior models may still be necessary to make sense of the world until an individual has fully accommodated a new conceptual framework (see Vosniadou and Brewer’s [1992] research on mental model development).

In composition research, Rebecca Moore Howard (1999) has described the process of learning academic citation practices along a similar path: student writers can summarize and paraphrase (otherwise, the classic “What I Did on Summer Vacation” assignment would be far too daunting for the first day back at school), indicating an existing conceptual model for that mode of writing. However, student writers might lack a conceptual model for a complex subject, such that

the known genre of summary is not enough to write about it effectively, and they may resort “patchwriting” (Howard, 1999, p. 7-14), wherein the conceptual model for summary allows the writer to discuss the major ideas of a work while s/he attempts, initially with much difficulty, to describe the subject while correctly placing markers like quotation marks and parenthetical citations. Over time, summaries and direct quotes are correctly cordoned off with quotation marks (as I did with Howard’s special term “patchwriting” above), while ideas primarily from the writer and primarily from other sources are likewise identified by parenthetical citations, footnotes or other reference markers. At no point is the ability to summarize lost, nor is it wholly subsumed by the new model of academic summary writing. Instead, summary provides support for a more complex model of academic summary, which will in turn grant access to other, even more complex, writing models.

In the Piagetian framework, the process of learning falls into two categories: assimilation and accommodation of new information. Assimilation is primarily accretive – new information is internalized according to an existing mental model. diSessa calls these bits of new information as phenomenological primitives, or *p-prims* (1993, p. 111-117) and describes them as

...*phenomenological* in the sense that they often originate in nearly superficial interpretations of experienced reality. They are also phenomenological in the sense that, once established, p-prims constitute a rich vocabulary through which people remember and interpret their experience. They are ready schemata in terms of which one sees and explains the world. There are also two senses of primitiveness involved. P-prims are often self-explanatory and are used as if they needed no justification. But also, *primitive* is meant to imply that these objects are primitive elements of cognitive mechanism-nearly minimal memory elements, evoked as a whole, and they are perhaps as atomic and isolated a mental structure as one can find. (p. 112, italics in original)

In composition, these structures are difficult for a learner to observe without immediate feedback of some kind to identify them. Proofreading tools like Microsoft Word’s Spelling and Grammar check provides a low-level version of this feedback by providing responses in the form of colored underlining for words and phrases that are incorrect or inelegant. Over time, I believe it is

possible to examine something like p-prims in concepts as complex as evidence use: as students develop the rhetorical skill to better match evidence to claims for particular audiences and associate such successful matching with preferred responses, readers should observe greater proportions of evidence matching the epistemology of a discipline, instructor or task.³

Over time, an individual may encounter enough new information and experience to necessitate a major change to the conceptual framework the ideas fit into, what Piaget called accommodation. Similar to Kuhn's idea of a paradigm shift (1970, p. 52-57) for entire fields of thought, accommodation is the creation of an entirely new framework to make sense of information. Piagetian accommodation may not be as earth-shaking to the external observer as Einstein's theory of General Relativity, but it is quite a major event for the individual. Vosniadou's research (Vosniadou & Brewer, 1992; Vosniadou, Vamvakoussi & Skopeliti, 2007) observed accommodation in children when a child at first conceptualized the earth as flat and described gravity merely as objects falling (concepts stemming from everyday observation) and later conceptualized the earth as round and gravity always "pulling" towards the center as an explanation for two new pieces of knowledge that conflicted with the prior model: (a) the apparent movement of celestial bodies and (b) people in China not falling off the earth into space (2007, p. 5, 9-10). In composition, we might see accommodation occur in styles of evidence use, from the merely mechanical insertion of data to a more nuanced discussion of how that data contributes to a larger argumentative structure. As noted earlier, Howard (1999) discusses the assimilative acts of "patchwriting," unintentional

³ This does assume that instructors are more persuaded by claims matching their own epistemologies for a given domain. While some may claim that a college instructor should be less subjective, I would note that the ethos of a discipline is very closely related to its epistemology, such that violating one necessarily violates the other. See Foucault's discussion of a discipline as an epistemological frame for making sense of the world in *The Archaeology of Knowledge* (1972, p. 40-43 especially).

plagiarism, and clunky use of sources as part of the learning process, implying that the disappearance of these moves may indicate accommodation of a more robust mental model of the subject matter.

However, it is possible that new information may conflict too much with an existing mental model to truly be assimilated, but it may not conflict enough (or it may not be intelligible enough) to require accommodation. In this case, the new information may be quickly forgotten, as it has no framework in which to fit (e.g. students not adhering to research-writing conventions when learning them for the first time are bemoaned as simply ignoring citation rules [Howard, 1999]).

Alternatively, new information may be assimilated whole cloth without interacting with its related mental model. Vosniadou, Vamvakoussi and Skopeliti's study found that children in Piaget's preoperational stage have difficulty conceptualizing that they live on a spherical planet even after being told that is the case (Vosniadou et al., 2007, p. 6-8). Some children, unable to accommodate this new information, assimilated the notion of a spherical earth into their own mental models by positing two earths: "a flat one on which people live [the existing mental model] and a spherical one which is up in the sky and which is a planet [what they had been told was true]" (p. 7). Similarly, a composition teacher may encounter students who adopt a model of writing specific to an assignment, particularly when it has been taught explicitly for that assignment, but later are unable to apply those lessons to different assignments (cf. Hassel & Giordano, 2009). In evidence use, we may observe this in writing that relies heavily on direct quotes from external sources, regardless of their academic pedigree. In this case, the student knows s/he must quote *something* in research, but s/he may not have a conceptual model for determining the most rhetorically appropriate source to use, providing writers like Mark Bauerlein (2008) and Nicholas Carr (2008) a platform for claiming that student writing is worsening as a result of easily available information on the internet.

Piaget's model describes the common conceptual frameworks for different stages in an individual's life, but it provides few mechanisms or events to cause the shifts between stages beyond the observation or experience of phenomena not explainable by a conceptual frame – in other words, a teenager may not have achieved the formal operations stage merely because s/he has not experienced events that require accommodation. As a result, we cannot judge an individual as more or less advanced than s/he “should” be.⁴ Despite this fact, Piaget's and other developmental frameworks quickly lost favor in the composition studies field when teachers and administrators used the model as a guide for categorizing the mental capacities of students (Rose, 1988). While Mike Rose was an early fan of using cognitive science to improve the writing classroom (1983), he would later find fault with individuals untrained in cognitive science and psychology adopting this framework, as the practice would frequently lead to describing a student as “stuck” in a lower stage, and as a result of this “stuck”-ness, students would be tracked into remedial courses and programs with less perceived cognitive demand.

The error in that type of categorization lies in a misunderstanding of what it means to move between stages. Just as I have not relinquished my sensorimotor conceptual frameworks, neither would adult learners relinquish other conceptual frameworks. Rather, a Piagetian stage indicates a potential for a particular type of reasoning. Individuals capable of abstract reasoning might only perform concrete reasoning for the same reasons that contemporary engineers may opt for a Newtownian, rather than Einsteinian, conceptual framework of physics to solve a problem: the “less advanced” understanding might perform the task just fine without introducing unnecessary complexity (i.e. its use produces no Dissatisfaction, to use the language of Posner et al. [1982]).

⁴ It is worth noting here the tie to Perry's (1998) defense of the term “growth” in his model, almost predicting Rose's (1988) concerns.

Piaget's death stalled continued development of his model. Although other scholars attempted to continue his work in developing this stage (cf. Commons, Richards & Armon, 1984), conceptual change scholars like Paul Pintrich, Stella Vosniadou and Michelene Chi, as well as personal epistemology researchers like Marcia Baxter Magolda, Barbara Hofer and Mary Field Belenky, have applied Piaget's work to specific domains or facets of life, rather than viewing them as all-encompassing conceptual frames.

Piaget and Composition

While Piaget's framework is not commonly applied to college composition classrooms, largely due to the objections of Mike Rose (1988), it does raise questions about changes in evidence use. In an individual course, we may view content acquisition as an accretive process similar to assimilation. The student's task in this case is to make new information fit with his/her current conceptual framework. However, Howard (1999) identifies the tension between acquiring knowledge and writing about it. She suggests that "patchwriting" may be the result of an individual attempting to create a more robust conceptual framework surrounding a concept – as a writer grapples with a new or unfamiliar idea, summaries of that idea may incorporate large portions of text directly from research sources. When an individual's conceptual framework has shifted or been revised enough to allow for more fluid integration of the idea, we might be seeing signs of accommodation. At this point, we might turn to Posner et al.'s (1982) approach to conceptual change theory to better explain the mechanics of the transition.

Conceptual Change Theory

Following Thomas Kuhn's *Structure of Scientific Revolutions* (1970), researchers like Posner et al. (1982) have used the notion of "dissatisfaction" (p. 214) as the starting point for learning. Much as scientists at various stages in history have been dissatisfied with then-current theories when

examining new or unusual phenomena, conceptual change scholars following Posner et al. (1982) have sought to understand the conceptual models individuals have of different phenomena and the catalysts for creating enough dissatisfaction to drive them to a new understanding. Posner et al. (1982, p. 214) use a four-stage model to describe the conceptual change process, which could be applied to writing and rhetoric as follows:

1. Dissatisfaction with current model: An individual's current conceptual understanding of a subject or phenomena no longer adequately explains his or her observations. Stella Vosniadou (Vosniadou, Vamvakoussi & Skopeliti, 2007) uses the example of children realizing coming to realize that numbers are more than just counting numbers – there are infinitely many numbers between any two integers, and numbers may be represented in a variety of ways (e.g. 1.5, $1\frac{1}{2}$, $\frac{3}{2}$). In writing, dissatisfaction can be observed when students grapple when previous lessons and practices no longer work as they once had. Fanetti et al. (2010) identify the five-paragraph essay format as a conceptual framework for writing that functions well in high school and standardized test settings, but fails to elicit the same praise in college settings, potentially creating dissatisfaction in writers who have no other model for writing.
2. Intelligibility of an alternative model: Once dissatisfied, an individual must encounter or create an alternative conceptual framework that is intelligible. In terms of Piaget's development model, the individual must be sufficiently advanced within a current stage or substage before s/he can move on to the next. The same student above becoming dissatisfied with the five-paragraph model would hopefully encounter other rhetorical models not bound to length, such as the Toulmin model discussed later in this chapter.

3. Plausibility of an alternative model: If an alternative model can be understood, it must also be viewed as a possible alternative. In Posner et al.'s (1982) explanation, plausibility implies that a new framework or theory must show the possibility of explaining the phenomena or solving the problem that caused dissatisfaction in the first place. A student in a college writing classroom may be dissatisfied with the five-paragraph method, but s/he must also believe that adopting Toulmin's or any other framework can solve his/her current problem before conceptual change can occur. If no suitable alternative is plausible (e.g. building an essay of an indeterminate number of paragraphs from a series of questions or rhetorical concerns), the student will return to the unsatisfactory but functional model (e.g. writing a paragraph in response to each question or rhetorical concern posed by an assignment prompt).
4. Fruitfulness of an alternative model: The final condition for conceptual change is that the alternative model must yield benefits upon its adoption. A writing student may understand Toulmin's framework and might see benefits in adopting it, but if the student's writing sees no benefits after adopting it (perhaps the student continues to receive unsatisfactory grades), conceptual change is unlikely.

This common model of conceptual change has been used in composition contexts (Hennessey, 2003), so it is assumed to be a safe lens to use in examining student writing. Additionally, it resolves concerns of a post-formal operations stage by creating an avenue for continually refining conceptual frameworks of phenomena, particularly as two individuals may be equally capable of abstract, propositional reasoning while holding wildly different conceptions of valid evidence of the nature of the universe or of the attributes of "good" writing. In simpler terms,

this framework helps explain the different but similarly valid approaches a Biology student and a History student may take when composing in their respective disciplines.

This model is particularly helpful in understanding the structural changes undergraduates display in their writing over time through the descriptors that may be applied to different styles of reasoning or support. Although it is not possible to observe an individual's psyche via writing,⁵ it is possible to identify particular moves made by the writer and track changes in those moves over time and by audience and task. Conceptual models of writing can be inferred from the structures students use most often, with conceptual change evidenced by deviations from common structures. For example, a first-year student consistently relying on personal experiences and common knowledge who eventually changes to consistently rely on laboratory observations and scientific theories of phenomena has likely experienced some conceptual change regarding the types of knowledge most appropriate for arguments or writing assignments. Whether that change is domain-general (e.g. the student only believes evidence gathered through the scientific method, regardless of topic) or domain-specific (e.g. the student only trusts arguments generated by the scientific method in Biology and Chemistry, but still considers personal experience valid elsewhere) requires another branch of epistemology.

Perry and Muis et al.: Domain-Generality vs. Domain-Specificity

Although student personal epistemologies and conceptual frameworks may change in predictable ways in response to different experiences, there is dissent in regards to what extent epistemologies are domain-general or domain-specific. Many early studies of epistemological change largely assumed domain-generality. For example, Perry's study of Harvard men in the 1960s (1998)

⁵ Were it possible, this dissertation would have been completed much more quickly, if the impetus driving its study even existed.

was built around interviews conducted at the end of each academic year, asking each subject how he⁶ felt about knowledge and learning. Perry assumed that each of nine major “stances” an individual could demonstrate were largely indicative of his or her personal epistemology. Variations in stances were attributed to uncertainty or not yet full commitment to that stance. For instance, a subject might indicate that knowable truths exist in the universe and are discoverable by experts (a common ground in positivist epistemology, called “dualism” in Perry’s work). However, that same subject might mention concerns over the expert’s role in describing that truth: is the description influenced by the expert’s own conceptual schema (cf. Lather, 1993), or do we only grant “expert” status to those able to describe knowledge without any bias (cf. Carnap, 1970)?

Perry’s framework is domain-general, as it assumes that beliefs about knowledge are generally monolithic. In this type of model, the dualist subject described above would believe that truths were discovered and described by experts in all fields: a physicist describes the interactions of dark energy, a historian describes the battle of Waterloo, and a literary scholar describes reification of patriarchal power systems in *The Hunger Games*. Although domain-general is not regarded as an invalid framework of personal epistemologies, it has been criticized as too simple a view of human understanding (Muis, Bendixen & Haerle, 2006). Proponents of domain-specificity point to the role of expertise and belief structures in views of domain knowledge, such as the familiar claim of students that math and science are “fact based,” while literature and art are largely matters of interpretation or opinion.

⁶ While this pronoun does limit the generalizability of Perry’s study significantly, it is important to note that his was the first large-scale examination of college students’ ways of knowing. Concerns of gender, class, race and other demographic bias in his sample would lead to many other, similar studies, such as Belenky et al.’s examination of women’s ways of knowing (1986). See Hofer and Pintrich’s comprehensive literature review (1997) for additional history.

Muis, Bendixen and Haerle's review of current studies in domain-general/-specificity among students (2006) notes that the reality (and the agreement among most scholars) is somewhere in the middle (p. 4-5). They discuss an approach to personal epistemology in which a domain-general epistemology prevails except when an individual's domain expertise may supersede it. For example, many students of rhetoric are taught to believe that knowledge is socially constructed, as Western scholars from Aristotle to Foucault have described the role of discourse and participation in creating, disseminating and controlling knowledge. As a result, we may view the truth⁷ of the birth of the universe as culturally constructed: the truth of the Big Bang may depend on the individual's understanding of metaphor (was that the point at which God separated light from dark?) and empirical astrophysics (Hubble's math and later Arno Penzias' and Robert Wilson's experimental data explaining the "cosmic microwave background," supporting the estimate that the universe is roughly 14 billion years old and still expanding [Ananthaswamy, 2010, p. 85]). However, gaining substantial domain expertise in astrophysics may lead us to believe that the Truth of the birth of the universe is not culturally constructed: the fact is that some cosmic microwave background noise exists in a specific region of observable space, and its existence is consistent with models and observations indicating the universe's age and mode of formation.

Domain Specificity in College Student Writing

Although this study cannot tease out the truth of each subject's personal epistemology through the writing it examines, this final strand of cognitive and epistemological development

⁷ Please note the explicit choice of capitalization in this paragraph.

scholarship is useful in understanding the notion of writing for the particular professor or class.⁸

Student 79, in the Junior Writing Portfolio timed writing, writes the following:

Every class in writing since [high school] has been an exercise in honing my procrastination skills. The lab write-ups in Physics 201 and 202 are included in that category as were my extremely mediocre papers in English 101, which I admit, I am not proud of. (Student 79, Junior Timed Writing, Reflection)

The “extremely mediocre” English 101 papers that Student 79 refers to were composed for my class, and I praised them highly because they performed a particular kind of writing knowledge at that moment. In other writing collected for this study, Student 79 demonstrated very thorough understandings of subject matter and provided self-aware commentary in advanced lab reports for electrical engineering courses. In English 101 writing and impromptu essays, the subject relied heavily on domain knowledge, personal values, and syllogistic reasoning. In Electrical Engineering writing, the subject relied instead on domain knowledge and expert references (the latter in the form of disciplinarily acceptable mathematical transformations and formulas). In Muis et al.’s (2006) understanding of the domain-specificity problem, we might note that this individual most highly values his or her internalized domain knowledge above all else (seeing knowledge as evaluated, not constructed, by the knower), but performing an especially self-based epistemology for English via the use of external sources to validate domain knowledge (appropriate for that course) and performing an especially expert-outsider–based epistemology for Electrical Engineering via the use of domain knowledge to justify the use of disciplinarily appropriate formulas and practices.

Theoretical Framework

⁸ Ken Hyland (2004) has likewise provided excellent frameworks for understanding the role of disciplinary expectations in controlling discursive acts. These expectations are discussed in Chapters 4 and 5, but where Hyland’s work allows for an understanding of external constraints on expert discourse, research into domain-specific personal epistemologies helps explain why a novice might choose one form of evidence over another.

From the foundation of scholarship described above, I use the following frameworks to construct my own instrument for coding and understanding student writing. It should be understood that, like any structure built atop a sturdy foundation, this is my approach to better understanding and appreciating the intellectual landscape in which I am immersed. Had this study been conceptualized in another location, at another college or university (or even at a high school or professional office space), Toulmin's notion of the practical argument, Harwood's functions of academic citations, and Baxter Magolda's theory of self-authorship may not have sufficiently explained the moves in the writing I saw around me. Indeed, I still have some dissatisfaction with these theories' explanations of what I observe, but that will be addressed further in Chapter 6.

Stephen Toulmin's Structure of Practical Arguments

Every student in an introduction to philosophy class learns the classic syllogism:

Socrates is a man.
All men are mortal
Therefore, Socrates is mortal.

However, not all writers or speakers construct arguments in the simple fashion of "minor premise, major premise: conclusion" (Toulmin, 1958). Instead, we might see the statement "Socrates (...470/469 – 399 BC) was a classical Greek (Athenian) philosopher credited as one of the founders of Western philosophy" (Wikipedia), implying at the very least the second premise and the conclusion. Toulmin's *The Uses of Argument* (1958) differentiated practical structures from ideal structures in that, despite the common demonstration of syllogisms like the above in discussing argumentative structures, "it has not always been recognized how rare, in practice, arguments having their special characteristics are" (p. 124). In other words: the people who describe the best kinds of arguments tend to operate in a realm separate from the average practitioner.

We can read college students as similar to the average practitioner of argument because (a) they do not write for a professional audience, because (b) their writing is often graded as writing (rather than as a set of ideas), and because (c₁) they are still gaining access to their discipline or (c₂) they are merely performing the disciplinary discourse for general education credit. Their arguments are not refined to the point of exemplars or ideals of the disciplines in which they write. Sometimes, the task is only to demonstrate knowledge of a concept, rather than analyze it or evaluate its worth. Likewise, many academics can remember times that they advanced unique arguments in undergraduate courses, only to discover later that those lines of thought were quite old and well-trodden. Others might make an argument without sufficient backing of some pieces of evidence for the audience to follow. Ultimately, arguments may be made in many ways, in a variety of forms outside the ideal syllogism, and audiences may still understand the conclusions of the rhetor.

Toulmin describes practical arguments as consisting of several parts. At the most basic, arguments are a claim or conclusion and some data or evidence (1958, p. 97-102). An example might be “Let’s not eat Joe’s [claim]. My dad caught conjunctivitis from the French fries [data].” Data might be interrogated based on their validity, so the speaker may elaborate that “Conjunctivitis is spread by looking at people, and the cook looks a lot at the French fries.” This provides a warrant, which is a connection between some datum and a claim or conclusion. An individual may question the warrant further – perhaps by noting that looking at a food will not put conjunctivitis “on” it – resulting in qualifiers that act as backing or qualifiers: “Well, let’s still not eat at Joe’s [claim]. I’m pretty sure [qualifier] my dad got conjunctivitis [data] from the cook’s own highly contagious eye infection [data]. It is well known that conjunctivitis, or ‘pink eye,’ spreads easily [warrant].”

However, it is important to note that the audience helps dictate different functions of the argument. If Joe’s is known for ill health effects on diners, then the first example may be the only

necessary argument against it. Conversely, if Joe's is either not known for causing ill health effects or if the audience understands that conjunctivitis is not spread by merely looking at objects, the audience may question the warrants presented by the speaker. In Toulmin's framework, the structure of a practical argument is as follows:

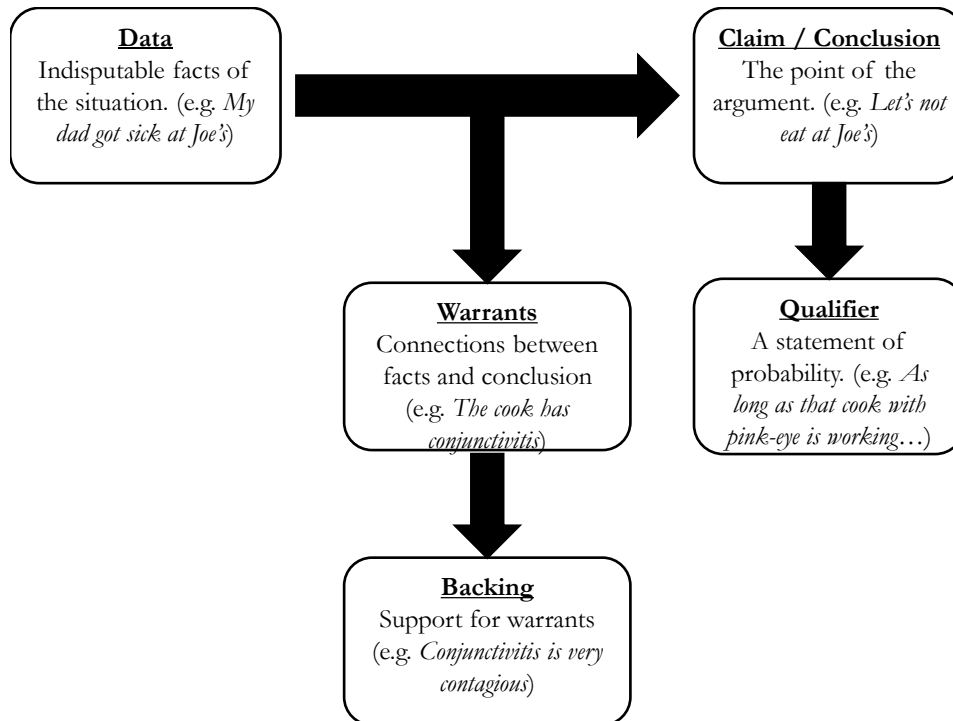


Figure 1: Brief Outline of Toulmin Framework

Warrants and backing are required primarily when the audience is unlikely to believe the data's connection to the conclusion. Backing is required especially when the warrant is questionable. Qualifiers are required when the conclusion is not absolute.

Toulmin, like this study, places greater emphasis on the function of statements rather than their placement within a specified logical structure. Undergraduates enter college with many frameworks for argumentative writing (cf. Fanetti et al., 2010), and they continue to develop other frameworks based upon the disciplines they intend to join (cf. Hyland, 2004). As described more fully in Chapter 2, I simplify writer utterances to Claims, Evidence and Other. Claims are the boxes

furthest right in the figure above, while Evidence is the other two columns of boxes. At times, unskilled writers or writers performing for an academic audience may include statements that perform neither of those functions, typically by declaring that they are answering a particular question or by offering a statement that performs no purpose in particular (e.g. a sarcastic aside).

Harwood's Functions of Citations

Typically, when students are taught to use evidence in their writing, evidence is equated with cited scholarship and external sources of information (cf. Ede, 2014; Clark, 2011; VanderMey, Meyer, Van Rys & Sebranek, 2011) rather than direct experiences and observations of the writer. While evidence can refer to many kinds of support, the word is frequently used equivalently to Aristotle's *inartificial evidence*, things "not furnished by [the writer] but were already in existence" (2012, II.2.). In this study, the inartificial evidence cited by students is classified using a framework developed by Nigel Harwood (2010) to describe citation functions in published academic writing.

Harwood's work comes from interviews with other academics, who described the various purposes behind each of their citations in recently published work. Some functions were more popular in some disciplines than in others, primarily for reasons appropriate to that discourse. For instance, while Sociologists used more citations than Computer Scientists over all (Harwood, 2010, p. 305), a larger portion of their citations were used to signify their or other scholars' positions in regards to an issue ("Position"). Computer Scientists, on the other hand, most frequently used citations to indicate where an argument or analysis was going ("Signposting"). However, the functions of each of these categories were generalizable between disciplines, such that both Computer Scientists and Sociologists could identify a "Position" citation, regardless of its domain.

Details of each code and some discussion of their frequency in the data set are discussed in Chapter 2.

Marcia Baxter Magolda's Theory of Self-Authorship: An Improvement on Perry's Scheme

Baxter Magolda's theory of self-authorship originates in a longitudinal study she began with a group of first-year undergraduates in 1986, who she continued to report on until 2009 (Baxter Magolda & King, 2012; Baxter Magolda, 2002, 1992). Continuing into her special issue of the *ASHE Higher Education Report* with Patricia M. King (2012), Baxter Magolda has developed a framework for the roots of epistemological stances that individuals may demonstrate. Like many researchers in this area, she built from William Perry's 1968 study of Harvard undergraduates (1999).

Perry found that undergraduate stances regarding knowledge fell into the categories of Dualism, Multiplicity, Relativism and Commitment within Relativism.⁹ Briefly, a Dualist stance is largely positivist and authority-driven: dualists tend to view statements as correct or incorrect, particularly as evaluated by some expert figure, and most students entering college tend to be dualists. Multiplicity characterizes the growth out of dualism, when individuals begin to see multiple, competing frameworks for understanding and explaining phenomena as not mutually exclusive. This is the stage in which many of us feel that truth is largely a matter of opinion or power: Richard Nixon's famous statement that "we're all Keynesians now" was not a declaration that Keynes was right about economics, but merely that the policies stemming from his theories were the ones that had taken root in society. Multiplicity is an extension of dualism in the sense that knowledge is still derived from and evaluated by external authority figures.

While relativist (and committed) individuals also feel that there can be multiple truths at work within a given discourse (e.g. that Keynes' economic theories can be correct in large, chaotic structures while Friedman's theories are more applicable in small, heavily structured groups), they

⁹ See Hofer & Pintrich (1997, p. 90-94) for a more detailed, but still succinct, discussion. Perry's work is important enough to warrant a brief description here, but it does not provide much interpretive power to the data collected in this study, beyond that which Baxter Magolda's work provides.

are more willing to commit to a particular theory or argument if it fits its situation well. In this sense, truth is not merely a matter of who has the most power in a given discourse, but that such power is likely to have been gained by the theory or argument with the most utility for the situation at hand (e.g. “we’re all Keynesians” *because* that framework led to massive economic growth between the abandonment of the gold standard and the eventual economic crunch in the late 1960s Nixon was commenting on).

However, as noted earlier, Perry’s work was domain-general and built from a very narrow demographic slice. His work is immensely important as a foundation for understanding not just the epistemology of the undergraduate student (particularly as it differs from the high school student entering college and the college instructor designing coursework for undergraduate students) but also the nature of epistemological change during the undergraduate years. In Perry’s study, most students entered Harvard as dualists, and this is a trait we continue to see today (cf. Fanetti et al., 2010). Mike Rose lamented in the 1980s that the assumed bogeyman was that individuals were entering college unable to ascend to particular developmental stages (1986), while more contemporary arguments are that it’s a loss of creative problem solving in the classroom (Arum & Roksa, 2011) or our test-driven K-12 culture (see Addison & McGee, 2015; Kohn, 1999; see also Meier & Wood, 2004). While the foundation is solid enough that we seem to keep saying the same things about our students, Perry’s work does not provide enough extra explanatory power to discuss student work across domains.

Baxter Magolda built from Perry’s foundation to focus on the source of knowledge and the individual’s method for evaluating it. Baxter Magolda’s theory has three major stances along a continuum (Baxter Magolda, 2002; Baxter Magolda & King, 2012). On one end, the knower trusts knowledge coming from external authority (similar to dualism or multiplicity). On the other end,

knowledge may be self-authored, coming from within the knower via personal values or ethics or via logical reasoning (not directly covered by Perry). And, in the middle of the continuum, knowers encounter the “Crossroads,” where they begin to construct and validate new knowledge, typically by comparing it to other internalized knowledge or personal experience (similar to relativism). These three stances may be summarized as follows:

External Authority: The earth floats in space, because the Bible clearly states that God “hangeeth the earth upon nothing” (Job 26:7, KJV).

Crossroads: The earth floats through space because we can observe the movement of celestial bodies, such as the sun, moon and stars, around us using telescopes. We can describe that movement using Physics.

Self-Authorship: It’s silly to think that the earth isn’t a round object floating in space. If it was flat, the oceans would run over the edge, and we’d be out of water. We still have water, so there can’t be an edge.

As with Harwood’s framework, it is important to note that none of these stances are wrong, nor are any more correct than others. While Baxter Magolda believes her system is developmental – i.e. that most humans will begin in the external authority mode and tend towards self-authorship as they age – that is not to say that self-authorship is necessarily more desirable than an externally oriented epistemology. While Mike Rose (1988) might worry that applying these theories student writing may result in the categorization of some students as more advanced/developed than others, it is important to note that each of these ways of knowing are better matched to some disciplines than to others. Engineers, for example, might internally validate a design as sound or not, but they must ultimately defer to legal codes governing their domain. Likewise, a literature student might rely heavily on Freud’s writings to understand the sexualization of female superheroes, but s/he will likely be expected to explain his/her internal belief of *why* Freud was a better option than another scholar.

Theoretical Takeaways and Resulting Assumptions

Borrowing from these three strands of scholarship in cognitive and epistemological development, this study assumes that (a) epistemological growth, to use Perry's term (1998), occurs as the individual gains more knowledge in any number of domains; (b) an individual's personal epistemology is demonstrable through the ways s/he provides support for arguments; and (c) an individual will perform differently for a specific audience or discipline (cf. Hyland, 2002), e.g. the same student writing a term paper for an economics class or completing a discipline-neutral¹⁰ impromptu writing exam will support his or her arguments with fundamentally different types of evidence.

With these assumptions in mind, this study will examine impromptu writing produced for first-year composition course placement and for mid-career assessment, under the assumption that writers will perform a domain-general or "default" epistemology when writing for an unknown audience. This study will also examine writing produced in first-year composition, as writers are assumed to be performing for a specific type of audience. Finally, this study will examine coursework produced through general-education curricula and early writing in the disciplines courses (typically the first two or three years at this university), as writers are assumed to perform differently for audiences in different disciplines.

And Why Should We Care?

Ultimately, this project addresses the scholarly and political gaps regarding college students' intellectual growth. Whether a 1970s debate over standards and expectations in response to increased enrollments of non-traditional students, 1990s concerns of political correctness in

¹⁰ As discussed in Chapter 2, the impromptu exam prompts are taken from popular academic writing in various disciplines, but they are chosen to require as little specialized knowledge as possible.

university environments or the recent explosion of think-pieces questioning whether “trigger warnings” are a sign of intellectual hospitality or a coddling of infantile adults (AAUP, 2014), few have claimed that the role of a college education – or any education, for that matter – is not to bring about some intellectual change. However, as Richard Miller points out in *As If Learning Mattered* (1998), many of these discussions and debates find their origin in ideology of what education could be rather than empirical data of what the reality supporting education actually is (p. 20-21), arguing towards a desired end rather than from a commonly observed, current problem.

Even smaller issues like writing program decisions at a single university can be led down the path Miller describes (e.g. Anson, 2008). Ought first-year composition be a literature course taught by the English department, so students learn to emulate the best writers; or, should it be an introduction to academic writing, so students learn the skills that will be necessary over the next few years of their education? Should it be diffused through the curriculum, requiring all courses to teach appropriate writing styles for their fields? Should it even be a requirement, as many students now enter college with Advanced Placement or some similar credit, indicating that they’ve demonstrated some competence in college-level work?

Chris Anson’s account of an attack on programs at UNC-Chapel Hill and NSCU (2008) provides a smaller scale picture of the discussions that scholars like Hirsch (1996) and Bauerlein (2008) contribute to. In Anson’s case, a report from the John William Pope Center for Higher Education Policy called for changes to first-year composition, specifically to make it more like a literature and grammar course (akin to high school English courses). Anson describes the report as “seem[ing] to reverse the laws of cause and effect” (p. 12) when it correlates changes in first-year composition with declines in high school student performance on standardized tests; as “a hodgepodge of points” attacking NCTE and CCC statements on grammar instruction; and, as

“relying on familiar myths” to decry pedagogical practices like group work. Much like the other pieces cited above and those discussed by Miller, the Pope Center’s report is hard to argue with: its supporting logic is compelling – of course teachers with “a passion for the written word” (Anson, 2008, p. 12) are preferable to those that lack it – but it doesn’t address the specifics of the UNC-Chapel Hill or NCSU student body. Further, the sentiment is easily attached to the anecdotal evidence¹¹ of anyone who has observed a younger person with writing skills poorly matched to their rhetorical situation. The argument lives in “familiar myths” (p. 13), easy appeals to the ethos of citizens concerned about educational policy, rather than what Aristotle (2012) called *inartificial evidence*: statements, data and observations that exist independent of the work or speech in question (in this case, actual student performance data that would support one first-year composition model above others).

In the following chapters, this dissertation will closely examine the work of actual college students, rather than accounts of what college students produce. Further, it will use a pool of writing produced over several years by each individual, without limiting the lens to one discipline or academic level. It will draw upon writing assignments designed for normal coursework and assessment practices, not prompts contrived for a study on epistemology. In addressing what I see as a scholarly gap – the students themselves, frequently missing from grand claims of whether or not college is working and why – I also hope to address a policy gap, in that *if* growth can be seen occurring in a specific kind of pattern, *then* educational institutions ought to design curricula to take advantage of whatever kairotic moments students are already encountering.

¹¹ Compare this Lunsford and Connors’ (1988) “Ma and Pa Kettle Do Research” or Lunsford and Lunsford’s recent replication (2008).

Evidence gathered from interviews suggests that college students make a common set of personal epistemological changes during their time in higher education. As such, this study attempts to answer the following questions:

1. Can an individual's epistemological change be observed in the writing produced during the normal process of the college experience?
2. And, if so, do the changes observed support claims made by researchers like Marcia Baxter Magolda (1992) and William Perry (1999), claims that college students come to think of knowledge as constructed and relative rather than absolute and independent from the knower?
3. Finally, to what degree can these changes be identified, tracked and measured?

A Minor Conclusion and Look Ahead

While upcoming chapters do examine the rhetoric of thinkers who hope to change higher education curricula or cultures, the focus here is the writing of college students. This dissertation aspires to do many things while avoiding unsavory moves common to this kind of study. First and foremost, it does not intend to judge student work at any level of performance. Precisely zero students featured in this data set did anything less than acceptable work for the situations they were in. At different points, many of these students performed exceptionally well. In no way should this work be read as though Student A is epistemologically underdeveloped or unsophisticated or that Student B is clearly *better* than Student A in some regards. Neither epistemological complexity nor epistemological growth are an explicit goal of post-secondary education¹². In all cases, these students are assumed to be performing exactly what they believe is expected of them in their writing.

¹² More accurately, neither of these concepts are apparent in any mission statements I have run across.

Instead, the intent is to showcase, in an effort to better understand, the complexity of student epistemologies as expressed through writing. In an era when many social commentaries demand that colleges and universities better train students for specific jobs (see, for example, Mike Rowe’s mikerowWORKS Foundation [2017] as compared to Louis Menand’s [2011] reflection on the greater public value of an education), we ought to question whether the students themselves display a propensity towards thinking like experts a particular domain or like something else. We also might question whether that thinking has any effect on the student’s success in their target career field or in their lives in general, but that is beyond the scope of my work here.

Beyond that descriptive investigation, this dissertation also tests a particular framework for reading student writing for either formative or summative assessment. Studies by composition scholars have suggested that composition-knowledge (e.g. grammar, mechanics, general “correctness”) are concentrated most highly in composition-related disciplines on college campuses (cf. Williams, 1981) because that is their domain. Similarly, we would expect Chemistry, History, Business Management, Landscape Architecture and others to have a mastery over their own domains to the extent that they could judge whether an individual was reasoning as an expert in their own fields. Although the coding framework described in Chapter 2 is rather complex, a simplified version is presented in Chapter 5 to provide an avenue for rich feedback on student writing outside traditionally writing-heavy disciplines.

Finally, this dissertation assumes the following of all students represented in its data set as well as all students the author has encountered as a teacher, tutor, friend, acquaintance or copyeditor: every writer writes in an organized, rational¹³ form to advance a defined¹⁴ objective to a

¹³ I am consciously calling on the Aristotelian notion of the rational here: that every element, premise or conclusion exists in some proportional relationship to the other components of the argument.

known¹⁵ audience.¹⁶ Any exemplars or data points using student work should be read with the same gravity as this author referencing Constance Steinkuehler's research on *World of Warcraft* or Baxter Magolda's research on personal epistemology. The author believes that all other writers also assume that any evidence presented performs some function to support an argument – it may be tangential or even ridiculous, but it is presented in earnest.

With those assumptions declared, the rest of the dissertation is as follows:

Chapter 2 describes the methodology of this study, including the technological and theoretical instruments developed to allow for a systematic review of epistemological moves in student writing. Chapter 2 also describes the setting of this study.

Chapter 3 will describe the traits of students and their writing examined in this study. It will also present aggregate data regarding their writing and, where possible, compare that data to the larger WSU population.

Chapter 4 will discuss disaggregated data to discern to what degree students demonstrate epistemological growth during their general education coursework. Preliminary research has suggested that students develop discursive practices appropriate to their disciplines prior to completing the Junior Writing Portfolio, though some of those traits can be identified in students' writing as they enter the university.

¹⁴ I am consciously implying that the student has his or her own objective in the piece composed. This may be anything from "I wish to change the field of [discipline] with the excellence of my work" to "I sure hope I get a good enough to keep my GPA at an acceptable level." But, I do believe the goal is consciously defined.

¹⁵ In reading student writing for various assessments, I always attempt to remain conscious of the "audience invoked" (Ede & Lunsford, 2003) for the writer. In all works examined, students are performing for an academic audience, usually teachers but also administrative assessment officials. It is expected that this audience will affect the student's writing to a significant enough degree that evidence use must be considered in a specific disciplinary context.

¹⁶ Incidentally, the last three footnotes demonstrate Toulmin's "backing" function. Experts in rhetorical and/or composition studies are likely to pick up on key terms (rational, objective, audience) and skip these footnotes, while non-experts would use this extra information to make sense of the claims I'm advancing.

Chapter 5 will expand upon the findings and discussion by presenting pedagogical and administrative approaches to help students work towards their discipline's discourse.

Chapter 6 will offer concluding notes on the study, particularly on the importance of replication and aggregation of statistics describing student development during their undergraduate careers.

Chapter 2:

Like That One, Only Different: Justifying a New Take on an Old Research Method

I'm a happily [claim] married [data] 28-year-old [data] with a beautiful wife and son [data]. My life is good [claim].
But if research is correct [qualifier], I will grow increasingly more dissatisfied with my life over the next 20 years [claim]. Which is terrifying.
The midlife crisis is very real [data, link to source].
Studies [backing] show that people are pretty happy when they're young and when they're older [data]—thank youthful exuberance and not having to work, respectively [warrant/backing]. But between 46 and 55, folks endure peak ennui [data].
That happiness ebbs as one ages is not particularly surprising [claim]. Careers plateau, dreams are deferred and bills increase in quantity and frequency [data].
This U-shaped happiness curve has been the focus of a lot of research [data, link to source] recently...
[The] findings could leave many of my peers in an emotional nadir [claim]: According to data from the Pew Research Center, millennials just aren't terribly interested in the institution of marriage [data]. Only 26% of people aged 18 to 32 were married in 2013—10 points lower than Gen X when they were of a similar age in 1997, and 22 points below boomers' marriage patterns in 1960 [data].
My generation still has a few years before they hit the bottom of the U curve [data]. And perhaps an improving economy will make the prospect of marriage more attractive to those in my cohort [qualifier + claim]. Here's hoping.

Annotated excerpt from Taylor Tepper, "Why Millennials Are in for a Worse Midlife Crisis than their Parents" (Time.com/Money, Apr. 15, 2015)

This chapter will describe the methods used to gather, process and analyze the student writing used in this study. As noted in Chapter 1, this study attempts to identify whether epistemological change can be identified in college student writing, whether that change matches the qualities described by previous research and whether those changes can be accurately tracked and measured between a student's entrance into college and the start of their junior year.

Methodology

Context and Participants

This study was performed at the Pullman campus of Washington State University, a large, land-grant university in the Pacific Northwest. Students at this institution participate in two regular writing assessment processes: a writing placement exam and a mid-career writing assessment. Both use two-hour impromptu writing exams consisting of an analytical task in response to a brief passage

and a reflection regarding the writing just produced. Additionally, students submit three pieces of writing as part of the mid-career assessment. These pieces of writing typically come from the student's general education coursework before entering a major. From the placement exam, students may be required to enroll in a variety of first-year composition (FYC) options. This study limits itself to those placed into mainstream (i.e. not providing additional English language support) FYC.

Student Writing: Thousands of Pages of Honest Thought

This study used a convenience sample of student work. For each of the students represented in the study's collection, the following works were collected.

1. A portfolio of work completed in mainstream FYC. Portfolios in this data set consist of 2-4 revised essays, including at least one research paper, and a cover letter describing the contents of the portfolio. Using the existing archives of FYC portfolios, a list of eligible students was generated to collect the next three items.
2. An impromptu writing placement exam. This work is not revised and is almost never revisited by the student after completion.
3. Three pieces of writing completed as part of the mid-career writing assessment, the "Junior Writing Portfolio." While these pieces do not indicate the individual's revision process or other conversations with his or her audience, they do provide insight into the student's performances for other audiences.
4. A second impromptu writing exam, completed as part of the Junior Writing Portfolio. This exam is a near duplicate of the placement exam.

This sample represents what I prefer to call "honest thought." Interviews, the common method in personal epistemology research, must account for the "guinea pig" effect, wherein a participant performs in response to perceived or believed expectations of the researcher (cf. Lincoln & Guba, 1985, p. 94). The same is assumed true for writing samples taken from participants instructed to write for this study. As such, all writing was collected from collections on campus: no student was aware of this project while s/he was completing any of the works examined (indeed, many of these works were completed prior to the study's earliest conception).

As a result, the work here was produced in earnest. A student writing for a world history assignment is writing as a historian,¹⁷ not as a participant in a study on epistemological change. Although college students may feel as though they write what their professors want to hear, as though they just “regurgitate” lecture notes, or as though they are writing as anyone but themselves, even those performances indicate epistemological depth on the part of the writer. After all, a pure positivist writing as a social constructivist must understand on some level what those epistemologies entail and give some credence to Aristotle’s admonition that the rhetor meet the audience’s ethos if s/he is to be trusted (2012, II.3-4). Similarly, a pure positivist refusing to write from anything but that stance indicates that s/he believes there is only one true route to knowledge, whether or not the audience is aware of it.

Participant Demographics

It is worth examining traits of the students themselves, as well as the objects they produced. Although this study pulled a random sample of student writing, it cannot be simply assumed that these students are representative of the WSU population as a whole. After all, because this sample set was limited to students who produced writing for FYC and did not retrieve their portfolios after the semester was over *and* had completed their Junior Writing Portfolio, there was no meaningful way to control for major, gender, first-generation status, primary language, ethnicity or other factors that may have impacted what students produced. While this much of this information could not be collected in this data set, its potential effects will be discussed in Chapter 4.

¹⁷ Or, as an electrical engineer writing as a world historian. See chapter 4 for some of the more complex epistemological stances demonstrated.

Major local factors like WSU's enrollment increase in Fall 2011¹⁸ or the rearrangement of colleges and academic units in Spring 2012 likewise may have some effect on students in this data. Class sizes in many cases increased with the enrollment boom, and the changes in academic units (eliminating some programs, moving others, and changing General Education requirements) created different learning environments for students who initially enrolled prior to or after these events. As such, within the data set, many students have work from courses that no longer exist or whose replacement versions are significantly different from the originals. For example, General Education 110 and 111 (typically taught by History faculty and graduate students) became History 105 after Spring 2012. While both courses teach historical research methods and general research writing practices, History 105 was redesigned as *Roots of Contemporary Issues*, emphasizing a semester-long research project in which students examined the historical causes or developmental factors of a contemporary issue of their choice, as compared to General Education 110 and 111 which emphasized several shorter research papers, only a few of which on subjects of the student's choice.

However, even considering the changing environment, are the students represented in this study similar in many respects to their peers? We might begin by examining the amount of time it took students in this study to complete the set of work being analyzed.

Academic Year	Terms	Placement to FYC	Placement to JWP Paper	Placement to JWP Timed Writing
First	0	0 (0%)	0 (0%)	0 (0%)
	1	22 (29.3%)	15 (6.2%)	0 (0%)
	2	42 (56%)	23 (9.5%)	0 (0%)
Second	3	1 (1.3%)	5 (2.1%)	1 (1.2%)
	4	8 (10.7%)	37 (15.4%)	4 (4.9%)
	5	0 (0%)	37 (15.4%)	6 (7.4%)
Third	6	1 (1.3%)	4 (1.7%)	3 (3.7%)
	7	0 (0%)	53 (22%)	49 (60.5%)

¹⁸ See WSU's Institutional Research reports at [ir.wsu.edu/Student Data](http://ir.wsu.edu/Student%20Data) (space included in URL)

	8	1 (1.3%)	55 (22.8%)	17 (21%)
Fourth	9	0 (0%)	3 (1.2%)	0 (0%)
	10	0 (0%)	8 (3.3%)	0 (0%)
	11	0 (0%)	1 (0.4%)	1 (1.2%)
* “Terms” refers to the number of semesters elapsed since the Placement Exam. The majority of students take their Placement Exam in the summer prior to their first year, so terms 0, 3, 6, and 9 generally refer to summer semesters. However, there are many exceptions to this rule, so this data is reported only as the amount of time between events.				

Table 1: Artifact Completion by Academic Career Length

The vast majority of students in this data set completed their FYC course in their first year – over 85%.¹⁹ Nearly 80% completed their Junior Writing Portfolio Timed Writing during the Fall of their Junior year, with over 95% completing their packet writing by the Spring of that year. This is a greater compliance rate than WSU’s reported numbers on Junior Writing Portfolio compliance, which has found that roughly 70% of students have completed their Junior Writing Portfolio by the second semester of their Junior year since 2009 (Neider, Frye, Fernandez & Torres, 2016; Frye & Hunsu, 2014), a range which includes every student in this set. Lateness in portfolio compliance has been attributed to factors that are unlikely to apply to the students in this set: transfer students tend to complete each stage of their portfolio one semester later, and students whose first language is not English also tend to complete their portfolios at the end of their Junior year.²⁰

While students in this study tend to complete required components of their undergraduate programs more quickly than the general student population, the few demographic traits observable in their work suggests that they are not significantly outside the performance of non-transfer, native-speaker students. Further, as these students largely took their placement exams two academic years

¹⁹ Unpublished program assessment data for the English department found slightly lower rates of completing FYC within the first year of enrollment. This figure, however, is not so much greater as to suggest that these students are outliers.

²⁰ The portfolio reports assume that the delay is caused or compounded by multiple factors. For transfer students, it’s simply a matter of needing additional time to gather material. As non-native speakers simply complete their portfolios early at a lower rate (prior to Junior year), the numbers for completion in other semesters are inflated. As these groups are not well represented in this sample, I cannot speculate beyond these assumptions.

prior to completing their Junior Writing Portfolio (the amount of time it takes to accumulate the credit hours necessary to engage in that assessment), it is safe to assume that there are few transfer students in the set.²¹

Timed Writing Performance

As noted earlier, the Junior Writing Portfolio uses two measures to assess student writing: an impromptu timed writing examination, consisting of an analytical prompt and a reflection, as well as a packet of writing samples produced in general education coursework. Likewise, students are first placed into FYC courses based on a similar impromptu timed writing examination as incoming first-year students (or upon enrolling as transfer students). Students in this study differ slightly from the larger WSU population in terms of placement. Comparisons for the placement examination come from an unpublished internal memo written for the writing program.²²

Placement Exam	English 100	English 101	English 101 + English 102
This Set (n = 91)	17.6%	63.7%	18.7%
WSU Average 2006-2012	2.5%	71.5%	20.6%

Table 2: Comparison of Placement Examination Results, This Data Set vs. All WSU 2006-2012

Given the full set of students who have both Placement and Junior Portfolio timed writing exams, students in this data set placed directly into FYC at lower rates than the norm and into English 100 at significantly greater rates (a full 16 students in this study). While many of the students in this study took their placement examination in Academic Year 2012 (a year with significantly greater English 100 placements than years before and after, according to the memo), only two of the English 100-placed students were placed that year. Within this set, three students did submit English 101 work in their Junior Portfolios, but thirteen (81% of those placed into English 100) did not.

²¹ Very few students mentioned anything suggesting transfer status in their writing. One explicitly commented on his transfer status in both the placement and Junior Writing Portfolio timed writings, largely because he took them both within a few months of each other, and he took the Junior exam *first*.

²² Submitted December 12, 2012 to the Writing Program, composed by Matt Frye.

This is similar to the rate of other students placed into English 100 who completed their Junior Writing Portfolios between 2009 and 2015 – 80.6% of those 103 students did not submit English 101 work as part of their portfolio, as compared to 83.2% of all students completing their portfolio in that timeframe. Ultimately, without further examination into the individual students’ histories, I cannot speculate as to why students placed into English 100 feature so prominently in this study. They otherwise fit the characteristics of the average WSU student as far as data collected for this study is concerned.

At the other end of the timeline, students in this study performed closer to the middle range of expectations.

Junior Timed Writing Exam	Incomplete	Complete	Distinction
This Set (n = 91)	17.6%	63.7%	18.7%
WSU Average 2006-2012	26.4%	64.5%	9.0%
Junior Packet Overall	Incomplete	Complete	Distinction
This Set (n = 91)	7.8%	86.7%	5.6%
WSU Average 2006-2012	9.6%	83.8%	5.3%

Table 3: Comparison of Junior Writing Portfolio Results, This Data Set vs. All WSU 2009-2015

As the Junior Writing Portfolio reports note (Neider et al., 2016; Frye & Hunsu, 2014), the majority of students ultimately receive a “Complete,” due largely to the writing performance in their packets of writing. In the long run the students in this data set perform similar to the WSU average, with the exception that their timed writings seem to be rated better more often. It is interesting to note that 14 of the 91 students with both placement and junior timed writings were given repeat analytical prompts. As there are ten to fifteen possible prompts in circulation each academic year, and each year several are phased out and new ones introduced, it is extremely unlikely for students to get the same prompt more than once. Unfortunately, this data is not tracked, so it is difficult to compare whether this group of students is far from the norm. However, because this provides some degree of a control variable, these students will be discussed in greater length in Chapter 3.

Overall, in terms of timed writing performance, the students in this data set are slightly outside the average, in that they are 10% less likely to be rated poorly on their timed writings and 10% more likely to be rated highly. That 53 (58% of the total) of the students in this set completed their placement exam during the Summer of 2011, and that 40 of those (44% of the total) completed their Junior timed writing in Fall 2013 may have some effect on these numbers: all four timed writing Distinction ratings in this set come from Fall 2013, and all four were students who were placed in Summer 2011. None of these students were given repeat prompts for their timed writings. However, their course writing (which is the final determiner of Junior Writing Portfolio performance) places them in line with average WSU student performance.

JWP Packet Performance

As noted above, while this set of students generally performs better on Junior Writing Portfolio timed writings than the WSU average, their packet performance is squarely in line with the norm. Of the 267 portfolio papers collected, 107 (40.1%) were rated as Outstanding, and 145 (54.3%) were rated as Acceptable. Neider et al. (2016) found that, from 2007 to 2015, 42.9% were rated as Outstanding, and 49.2% of portfolio packet papers were rated as Acceptable (p. 25). It is likely that this data set's abundance of Acceptable ratings is due to the low number of OK ratings: 5.6% (15 papers) in this set received that rating, compared to a rate of 7.9% for the WSU population overall. OK ratings are given to papers that are acceptable material for the Junior Writing Portfolio, but which cannot be approved by the assigning instructor. They are frequently given to papers used by transfer students or students re-entering school from the workforce who cannot get the original instructor to sign the submission sheet. As such, because this data assumes a low number of transfer students, these numbers do not appear to make these students outliers among the general WSU population.

But, if they are not outliers, then what other details can we find about them? No single major or discipline seems to dominate the group. Of 90 known majors,²³ the most heavily represented is Communication and its related majors with eight students overall. Thirty-two students are the sole representative of their degree program. The College of Arts and Sciences is the most heavily represented (28 students, 31.1% of the total) with 19 different majors, followed by the Voiland College of Engineering and Architecture (17 students, 18.9% of the total, 8 majors). These numbers follow closely with WSU's overall demographics.

College	Proportion in This Study	Proportion of WSU Students Overall*
Carson College of Business	15.6%	18.4%
College of Agricultural, Human and Natural Resource Sciences	8.9%	10.2%
College of Arts and Sciences	31.1%	32.6%
College of Education	13.3%	6.1%
College of Nursing	2.2%	4.1%
College of Veterinary Medicine	1.1%	2.3%
Edward R. Murrow College of Communication	8.9%	5.1%
Voiland College of Engineering and Architecture	18.9%	13.4%

* Overall proportion from Neider et al. (2016, p. 37) figures of students completing the Junior Writing Portfolio between 2013 and 2015, which includes most of the students in this data set.

Table 4: Population by College

Among the larger colleges in the WSU system, this study's population is close to the overall representation of degree areas, with the exception of Engineering. This is likely due to the small number of students used in this study: reducing the representation of Engineering from 19% to 13% would require a loss of five students in all. Cross-listed majors – like Interior Design (one student in this study) and Apparel, Merchandising, Design and Textiles (three students in this study), both part of the College of Engineering and the College of Agricultural, Human and Natural Resource

²³ Not all students complete their Junior Writing Portfolio cover sheet accurately or legibly.

Sciences – were grouped with the Colleges from which the majority of their papers originated. It is possible that, had more papers been assigned or chosen from other courses, these numbers would more closely represent the WSU population.

Instrument and Coding

Initial versions of this study found themes in individual students' evidence use, and that those themes correlated with the student's major (Frye, 2013) or stayed consistent through their college career (Frye, 2015). From these early studies, a coding schema was developed based on Baxter Magolda's (1992) and Harwood's (2010) research. The coding program was developed to allow more individuals to process texts in a uniform manner.

Instruments

This study relies on a conceptual instrument for descriptive coding of student writing and a technological instrument for applying and tabulating codes. Both were developed for this study.

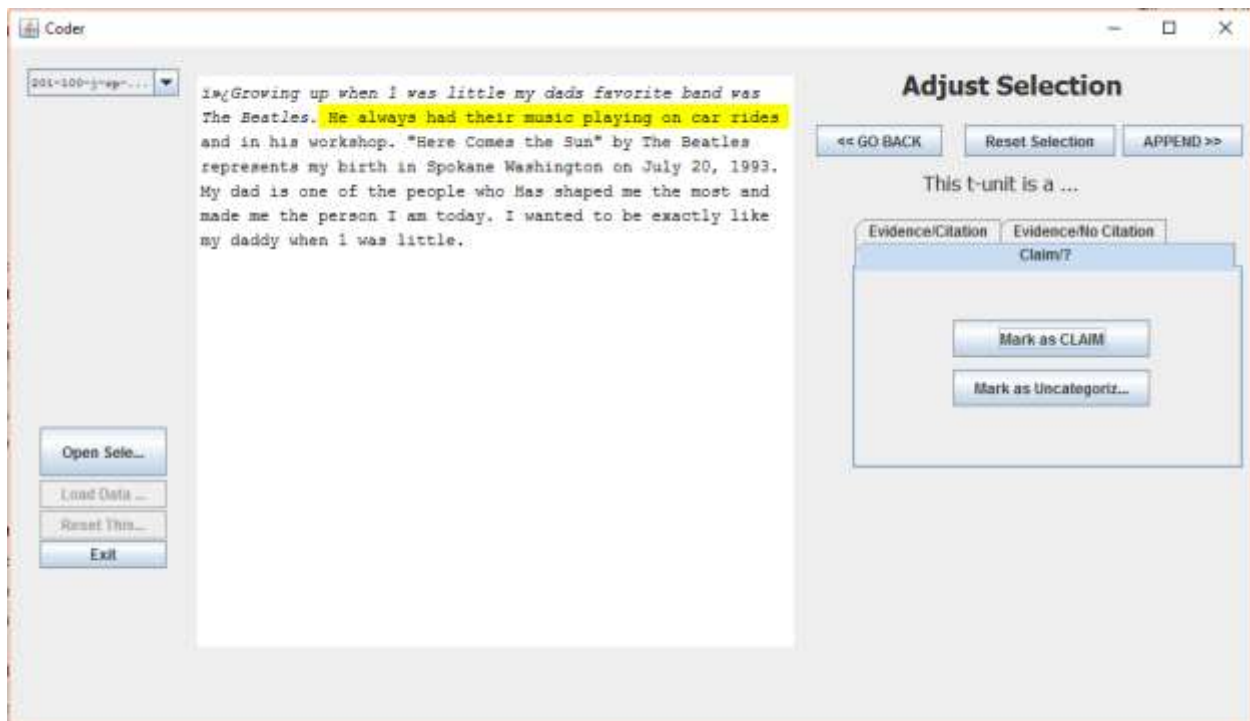


Figure 2: Screenshot of the Coder program, Claim/Other Codes



Figure 3: Screenshot of Coder Program, Evidence with Citation Codes

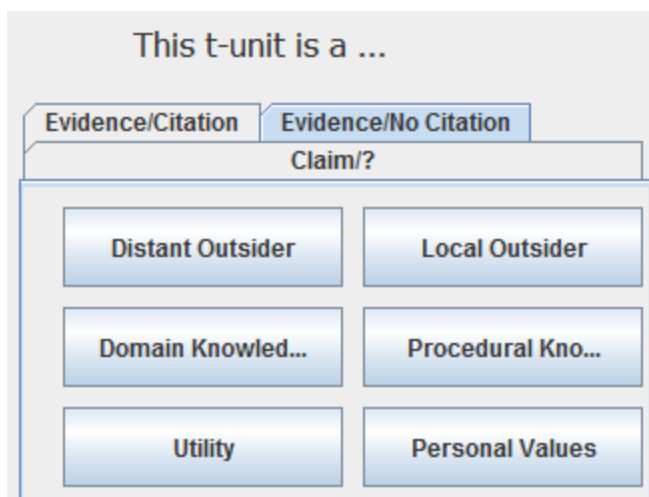


Figure 4: Screenshot of Coder Program, Evidence without Citation Codes

The technological instrument is a computer program designed by the researcher and a paid consultant.²⁴ The program reads text files and identifies statements as potential t-units by applying breaks at common markers splitting clauses: coordinating conjunctions, subordinating conjunctions and punctuation. It then displays texts statement by statement to a coder, who determines whether the statement is a claim, evidence supporting a claim or something else by clicking the button for the appropriate code. Each click submits the statement and code to a database for the individual coder, maintaining a record of which document the statement came from and where in the document it was located by paragraph and statement index.

This initial framework is based on Stephen Toulmin's (1958) model of argumentative writing. In examining writing as part of the writing placement process and as part of my normal teaching duties, Toulmin's framework (discussed in more depth in Chapter 1) became a useful heuristic for identifying what students were doing in their writing.

²⁴ This consultant and the coders recruited were paid through the generous support of the Samuel H. and Patricia W. Smith Teaching and Learning Endowment in 2015.

In this study, Toulmin's framework is simplified to allow greater focus on the uses of evidence – whether as data, warrants or backing – in writing. In student excerpts in Chapters 3 and 4, some statements will be coded as “Other.” As far as coders are able to judge, these statements neither make claims nor do they provide evidence. For example, an Other statement may be an intentional aside, a sarcastic remark or a fragment of text that performs no apparent purpose. Additionally, the function the statement performs is simply not part of the student's argument, as when students declare that they are answering a particular question in an assignment.

The Coding Schema

In the my normal duties as a writing teacher, writing tutor and participant in university writing assessment practices, I noticed recurring themes in evidence use, particularly in impromptu writing exams like WSU's placement exam and the Junior Writing Portfolio timed writing. Uncited evidence frequently fell within the bounds of Baxter Magolda's theory of self-authorship, as students relied primarily on external authority figures, internalized domain knowledge or personal beliefs to support their claims.

In one portion of these tasks, students are asked to reflect on the writing produced and knowledge used in another part of the timed writing. Incoming students taking the placement exam frequently attribute their writing prowess and broad knowledge to influential teachers. Students taking the mid-career Junior Writing Portfolio timed writing more regularly credit their coursework, major and a key professor or two. Oddly, the same evidence is used to support claims to the contrary: a student might view his or her writing as lacking some important traits because a teacher had said the same in the past or because a teacher did not do his or her job well. Regardless of the direction of the claim, students tend to view outsider judgments as the best measure of their writing.

In the other portion of the exam (both are discussed at greater length in Chapter 3), students are asked to write an analytical response to a short excerpt of a popular-scholarly work like *Garbology: Our Dirty Love Affair with Trash*, Humes' 2012 book on humanity's propensity to produce trash²⁵, or "Can You Hear Me Now?," Sherry Turkle's 2007 Atlantic article on the effects of social technology. Responses to these texts often pull from other sources of evidence: personal experience (most often coded as domain knowledge) or syllogistic reasoning (typically coded as either Utility or Personal Value, depending on individual instances). Influential voices from high school are absent, even when a student's reflection credits teachers for knowledge used in the analytical essay. Though they are not coached to use any particular kinds of evidence (only to support their arguments), students follow these trends regularly enough that they are trends, at least anecdotally.

Additionally, Harwood's citation functions are a useful teaching tool, and students' use of the framework in their writing suggested that the citation practices of academic scholars may be demonstrated by undergraduate students as well. In the classroom, I have regularly asked students to analyze their own citation use by coding their essays using his eleven codes. While students in my courses indicated that they used a wider variety of citation functions than were observed in this study, I suspect it may have been due to explicit coaching in the fact that citations can perform more functions than supporting a claim or showing that research was done. However, that anecdotal data was not collected as part of this study, and none of those students are represented in my sample.

But, the anecdotal is what is being tested here. Claims in the preceding paragraphs do not include rates of moves occurring over time, nor do they include exemplars; these are the moments that stand out to those who read these exams. Whether they stand out due to confirmation bias or

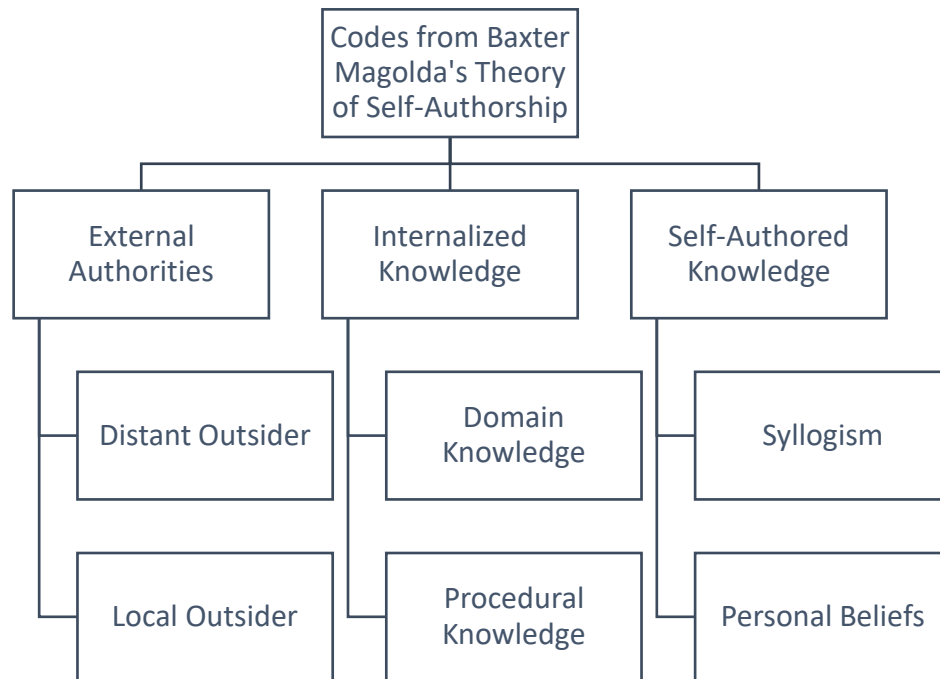
²⁵ Also part of WSU's Common Reading program for academic year 2015. As discussed in Chapters 3 and 4, the common reading program provides an excellent conceptual tie and opportunity for knowledge transfer between courses. However, the heavy focus on particular disciplinary modes of knowledge production and analysis may be leading students to use sources and knowledge

because they represent a significant portion of the evidence used will be explored more in Chapters 3 and 4.

Baxter Magolda's Theory of Self Authorship

Marcia Baxter Magolda's theory of "self-authorship" has been developing for several decades, beginning with a longitudinal study of several dozen university students in 1986, reporting of which continued through the 1990s and early 2000s (Baxter Magolda, 1991, 2001, 2008, 2009). Where Perry interviewed the same set of individuals each year for their four years at Harvard, Baxter Magolda interviewed the same set of individuals each year into the participants' thirties! Her study, like many other longitudinal studies attempting to *follow* individuals over time lost many to the basic attrition of time (cf. Haswell's discussion of the pitfalls of longitudinal, qualitative research [Haswell, 2000]). However, she was able to maintain enough of a population to describe several basic types of "self-authorship" from these individuals and from others that she recruited later on. The descriptions below are based on Baxter Magolda and King's (2012) more recent work.

This evidence still performs the role of data, warrant or backing in Toulmin's (1958) framework, but it may either fall under Aristotle's *inartificial evidence* category or his *artificial evidence* category, that evidence which is provided by the rhetor (2012, II.2-3). Writers may use ethos by aligning themselves with an external authority figure, or they may use ethos by declaring themselves the primary authority on a subject. Writers may use pathos by identifying values in their reader, and using reasoning that mirrors those values. Writers may also use logos by creating their own syllogistic or enthymematic structures within which to present other evidence. However they piece evidence together, writers will show knowledge coming from one of three major sources: external authority figures, internalized knowledge, or personal beliefs and reasoning.



Trusting External Authority

Baxter Magolda and King (2012) describe three major epistemological stances concerning external authority figures: (a) trusting external authority, (b) tensions with external authority, and (c) recognizing Shortcomings of Trusting External Authority (p. 53-54). While these stances represent a slow movement away from blind trust in external authority figures, the category as a whole indicates that the individual turns *first* to some other authority to validate or evaluate knowledge. A graduate student might ask an advisor whether it is wise to engage in academic pursuits outside a primary area of research. A mid-career college student might choose a major based on a beloved teacher's advice. A first-year student may challenge her environmental science teacher based on knowledge imparted to her by a parent or previous teacher. Individuals adhering to this epistemological frame see knowledge as held or created by some Other, whether a living being or a symbolic representation of authority (e.g. religious texts or job titles).

As this study does not have access to students' justifications of their use of uncited evidence, this type of epistemology is categorized as reliance on an Outsider and manifests most frequently as a reference to a known human being who imparted some knowledge or values to the writer. It is further sub-categorized as either reliance on a Distant Outsider (someone that the reader cannot reasonably be expected to know, e.g. a parent or high school teacher) or a Local Outsider (someone the reader could be expected to know, e.g. another instructor on campus or a fellow student). These categories were developed in response to the impromptu writing exams used for first-year composition placement and the Junior Writing Portfolio. In discussing the sources of their knowledge (a common reflection prompt in the exams), students regularly refer to the authority figures who have impacted their learning. For example, Student 81 refers to an AP Language and Composition course and teacher as a source of the knowledge that s/he has strong writing skills.

That year I decided to challenge myself, [claim] so I took AP language and composition with Mr. Greasman. [domain knowledge] I had to do a lot of writing in his class, [procedural knowledge] and for most of my essays there were lots of notes from Mr. Greasman on how the papers could use more work. [distant outsider] I began to realize that the organization of my papers was what was holding me back. [claim] So I began to work on that in each of our many essays, [procedural knowledge] and at the end of the year I ended up passing the AP test with a 3; [distant outsider] still not good enough for college credit, but I passed. [claim]. (Student 81, Junior Timed Writing Reflection)

The Crossroads

Baxter Magolda and King (2012) describe two positions in what they call "the Crossroads," an epistemological frame characterized by the beginnings of internal meaning-making. They note four stances within this frame: (a) questioning external authority and (b) constructing the internal voice (p. 67), followed by (c) listening to the internal voice and (d) cultivating the internal voice (p. 77). As Baxter Magolda and Kind (2012) continued Baxter Magolda's earlier methodology and relied

entirely on interviews, the questioning of external authority is significantly more visible in their data. Within this study's data set, only the use of an internal voice can be identified.

Because only the use of an internal voice can be identified, two sub-categories were created in response to observations of writing tasks requiring specialized, disciplinary knowledge. Students may rely on either Domain Knowledge or Procedural Knowledge, roughly “knowing that” versus “knowing how.” The primary difference between these two categories is that Procedural Knowledge is demonstrated in the doing, as in a lab report or a method of analysis²⁶, while Domain Knowledge is demonstrated in an explanation *why* that action, analysis or statement is supported. Students need not use only one, though some assignments are clearly designed to demonstrate one more often than the other. Neither is more or less advanced than the other: due to my academic background, I can explain several vagaries of Arabic syntax and grammar (Domain Knowledge), but I could not hold a conversation with a Jordanian toddler if my life depended on it (Procedural Knowledge). Both categories are used here primarily to help differentiate whether students are developing an internal voice because they can perform specialized tasks or because they understand the theoretical underpinnings of those actions.

Self-Authorship

Baxter Magolda and King (2012) describe three positions in the self-authorship epistemological frame: (a) trusting the internal voice, (b) building an internal foundation and (c) securing internal commitments (p. 87). At this point, the authors note, “the internal voice is the mainstay; the overall structure for knowledge, identity, and social relations is internally grounded. The internal voice mediates external influence, critically analyzing it and making judgments about it

²⁶ The discipline of computer science has a specific phrase for demonstrating this type of knowledge: “Does it compile?” Learners are regularly evaluated first by their ability to make a working program and second by their ability to explain how it works.

based on internal criteria” (p. 87). In writing, this manifests as students using either their own personal beliefs and values to validate the knowledge they present or in using their own reasoning to construct syllogisms and/or enthymemes. Assignments that require greater amounts of analysis or interpretation than reporting encourage internal forms of meaning making.

Again, because the longitudinality of this study is based on a series of discrete performance points – rather than conversations, interviews and an evolving relationship between researcher and participant – the processes described in Baxter Magolda and King’s three positions are difficult to identify. As such, this study relies on two sub-categories of self-authorship: appeals to personal beliefs and values (a combination of trusting the internal voice and securing internal commitments) and the use of syllogistic or enthymematic reasoning (demonstrations of the internal foundation of knowledge built by the student).

Harwood’s Functions of Citation

Harwood (2010) describes eleven possible functions of citations in academic writing, a taxonomy he developed by asking academic authors to describe the intended function of different citations in their own work (see Table 5). Some of the citation types are extremely rare in published work (and, as I will discuss, even more rare in unpublished undergraduate work), but they occur clearly enough to demand their own category. In this study, the writers themselves were not consulted regarding their intent with each citation – in many cases, the writers were no longer students at this university; in all cases, a significant portion of the work had been composed years prior to the study’s beginning. However, as I am using Harwood’s framework as a descriptor of citation functions, rather than a tool to validate arguments or assess student rhetorical skill with citations, I believe it is the best available tool for classifying the different functions students perform when citing sources.

Advertising	To alert readers to authors' own work or to the work of others
Building	To help authors develop methods or ideas
Competence	To underscore authors' expertise
Credit	To acknowledge authors' debts
Engaging	To help authors have a critical dialogue with their sources
Future	To establish future research plans
Position	To help authors identify viewpoints and findings
Signposting	To direct readers to other sources
Supporting	To help authors justify their research topic, method, or claim
Topical	To show authors are concerned with state-of-the-art issues
Tying	To align authors with others' methods or with other schools of thoughts or debates

Table 5: Harwood's Citation Functions (2010, p. 305)

Below, each citation function is defined in greater detail. Examples are provided from both published, academic work and the student writing used in this study. Because the examples are preserved in their entirety, citations are included. My citations are the final parenthetical note in each example.

Advertising

Advertising exists to *alert* readers to the author's own work or the work of others. It is not often used in college-level academic writing, but academics frequently use it to point out their previous accomplishments within a subject area. For instance, Gunther Kress, in *Multimodality* (2010), advertises his previous work in analyzing websites, using "see" to signal that the reader can consult his 2003 book, *Literacy in the New Age*²⁷:

The sequence in which [website] elements are "read" and ordered by them accords to choices which reflect their *interests*. In effect, the readers' *interests*, reflected in the manner of their engagement, provides for them the *design* for this page: readers redesign the page (see Kress, 2003). (Kress, 2010, p. 38, emphasis in the original)

²⁷ Kress' 2010 *Multimodality: A social semiotic approach to contemporary communication* comes after a long career in semiotics, and much of it builds on Kress' previous work. This example could be read as credit in addition to advertising, as *Literacy in the New Age* informs this particular discussion. However, this is just one example of many, falling within a short discussion of webpages as an example of the concerns of page design, which itself is just an example concept to explain the reader's role in designing a text's meaning. As Kress' own work represents just over 15% of the cited works in *Multimodality*, it seems safe to say that this citation advertises his previous work as a great example of new media analysis.

Within this study, only one student in one statement (of over ten thousand coded statements) advertised another author's work (none advertised their own):

Kosut explains Marge DeMello's quote "popular print discourses have contributed to the erasure of early images and meanings of tattoo by recreating tattoo as a middle-class cultural practice... distancing "modern tattooing from its working class history" (1044). (Student 100, General Education Paper 2)

Within the rest Subject 100's work, DeMello is never referenced again, but the idea of tattooing as a working-class practice is discussed extensively. As such, while the student did not need to bring in DeMello's name (as the sentiment was discussed by the student's major source, Kosut), mentioning her draws attention to the work she has done on tattooing.²⁸

Building

Building citations exist to help authors *develop* their methods. In this dissertation, I have relied on the work of diSessa (1993), Vosniadou et al. (2003), and Belenky et al. (1986) to show some justification for the assumption that epistemological change can be tracked via individuals' processes for approaching and solving novel problems. Academics often use this function in a literature review, as in this 2013 article on food neophobia in Switzerland:

Much research has examined the impact of food neophobia on people's willingness to eat or to try unfamiliar food products. This body of research suggests that food-neophobic persons are hesitant to try or to buy novel foods (Arvola, Lahteenmaki, & Tuorila, 1999; Backstrom, Pirttila-Backman, & Tuorila, 2004; Chung et al., 2012; Henriques, King, & Meiselman, 2009; Schickenberg, van Assema, Brug, & de Vries, 2008; Tuorila, Lahteenmaki, Pohjalainen, & Lotti, 2001). In the present paper, we examine the associations of various variables with food neophobia. (Siegrist, Hartmann & Keller, 2013)

²⁸ Incidentally, advertising has been observed outside the bounds of this study. My own English 101 courses – after the establishing of this data set – have featured an assignment in which students discuss a piece of writing produced for another course. In this assignment, students are more likely to advertise their own achievements in other disciplines when they are given the freedom to evaluate writing outside an English course by the criteria valued in another discipline.

As undergraduates are not often as deeply enmeshed in a discipline's discourse, detailed literature reviews are not very common in this study. In my experience as a tutor with the writing center, upper-division lab reports and research proposals frequently require building citations as students justify their choices to use particular pieces of equipment or modes of data collection and analysis. In lower-division courses, particularly general education courses, writers often use building functions to justify their response to a text or a situation they were asked to analyze. In the example below, student 49 uses quotes and summary of a class reading in a first-year composition class to build an argument that today's adolescents and young adults have a greater sexual awareness and freedom due to their exposure to modern media:

The article "Representing young people's sexuality in the 'youth' media" written by S.A. Batchelor reports on a study analyzing media outlets often consumed by young adults, specifically how sex is portrayed. The article examines the level of sexual health information provided within popular media. The introduction of the article begins by explaining current growing concern for teenage sexual behavior in the UK using supporting facts, such as how the UK suffers from the highest teenage pregnancy rate in Western Europe. Batchelor then describes how the study aims "to explore the types of messages that media outlets consumed by young people are offering and the implications these might have for sexual health and sexual health promotion" (Batchelor, 669).

The author goes on to present the research of a variety media outlets. He begins by explaining the methods used to obtain the research, especially why certain media messages were analyzed. (Student 49, FYC Paper)

However, when students are given a specific method for data collection and/or analysis, building citations are unlikely, or even undesirable (i.e., if I am told to do a Freudian analysis of Hitchcock's *Psycho* for a film class project, I probably do not need to discuss Freud explicitly). Indeed, slightly over 6% of statements with citations (less than 1% of statements overall) were

coded as building statements, despite the prevalence of lab reports and other genres that might, in professional contexts, require a fuller development of methodology.²⁹

Competence

Authors use competence citations to underscore their *expertise*. Academics often observe this as a part of the literature review (deLeeuw & Chi, 2002; see also Swales, 19xx), where authors show an awareness of the many conversations surrounding a particular subject or of the multiple understandings of a particular phenomenon (cf. the first half of this chapter). Competence citations for undergraduates are rare, comprising just over 4% of statements with citations in this study, and just over half a percent of statements overall. Competency citations, when they occur, appear as students dropping important facts into their writing, typically in the single utilization of a fact- or statistic-dense resource in a piece of writing.

In the 1960s, teachers constituted to be the largest group of professional workers in the United States (Stinnett). Since this was such a demanding profession at the time, there was a high projection of teachers in the future; they needed an estimated amount of 3,014,000 teachers to be hired by 1974 (U.S. Department of Government Health and Welfare 1965 Ed.). Even recent projections show that teacher's jobs will be increasing. The Bureau of Labor projects that the number of teaching jobs is going to increase 27 percent by 2016. (Student 26, FYC Paper)

Of course, it is worth noting that this is not a common citation function: only 68 of over 1550 coded citations (just over 4%, two-thirds of which at the Junior Writing Portfolio level) performed this function in this study. In a small set of Computer Science and Sociology academic articles, Harwood (2010, p. 305) found Competency citations in just over 1% of Computer Science citations (6 of 480 coded statements) and just under 0.7% of Sociology citations (6 of 871 coded

²⁹ I would like to note here that I have spent a great deal of time tutoring writers through WSU's "02" tutorial courses (e.g. English 102, UNIV 202, UNIV 302). Outside their writing, students do discuss resources in a manner resembling Building citations, though they do so in something closer to a "local outsider" form (see below). In cases where students are given some freedom to gather or use information, in these tutorials, they discuss their reasons for taking particular approaches as being based upon what an instructor has recommended or what a peer has found successful in the past. Unfortunately, gathering such data was beyond the bounds of my original IRB paperwork.

statements). While undergraduates appear to use this function more often (it is used in nineteen papers, on average between three and four times per paper), it is important to consider the role of a Competency citation. As students take more control of their knowledge, beginning to see themselves as *experts* in a subject rather than simply reporters upon it, Competency citations give a writer the power to make and defend seemingly unexpected connections between course material and information not discussed in class. In Student 26's case, this is an example of a novice Education major writing for a general-education composition course, in a research paper where this depth of data was not the norm.³⁰

Credit

Authors use Credit citations specifically to acknowledge intellectual debts. Student 63 acknowledges this debt with a phrase similar to many academic literature reviews: "Initial work, such as that done by Norval Morris and Frank Zimring, in their 1969 paper titled 'Deterrence and Corrections,' set the stage for future scholars by stressing the importance of studying deterrence" (Subject 63, Junior Writing Portfolio Research Paper 1). However, only Subjects 63 and 5 used Credit citations – once each, and both instances at the Junior Writing Portfolio level.

Engaging

Authors use Engaging citations to show a dialogue between themselves and a reference, but like Credit citations, they are rare in this dataset, occurring only twice. Subject 9 shows limited Engagement with the statement "If you were to read Nietzsche or Schopenhauer you might mistakenly take the idea of the will being behind all creation as a relatively new idea." I do assume that, just as Harwood found Engaging citations significantly more often in Sociology articles than

³⁰ As judged by other papers completed for this course and instructor during the semester. While not all of those papers made it into this study due to the Junior Writing Portfolio limitation, I was able to get a sense of the assignments completed in each student's FYC class by the other FYC portfolios I looked at in the text gathering process.

Computer Science (2010, p. 305), I would find far more Engaging citations if my dataset included more writing from different disciplines.³¹ Within this collection, there were few assignments seemed to ask students to engage critically with some resource, whether by examining a methodology (as one might in a sociological literature review) or explicating a literary work. Even in FYC courses that utilized WSU's Common Reading, most research-based assignments or reading responses seem geared towards expounding upon or applying the concepts within a reading, rather than engaging with them directly. Implications for this are discussed further in Chapter 4.

Future

It is not common in either professional or novice academic writing to use citations to declare future research plans. Harwood (2010) finds almost no instances of it (though he does find enough to call it a function of citation), and none were found in this study. However, it is worth noting the rhetorical function of such a citation: an author might claim a future research or publication trajectory and link it to an existing conversation (performing a function similar to, yet distinct from, a Tying or Topical citation). Studies performed at WSU (e.g. Baghdanov, 2013) and at other universities (e.g. Nowacek, 2011) have found that knowledge transfer between individual courses is rare. Nowacek (2011) identified cases of knowledge transfer resulting from students identifying connections between two or more courses, then planning to apply non-disciplinary or extra-curricular knowledge to a task (p. 119-121). Future knowledge transfer research³² may benefit from exploring this further, as such citation functions may prime individuals for making these connections.³³

³¹ See Chapter 3 for more discussion of the specific courses and assignment types represented in this study.

³² Too obvious?

³³ And, I would further note that existing research on such priming effects (see Huffman (1998) for a discussion and literature review) suggests that students may benefit whether or not they are held to the promises in these citations.

Position

Position statements “help authors identify viewpoints and findings” (Harwood, 2010).

Harwood notes that these statements can “explicate researchers’ standpoints in detail, or trace the development of a researcher’s or field’s thinking over time” (p. 307). An example of this is in the middle of a research paper by Student 63, when s/he informs the reader that a previous scholar has outlined an ideal in what a deterrence should offer in criminal psychology:

A good example of what we hope to achieve is demonstrated in an article by Andenaes, in which he analyzes “under what conditions and to what extent the deterrent purpose is effected” when the nature of the offense is changed (1971, 537). (Student 63, General Education Paper 1)

Signposting

Signposting functions exist primarily to direct readers to other sources. Like Competence citations, they show a writer’s breadth of knowledge, and like Advertising citations, they point out the semi-relevant work of other authors. Where Signposting citations differ from others is in their role as an intellectual shortcut or blinder, depending on the author’s purpose. Footnote 8, in Chapter 1, is one such example:

Ken Hyland (2000) has likewise provided excellent frameworks for understanding the role of disciplinary expectations in controlling discursive acts.

Here, I used the citation as a blinder to address what I believed would be growing concerns over the role of academic discipline, register and genre in dictating what a student writer could or could not do in an assignment. By Signposting, I am able to direct the reader to a resource that can explain the idea in more detail than I have space to within my own writing. Likewise, I gain a shortcut in my

Simply verbalizing an expected connection may give an individual the mental preparation for making these connections in the future, in a manner similar to the old “KWL” charts utilized in k12 classrooms.

argument by allowing Hyland's work to "stand in" for any discussion I might provide here (assuming my reader is aware of his work).

Only one instance of explicit Signposting exists in this study. Student 63 provides a quote from an academic article related to his/her topic, but not central to it:

Two articles we chose, one by Williams and Gibbs (1981), and the other by Radelet and Borg (2000), illustrate this well. In the former, the authors studied 2,400 residents of Tucson, Arizona in 1974-1975, to test the second major tenet of deterrence theory: that fear of punishment will prevent the public from committing similar crimes in the future (Williams and Gibbs 1981). What they discovered, however, was that prior knowledge of the typical punishment for a crime did not provide a consistent measure for future willingness to commit crimes. A crucial reality of deterrence is that each punishment is appropriately matched with each offense and offender, so it seems reasonable that there's still a degree of uncertainty in the potential criminal's mind about the result of his actions; however, an additional item limits the usefulness of this study. The survey given to the Tucson residents only asked about a potential 14 crimes, of which there are obviously far more, and we have no guarantee that this was done in a reasonable representation of common crimes of that area at that time period. They did discover, however, that perhaps criminals are more afraid of society's reaction to the crime they committed, rather than just the legal punishment involved. *Building on that, an additional article by Williams and Hawkins notes that "The emphasis being on the identification of the direct (i.e., fear) and indirect consequences (i.e., stigma, attachment, and commitment costs) of legal sanctions that promote deterrence" is needed in order for it to be effective (1986, 568).* This would be echoed by later scholars. (Student 63, General Education Paper 1)

In this example, Student 63 points to a more recent study of the criminal justice system suggesting an additional theory about punishment and deterrence. It is not addressed further, except to say that other scholars would later examine the suggestion.

Supporting

Supporting citations are those that many students describe as the main function of citation: they justify a method or claim by associating the author's words with those of some other, established line of research. Harwood (2010) found this function in nearly 19% of citations for Computer Science, and almost 15% in Sociology. Within the statements with citations, 59.3% were

performing a Supporting function (representing 8.6% of the total coded statements). A student example of such a citation is below:

To go along with the economic factors that we are having in the world and throughout the educational system, Finn states in his article, "...working class, about one third of the breadwinners were skilled blue collar workers; about half were unskilled or semiskilled blue collar workers, and about 15 percent of the heads of the households were unemployed." (Finn 9) Being a child of one of these "blue collar workers" to Finn means that they are going to follow in the footsteps of their parents or guardians and become factory workers or fill other non-skillful positions. Do the teachers, family members or even the students themselves think they are going to become the next President, or CEO of a big company? No. because that is not how they were grown up, or taught in the working class schools. The working class teachers taught students by giving them facts, making them follow steps and they had little of their own decision making skills. Those students are going to go onto middle school and high school knowing how to do those things, and those things only. If they kept on going throughout school, they most likely are going to get a high school diploma, and then go off into the working force and find a job that they have credentials for. Most likely they wouldn't go to college to get a Bachelors degree for a number of reasons. I believe that everyone benefits from being educated, but the ones that are going to benefit more are the kids in the executive elite school, affluent professional and the middle class schools. Not so much the kids in the working class schools. (Student 107, FYC Paper)

Although some of the claims following this citation are problematic – there is little evidence given before or after this paragraph that the Finn reference explicitly says that children follow in the footsteps of their parents – the reference does stand in as evidence supporting the rest of the paragraph's claims that the children of working-class parents are most likely to achieve a level of education that maintains their socioeconomic status, rather than changes it.

For better or worse, many Signposting citations match this rhetorical function. Many students use these types of citations to show that they have done some course reading (similar to a Competence citation with less confidence) or to identify the fact that they have done some research (like a Signposting or Advertising citation, but more integral to the current enthymeme). The Supporting function is very often shown in a conceptually naïve (Vosniadou, Vamvakoussi &

Skopelleti, 2008) fashion, as students cite a reference primarily to justify their claims, rather than to engage in a scholarly conversation or document their research process.

Topical

Topical citations indicate that the author is concerned with immediate or popular concerns. By mentioning Bauerlein's *The Dumbest Generation* (2008) and Nicholas Carr's "Why Google Is Making Us Stupid" (2008) early in this chapter – and E. D. Hirsch's work (1996) early in the next – I have attempted to show that the study I am describing is in some way relevant to our current historical moment. I firmly believe that it's extremely important to our current moment, but these links allow me to show that others are concerned about it as well.

Students use Topical citations when writing about current issues. It is unclear whether these may be incidental to the research process (e.g. researching climate change over the last five years is likely to yield recent, highly topical resources) or if students are using these sources to show that their concerns are, indeed, topical. Student 1 opens a research paper in his/her first-year composition course with this quote:

"85% of the world's total energy comes from the burning of fossil fuels (Liu 1070)". Whether it is in our cars or in a large scale power plant, the burning of coal, natural gas, and oil and its byproducts has made up the majority of our energy since the 18th century. (Student 1, FYC Paper)

Nearly one in six (14.3%) Topical citations occur in the first paragraph, and *all* such citations occur as the first sentence of the first paragraph. This is a positive sign, as Swales (1990) found that the first sentence of published academic papers frequently did the same thing – identified an important, relevant topic and cited some reference to show a conversation existed.

Only seven such citations were demonstrated in this study, and all but one occurred as the first sentence of the first paragraph (the outlier being Student 63 in the same paper noted for the

Signposting citation; the Topical citation was for an article that challenged the author's other references, published in the same year as those references).

Tying

Finally, Harwood's Tying citations perform a similar function to both Signposting and Topical citations by associating the author with a particular line of research or school of thought. I have referenced Piaget, Vygotsky, Posner, Vosniadou and others to show that I also believe that learning is a matter of dynamic conceptual-frame building generally via incremental change, not a matter of simple fact-accretion (cf. Hirsch, 2009, and, to a lesser extent, diSessa, 1993) nor a matter purely of strokes of genius or ineffable moments of cognitive connection (what Pintrich, Marx and Boyle [1993] describe as "cold conceptual change," the process of students suddenly understanding concepts without intentionality). According to Harwood (2010), Tying citations occur infrequently in academic writing. We see them in examples like

Professors Robinson and Levin object that my recommendation summons up the specter of a "language police." I, too, find this aspect of my own recommendation troublesome. Like them, I believe that it is important within a scholarly community to value academic freedom and to keep proscriptions to a bare minimum. However, over the years I have reluctantly come to the conclusion that confusion over what statistical significance evaluates is sufficiently serious that an exception must be made in this case. (Thompson, 1997, referring to Robinson and Levin's 1997 "Overcoming feelings of powerlessness in 'aging' researchers: A primer on statistical power in analysis")

In this study, Tying citations were rare (occurring six times within the sample), but students, like Bruce Thompson in the example above, would note some form of assent in uncited statements. Typically, these occurred in conclusions or in later statements within paragraphs. Student 97 synthesizes two articles discussing voter registration laws in a way that Ties him/her to a particular stance:

Both the writers come up with a good point, a registered voter with no government-issued ID should not get one just to vote on one day every four years. (Student 97, FYC Paper)

Although this is part of a longer summary/response statement³⁴ (and, as such, as no citation within the individual sentence), the statement makes it clear that the student sees a particular set of voter registration laws as unnecessarily difficult to deal with, rather than, for instance, a necessary evil to protect the sanctity of an individual's vote.

* * *

Harwood's eleven citation functions largely fall outside the range of undergraduate writing. In this study, just short of 15% of all coded statements (one in six t-units) feature *a* citation. Only 74 of over 30,000 statements have more than one citation on a single statement. This is in sharp contrast to professional academic writing, which, as Audrey Thompson (2004) notes, encourages authors to pile citation upon citation (particularly in the case of self-citation), even for a claim as simple as "As previous research (Thompson, 1979, 1982, 1985, 1990, 1993, 1999, 2000, 2001a, 2001b, 2002) has demonstrated, racism is a serious and ongoing problem" (p. 47). This is not to say either form is better or worse than the other for its given purpose – in most assignments, students do not need a long series of Competence citations as the assignment itself is typically designed to show and evaluate their competence.

Unfortunately, massive studies like The Citation Project (Howard, Rodrigue & Serviss, 2010) focus a majority of their energy on cited statements. While these studies have yielded incredibly useful information, such as Jamieson's finding that students tend to cite the first page or so of any

³⁴ This is a bit of a stretch beyond the data gathering method discussed in Chapter 2. But, as many first-year composition instructors will agree, there are times when a student *ought* to be referencing a source directly when they ultimately do not. In this example, the combination of summary and response within the paragraph made it clear that the student was referring to both Walter Dellinger and Sri Srinivasan, but that the student was also trying to agree with the absurdity of an expensive government document that was only useful one day every four years.

text they encounter (2013), we are literally only touching the tip of the academic-writing iceberg with these statements.

Coder Training and Coding Process

Coders

Beyond myself, fourteen additional coders were recruited and trained in the coding framework. These individuals were all recruited via listserv messages to the English Department at WSU. This demographic was chosen due to the nature of the study: many of the codes rely on some expertise in reading student writing. While Toulmin's argumentative structure is applicable to both academic and non-academic conversation and argument structures, classroom writing does not always have a clear logic. An assignment may have been written in a single attempt, leaving awkward, ill-fitting passages.³⁵ It may also have been rushed, leading to a "data dump" essay with lots of citations and little discussion or any other format that seeks to answer a rubric. For a variety of reasons, student writing does not always perfectly match even Toulmin's descriptive structure for argumentation.

Coders were thus assumed to be ready to read student writing at more than a mechanical level. Building from this assumption, coders were given a 90 minute training session in the coding framework and theoretical orientation of this study. Training sessions were offered over two days, with twelve coders attending the first session. Each session concluded with norming on two pieces of student writing.

Coding Process

³⁵ This is especially true of impromptu writing. In recent years, however, more students have been observed beginning their impromptu exams with outlines, drafts of introductions and other evidence of revision during the two-hour process. Unfortunately, this trend began too late for these students to be included in this data set. Future work could investigate the secondary education practices that might be enforcing this behavior or the qualitative differences in impromptu writing before and after this trend.

Initially, statements are coded using a simplified version of Toulmin's framework – statements are marked as Claims (Toulmin's claims and qualifiers), Evidence (data, warrants, backing) or Other. Claim and Other statements are tabulated as such, but are not processed further by the coder. Coders will, however, give Evidence statements a closer look and label them according to the following framework based on Marcia Baxter Magolda's (2003; Baxter Magolda & King, 2012) work on personal epistemology and Nigel Harwood's work on the functions of citations in academic writing (2010). Although the set of possible codes is quite large, the six codes based on Baxter Magolda's work are conceptual pairs generated from her three epistemological stances; the eleven codes provided by Harwood are not simplified, but early versions of this study have found students relying primarily on a small set. In the current study, the lion's share of citations performed the Supporting Function (over 85% of citations), and much of the remainder were either Building or Competency citations (just over 10% of citations). The other citation functions are sparsely represented, but knowing that a student was showing Competency, rather than simply *not showing* Building or Supporting provides a closer look at the source and function of knowledge demonstrated by the student.

Only evidence with citations may be coded with Harwood's framework, while evidence relying on uncited individuals falls under Baxter Magolda's External Authority epistemological stance. Evidence that is untrue (e.g. "Abraham Lincoln once said the only thing we have to fear is fear itself."), that might require a citation in most college courses (e.g. "This was during his famous Gettysburg Address in November of 1864") or that is cited incorrectly (e.g. "To be or not to be, that is the question" [Marlowe, 1599]) is regarded as though it still performs its rhetorical function. Because school writing, as a genre, tends to be focused on demonstrating knowledge (see Fanetti et al., 2010, for the middle- and high-school perspective and Berlin, 1982, for a discussion of this

mindset as an expectation in college writing), it is assumed that students are attempting to demonstrate what they believe is true in each piece of writing. Future work with this instrument may yield interesting results when examining works with other purposes, such as political tracts, op-eds, and corporate-sponsored journalism.

Reliability Testing

Three graduate students and writing instructors acted as expert readers to test the reliability of the coding framework. The three were given a 90 minute training and overview of the codes, along with the study purpose. Passages drawn randomly from the study data set were used to test the reliability of different codes. The reliability is measured using Krippendorff's alpha.

Testing Procedure

Reliability testers were given three passages. Passages were chosen partially at random. Random pieces were pulled from the study's data set, until all of the following categories were represented in some way: a short, medium and long piece (where the "short" piece was roughly half the length of the medium piece, and the "medium" half of the "long"); a work with citations and a work without; an analytical work and an argumentative work; and, a work from FYC and a work from elsewhere. These categories were chosen to represent a variety of generic conventions without requiring additional analysis to represent something from the humanities, from the sciences, from upper or lower division courses, etc. Because different genres have different demands for types and amounts of evidence (cf. Wardle, 2009; Hyland, 2010), the intent of the selection process was to ensure a fairly wide sample of codes without first biasing testers by associating a work with a particular genre or discipline.

Tester Recruitment

Coding framework testers were recruited from local writing instructors. These individuals were deemed to be expert readers due largely to the fact that they assign, read and grade the types of writing represented in this study. This background is helpful in determining the relationship of a piece of evidence to claims, as writing courses at this institution often deal heavily with strengthening those relationships – as a result, these readers are skilled in identifying lines of support using more than proximity and ordering as cues.

Krippendorff's Alpha

Krippendorff's alpha was used as an ideal option for nominally rated items among four coders (Hayes & Krippendorff, 2007). Because the coding framework features multiple levels of granularity, reliability ratings for multiple levels of codes are presented below. All calculations were performed using Deen Freelon's ReCal3³⁶ utility.

Finest Grain, 17 Codes: At the finest granularity, testers reached an average of 52.7% agreement among items. Krippendorff's alpha was calculated as $\alpha = 0.457$, less than halfway between perfect reliability ($\alpha = 1$) and statistically unrelated responses from testers ($\alpha = 0$). While there was frequent agreement among two or three coders at this level of granularity, some items were unclear enough to reduce the reliability of this rating to below acceptable levels. Many of these disagreements stemmed from the citation functions based on Harwood's (2010) work, specifically the differences between Building and Supporting citations. According to Harwood, a Building citation is used "to help authors develop methods or ideas" (p. 305), while a Supporting citation helps "justify [a] research topic, method or claim" (p. 305). Both are very closely related, with the primary difference falling on the state of the writer's claims or argument: a Building citation lays a foundation for a writer to "piggyback" from another author's work, while a Supporting citation

³⁶ Found online at <http://dfreelon.org/utis/recalfront/recal3/>

justifies an action the writer has already taken. In the full data set, the Building code was just second most often, far behind Supporting.

One particular passage that caused disagreement among raters came from a student research paper on NCAA athletics, specifically the issue of whether or not to pay student athletes:

While every intercollegiate sport plays a part in generating revenue for schools, football and men's basketball are the two highest grossing sports and without them, schools might actually lose money. For example, the SEC (South Eastern Conference), generated \$124,636,534 from men's basketball, \$607,163,802 from football alone (which is shockingly more than the entire Pac-10 conference generated from all sports), and \$75,722,417 from all other men's and women's athletic programs. This adds up to a total of \$807,522,753 dollars in generated revenue for the conference (Rishe). (Student 30, Research Paper; citation in original)

The student cited a reference, but it was unclear whether this citation was supporting the claim that football and basketball “are the two highest grossing sports and without them, schools might actually lose money,” or if it was building toward a larger argument further down the line. In the follow-up discussion, all testers eventually agreed that it would likely be a Supporting code, as the excerpted passage did not culminate in any larger argument.

Because this disagreement was typically found between closely related items (e.g. Local Outsider/Distant Outsider knowledge, Supporting/Building citations), the study's data was still collected at this level of detail, but coders were made aware that results would be reported at different levels of granularity.

Increased Grain-size for Baxter Magolda Only, 14 Codes: Reducing the granularity of codes based on Baxter Magolda's work increased reliability. In this model, categories were collapsed into a single category based on Baxter Magolda's stances (Baxter Magolda & King, 2012): Distant and Local Outsider evidence became External Knowledge, based in the External Meaning Making stance; Domain and Procedural Knowledge became Internalized Knowledge, based in the Crossroads stance; and, appeals to Utility/Logic and Personal Values became Self-Authored

Evidence, based in the Solely Internal/Self-Authored Meaning Making stance. At this level, testers agreed an average of 58.3% of the time, with Krippendorff's alpha being measured at $\alpha = 0.501$. While this is a gain in reliability, it is not a large leap. This is due in part to the high number of citations in student work continued generating disagreement. The gain in reliability from this shift came largely from hiding disagreement over evidence from personal values and logical reasoning used as evidence.

Increased Grain-size for Harwood Only, 7 Codes: As noted above, the complexity of Harwood's codes caused regular disagreement. If citations are simply treated as a subset of Distant Outsider codes, average tester agreement reached 77.8% and Krippendorff's alpha was measured at $\alpha = 0.662$. This level of granularity is much more reliable than the levels described above, and it suggests that the largest hindrance to reliability is the Harwood framework.

Largest Grain-size, 4 Codes:

For reference, considering all cited evidence as a Distant Outsider and collapsing the codes based on Baxter Magolda's work into only three large categories did not improve much upon the grain-size noted above. Average tester agreement reached 83.3% and Krippendorff's alpha rose to $\alpha = 0.733$. The remaining areas creating a lack of agreement were differences between the use of Logic and the use of Domain Knowledge, largely because a single syllogism may rely upon Domain Knowledge to work, as in this example: "However, there is an inherent problem with [fossil fuels] [CLAIM]... These fuels are also limited, so the more we use the less we will have until we eventually run out [EVIDENCE SUPPORTING A CLAIM OF FOSSIL FUEL PROBLEMS]." Testers could not agree whether the evidence stemmed from the Domain Knowledge of natural resources (i.e. fossil fuels are a non-renewable resource) or from a syllogism (i.e. if a resource is limited, using the resources reduces its supply until supply is zero).

Is it reliable enough?

For the purposes of this study, I am considering these results reliable enough to move forward. Future work may benefit from additional coder training or a better designed data collection tool. The coding software's design at this stage did not allow for easy movement through a text, such that some coders re-coded documents upon realizing they had made a faulty assumption regarding an argument's structure. The Coder program has since undergone some revision to account for this.

This dissertation project serves as both an investigation of undergraduate writing at Washington State University and a pilot for expanding this investigation to other post-secondary institutions. Tables for individual students are presented at the largest grain size. However, data was collected at the finest detail level to better inform deeper analyses of individual pieces of writing.

Analysis

Once all documents were coded, individual coder databases were compiled into a master database in Microsoft Excel containing all coded statements, student information, and known details for each paper submitted – semester and academic year completed, Junior Writing Portfolio rating and course of origin. Impromptu exams included specific prompts students were responding to. Document word counts were used to estimate a number of pages (at 250 words per page), such that documents with different scales of handwriting, font size or non-text elements would not result in differently weighted statements in the student's average. Descriptive statistics were generated for the tables in Chapters 3 and 4.

Codes and Connection to Research Questions

Can an individual's epistemological change be observed in the writing produced during the normal process of the college experience?

The coding process is designed to identify choices in evidence as a result of an individual's epistemological stance at that moment. Whether the root of a particular piece of knowledge is some external knower (like a cited reference), the writer's internalized knowledge or the writer's internal beliefs or reasoning is believed to indicate the writer's stance toward the most valid type of knowledge for the rhetorical task. Collecting this data over two years of each student's college career is intended to identify points at which that epistemology may have changed.

Do the changes support claims that college students come to think of knowledge as constructed and relative rather than absolute and independent from the knower?

If Baxter Magolda, Perry, and Belenky et al. are correct, college students should begin their college careers favoring evidence from authority figures (citing authorities as direct support, referring to knowledge from distant and local outsiders). By the end of college, many should see themselves as authorities in their fields (citing authorities as examples or colleagues, referring to internalized and self-authored knowledge). Because this data set was collected up to a mid-career assessment, students should be seen somewhere in the middle – transitioning away from external authorities as the primary source of knowledge and towards their own judgments of the most appropriate knowledge for the situation.

Finally, to what degree can these changes be identified, tracked and measured?

It is assumed that changing amounts of each type of evidence, relative to the length of writing, indicates the degree of epistemological change. While individual assignments may ask students to use a certain type or amount of external resources (e.g. a research paper requiring four academic articles and a book), the portion of the coding framework derived from Baxter Magolda allows coders to capture any moments that the writer may use internalized knowledge to evaluate a cited resource or use self-authored knowledge to create the frame in which cited knowledge is used.

Chapter 3: **Representing the Norm? Aggregate Data on Student Writing Characteristics**

Introduction

In total, 31,645 statements were coded from 634 pieces of writing, composed by 91 students. All 91 students will be used in any results or discussion that apply to college students at large – performance disaggregated by demographic data, by placement data or by other lenses not longitudinal in nature. Any analyses that examine performance by individual students over time will be limited to fewer students due to difficulties in data collection and processing.

Following Haswell (2000), this study utilized archival material, partly to reduce the risk of participant attrition over time. However, as discussed in Chapter 2, challenges in collecting and preparing material led to some loss of student writing between initial collection and final analysis. Timed writing exams were transcribed by hand, as existing OCR programs commercially available were unable to parse student handwriting reliably, resulting in the discarding of illegible exams. Similarly, Junior Writing Portfolio packet submissions that did not contribute to the purpose of this study (e.g. entirely numerical and graphical lab reports, creative writing, short-answer homework, or illegible work) were not included in the work to be coded. Some Junior Writing Portfolio packets could not be used, as they were mismatched with other materials in the archive itself or other information was missing entirely.³⁷ As a result, the greatest longitudinal capability can be found for 41 students. Chapter 4 will discuss those 41 students in greater depth, but the data presented here is aggregated from all 91 students with at least two pieces of writing in this study.

³⁷ Aside from FYC work, all material was kept in a campus archive that, in the past decade (Neider, Frye, Fernandez & Torres, 2016), sees about 5,000 new additions and 5,000 removals each year. On top of this sorting routine, student placement exams are paired with their Junior Writing Portfolio work as each portion of that assessment is completed, resulting in yet another 5,000 moves. Because this was an opportunity sample, little could be done to mitigate this problem.

The reader will be reminded of the total number of students represented in each point of discussion below. Further, while the most detailed set is roughly half of the total number of students whose work was gathered,³⁸ it is worth noting that similar longitudinal attempts in rhetoric and composition studies to understand the cognitive and conceptual processes of college students are frequently limited to very low numbers: Hassel and Giordano's (2009) examination of knowledge transfer between two courses relied on twenty-one students; Nowacek's (2011) study of knowledge transfer looked at half a dozen students; Emig's *Composing Processes of Twelfth Graders* (1971) looked at eight individuals during their senior year of high school; and, Downs and Wardle's call to rebrand FYC as "Introduction to Writing Studies" (2007) used case studies of two students to support their theoretical frame. I do not mean to attack these other scholars (all of whom I am drawing upon for this study in one form or another); rather, it is important to note that longitudinal data is exceptionally difficult to gather when it comes to college students or writing, not to mention gathering data from both categories at once!

The following sections offer descriptive data from the pool of student work gathered.

Overview of general findings

So, do students show signs of growth (epistemological or otherwise) over time in their writing? And, is there a consistent nature in that growth? Glancing quickly at the full set, we can see some indicators of growth just in terms of the volume of text produced by undergraduates, and by the proportion of evidence-bearing statements within that text.

³⁸ For reference, 118 students' work was digitized. Several more students' work was collected without being digitized.

	Placement Exams (n=97)	FYC (n=80)	Junior Timed Writing (n=61)	Junior Portfolio Packet (n=97)
Average Words in Document	670	1860	878	2055
Average t-Units in Document	23	73	28	81
Average Words in t-Unit	14.5	19.5	15.7	19.2
Average Ratio of Evidence to Non-Evidence	0.581	0.956	0.597	1.143

Table 6: Average t-Units per Document

The above table indicates the number of coded units per document, presented roughly in the order that most students complete each task. “Non-evidence” includes claims, organizing statements (e.g. headings or “Next, I will discuss...” statements), and statements with no discernible rhetorical purpose. While an impromptu writing exam is not comparable to writing produced for a class (see O’Neill et al., 2009, p. 98-99),³⁹ there is a clear trend towards increased document length. The difference between FYC and other Junior Writing Portfolio coursework may be due to increased length demands for different courses or the nature of FYC assignments. In the timeframe that this data was pulled from, many general education courses culminated in a research-based essay of some type, and according to student descriptions, these papers often held length requirements of about ten pages. The FYC course represented in this study, on the other hand, utilized a final portfolio of twenty-two or more revised pages, to the effect of many students in this study completing several four to six page papers under the FYC umbrella.

On average, t-unit length in the portfolio packet did not increase from FYC, a finding in some contention with Haswell (2000), who found that t-units increased between placement exams

³⁹ While some junior portfolio documents were clearly produced as part of an in-class assignment or as a short-term out-of-class assignment, all benefited at the least from tools like spell-check and the assumption that students had access to content knowledge appropriate for the task. This is one reason that WSU’s Junior Writing Portfolio utilizes both impromptu writing and the packet of work (see Haswell, 2001).

and the junior timed writing (which is confirmed within the timed writing data above). While his work suggested that the same may be true in non-impromptu writing, these numbers imply that t-unit length stays consistent in essay writing within a chunk of time, though essay length may increase – that is, I may average twenty words per t-unit at a particular stage in my writing career, and that average will not change whether I write ten sentences or ten pages. Several factors may impact these numbers, not the least of which is the use of spelling check tools in non-impromptu writing. In the impromptu writing exams, many students used non-standard grammar and punctuation styles, such that it was difficult to tell what the true extent of a t-unit was.⁴⁰ Many students also resorted to lists of references to form data supporting their claims. For example, Student 14 describes NSA surveillance as “This ability for the government to eavesdrop onto people conversations, emails, facebook, myspaces, etc. would make people uncomfortable about what the government is actually reading or watching.” While, in a class essay, an instructor might insist that a writer expand on those examples individually, in an impromptu writing, many students would provide a series of “such as” examples in a manner similar to Student 14.

But, sentence length and complexity is not the same as epistemological growth and complexity. One need only apply the old “readability” scales to any Hemingway novel to discover that this arithmetic does not account for content. In terms of evidence use and complexity, students overall showed upward progression: in both timed writings, students used between five and six supporting statements per every ten non-evidence statements; in FYC, students used almost equivalent amounts of evidence statements and claim statements, and *more* evidence statements than non-evidence statements were used in the general education course writing for the Junior Writing

⁴⁰ The same was sometimes true in the class writing submitted for FYC and the Junior Writing Portfolio, as may instructors in multiple disciplines will often attest. However, the degree to which students used non-standard conventions was significantly increased in the pen and paper timed writing exams.

Portfolio packet. While this aggregate data cannot describe individual growth or the types of evidence provided (or whether the claim statements were introducing, discussing or building from evidence statements), it does suggest that, in classroom writing, students are supplying more supporting statements in their work as they advance. While this does not seem to be true, in general, for their impromptu writing, we do see in Table 6 that document and sentence length increased. Table 7 shows that the increase is generally due to students doing more in the same pattern, rather than increasing the ratio of claims or evidence in their writing.

	Placement Exams (n=97)	FYC (n=80)	Junior Timed Writing (n=61)	Junior Portfolio Packet (n=97)
Average Claim Statements	15	36	17	36
Average Evidence Statements	8	33	10	39
Average Unknown Statements	0.3	3	0.3	3
Total Average t- Units	23	73	28	81
* Total Average t-Units column slightly off from sum of column due to rounding				

Table 7: Overall Average Number of Statements by Type

Paired Data

However, all of these aggregate figures only attempt to understand what students are doing as a group. We see some evidence of students displaying increased complexity in their writing over time. Sentences are getting a little longer over time, suggesting that students are wrangling more ideas at once.⁴¹ More evidence is provided per claim, suggesting that students are demonstrating their expertise (and seeing themselves as experts) to a greater degree. But, these observations are based in the kinds of large-scale data one might use to make claims about student writing as a whole (e.g. Lunsford & Lunsford, 2008). While this data informs discussion about epistemological growth,

⁴¹ See Halliday (2004). Chapter 4 discusses this assumption further.

it does not provide all of the detail. For that, we must investigate the nature of these changes for individual students.

Placement Exam and Junior Writing Portfolio Impromptu Writing Pairs: Students who received same prompt

As noted in the Timed Writing Performance section above, fourteen of the students in this data set (15%) were given repeat prompts for their Placement Exam and Junior Writing Portfolio timed writing. Data for these students' impromptu exams are presented in Appendix B. While the Writing Program does not attempt to control for prompt repetition, nor is there any systematic method of examining whether students are given the same prompt twice, my own experience working with the Writing Program's data has shown that this is very uncommon, except in this data set. It is difficult to determine why students in this set may have received the same prompt twice more often than most, except that, as noted earlier, many of these students were drawn from the same placement and Junior timed writing cohorts. Some prompts are administered more often than others during a given academic year, and a few prompts have had a particularly long lifespan within the Writing Program's timed writing history (see Neider et al., 2016; Frye & Hunsu, 2014). It may simply be that these students come from a pair of cohorts for which a limited number of prompts were used more frequently.

It is worth using Appendix B to delve a little more deeply into students who received repeat prompts. While the data discussed earlier in this chapter and in Chapter 4 suggest that time is not the determining factor in epistemological growth (at least as measured by the increase in evidence use as a signal of personal authority in writing), the students represented in Appendix B represent a neat control set of students being asked to perform the same type of task at similar stages in their academic careers, with their stated majors being the primary difference between them.

However, even within this small group, there are few regular patterns to observe: most students complete their Junior Writing Portfolio timed writing during the first or second semester in their Junior year, some show an increase in evidence statements per claim, while others show a decrease. These changes do not appear to be directly related to a prompt or major. Bird's-eye, aggregate data – looking only at the surface features of student text – does not provide the additional detail necessary to understand the nature of epistemological change in the undergraduate career; though, like Haswell (2000), Lunsford and Lunsford (2008) and Connors and Lunsford (1988) we can see that the writing *is* changing. Chapter 4 will examine the qualitative nature of those changes in greater detail.

Disciplinary Epistemologies

The problems of cross-listing, of impromptu timed writing prompts, and of papers composed for general education courses all point to potential concerns over disciplinary epistemologies. Table 4 is meant to provide some justification for the data set examined further in Chapter 4: are these students truly representative of the WSU population as a whole, or does this study merely examine the epistemological growth of a particular discipline or way of knowing? The population distribution among Colleges and the performance rates reported in other sections imply that this study is as representative as just under one hundred students can be among a population of twenty-thousand. But, the traditional silos of university academic units may not be entirely helpful when attempting to discuss the development of epistemologies associated with a particular domain of knowledge. Students in Apparel, Merchandising, Design, and Textiles draw upon the design knowledge of their colleagues in Interior Design and Architecture, but they also rely on marketing and advertising knowledge from Business courses, and they must understand the nature of the supply chain – from raw materials to finished product – through Economic Sciences courses in the

College of Agricultural, Human and Natural Resource Sciences. As such, we might reframe the breakdown of disciplinary interests (according to major) in Table 8.

Domain Type	Students (n)	Proportion in Data Set
Applied	20	22.2%
Accounting; Apparel Merchandising, Design and Textiles; Architecture; Basic Medical Sciences; Communication/Broadcast Journalism; Communication/Public Relations; Elementary Education; English Education; Interior Design; Nursing; Spanish Teaching; Speech and Hearing Sciences		
Studies the particular ways-of-doing for a discipline or career path		
Business	11	12.2%
Advertising, Business, Business & Finance, Business Administration, Management and Operations, Entrepreneurship, Hospitality Business Management, Management Information Systems, Marketing		
Studies general ways-of-knowing and -doing for business management practices, ranging from large bureaucratic-corporate structures to small businesses		
Engineering	14	15.6%
Chemical Engineering, Civil Engineering, Computer Engineering, Computer Science, Electrical Engineering, Mechanical Engineering		
Studies general ways-of-knowing and -doing for various Engineering specializations; within each discipline, students gain knowledge of specialties related to their own		
Humanities	11	12.2%
Communication, Communication and Society, English, General Studies, History		
Studies various aspects of human culture		
Natural Science	14	15.6%
Agriculture Technology and Production Management, Animal Science, Biochemistry, Biology, Cell Biology and Genetics, Earth Science, Kinesiology, Kinesiology/Movement Studies, Movement Studies, Nursing, Wildlife Ecology, Zoology/Animal Care		
Studies the natural laws governing physical and biological objects		
Social Science	20	22.2%
Anthropology, Criminal Justice, Criminal Justice & Music, Human Development, Political Science, Psychology, Social Sciences, Social Sciences: Criminal Justice and Political Science, Social Studies, Sociology, Sport Management		

Studies the trends and activities of particular structures or institutions in society

Table 8: Populations by Major Domain Type

“Applied” domains here refer to majors that are designed to meet the needs of a narrow range of careers, such that a student in one of these fields likely has an accurate mental image of what s/he will be doing upon graduation. Previous research has suggested that the ability to see

one's self in a role facilitates the adoption of that discipline's ways of thinking (Seymour, 2000), which may impact the knowledge displayed for in-discipline writing among these students (see Chapter 4). Other domains are grouped according to their object of study, as students in these fields may pursue a wider variety of careers or specializations, and thus are able to envision themselves as part of that domain rather than on a singular career path.⁴²

Conclusion: What Should We Expect?

In general, the students in this study are representative of the WSU population as a whole. While they represent less than half a percent of the total student body to attend WSU during the time the writing in this data set was produced, they do represent the majors offered by WSU in similar proportions to the university's total population. Further, their writing, as rated by writing program employees charged with rating writing from a variety of disciplines according to common criteria, covers the spectrum of ratings in rates similar to their peers across the university.⁴³

If the findings from previous research on epistemological growth (e.g. Perry, 1998; Baxter Magolda & King, 2012; Belenky et al., 1986; Vosniadou & Xanthakis, 2007), which has largely depended on interviews, can also be observed in writing, then students should demonstrate more internalized knowledge, with cited evidence used in more forms as simply justification or direct support (i.e. deferring to another authority). Other research on disciplinary ways of knowing (e.g. Hyland, 2004) suggests that we should begin to see patterns emerge from students in the same or related fields, and that those patterns should be motivated by the discipline's own values.

⁴² Engineering is given its own grouping due to the wide variety of specializations that students will eventually need to pick from, and the variety of firm-types an individual may work for in the future. While it is generally an "applied" knowledge category, there are enough Engineering students in this study to merit a distinct category.

⁴³ The exception here is the number of English 101 and English 101 + 102 ratings given on Placement Exams. Because this data set was built first from FYC portfolios, this was unavoidable.

Chapter 4: **Meeting Expectations: Examining the Details of Individual Writing**

Introduction

Chapter 3 examined the surface findings of the broader data collected in this study. Much of that data is more detailed than many universities collect, but still does not tell the full story of a student's intellectual and epistemological development. While many might look at individual student performance over time (and, many have since Kitzhaber, 1963; see Haswell, 2000, p. 308-311, for a more detailed review than I can provide here), even going so far as multi-criterion qualitative assessments from instructors (see Romano & Daane Lawrence, 2013), few collect detailed data on the many individual objects students produce in their coursework.⁴⁴

Having collected and examined many of those individual objects, what can this study tell us about college students' growth during their general education coursework? In general, epistemological growth can be observed in writing produced during these years, but not in the ways predicted by previous studies.

Growth Across the Board

Chapter 3 examined the growth of several students according to the coded units in this study. The table below indicates the aggregate rates for types of statements across the data set. Appendix B disaggregates this data into the quintiles discussed in the next section. However, each quintile used these statement types at very similar rates even when broken into quintiles of 15 students. In each table, percentages are for the column. Individual evidence types are presented as a

⁴⁴ Schools like Rose Hulman in west-central Indiana do have extensive e-portfolio systems to store and track student work within individual courses (Williams, 2010). However, this practice is uncommon.

percentage of the column. Statements coded as “Other” – text that either could not be understood or had no discernible argumentative purpose – are exempted from this table.

	Placement: Analytical	Placement: Reflective	FYC	Junior Portfolio	Junior Exam: Analytical	Junior Exam: Reflective	Overall
Claim	1129 (60.3%)	794 (64.9%)	4663 (37.9%)	3159 (33.8%)	1390 (59.7%)	908 (64.1%)	12043 (48.6%)
Evidence	713 (38.1%)	426 (34.8%)	4649 (37.8%)	3824 (40.9%)	914 (39.3%)	505 (35.6%)	12142 (49%)
Knowledge from Authorities	44 (2.3%)	28 (2.3%)	346 (2.8%)	270 (2.9%)	49 (2.1%)	45 (3.2%)	783 (3.2%)
Internalized Knowledge	420 (22.4%)	342 (28%)	1445 (11.7%)	1423 (15.2%)	500 (21.5%)	413 (29.1%)	4543 (18.3%)
Personal Beliefs and Logic	67 (3.6%)	50 (4.1%)	1416 (11.5%)	836 (8.9%)	99 (4.3%)	46 (3.2%)	2514 (10.1%)
Citation	182 (9.7%)	6 (0.5%)	1442 (11.7%)	1295 (13.8%)	266 (11.4%)	1 (0.1%)	3192 (12.9%)

Table 9: Proportions of Statement Types from Placement to Junior Exam

Students overall show a slight increase in evidence use over time. Internalized knowledge, what Baxter Magolda called the “Crossroads” (Baxter Magolda & King, 2012), occurs more often during impromptu writings than during normal coursework, which may be expected as students are not allowed to use additional references during these exams. Interestingly, support from logical reasoning and personal beliefs occurs at greater rates during coursework. As Student 95’s writing below suggests, this may be a result of the writer being asked to work within domains that haven’t been fully processed.

With the exception of the reflection portions of the timed writing exams, students tend to reference source material in roughly 10% of their statements overall, whether writing for coursework or in an impromptu writing. While a vast majority of source material references in this study used the “Supporting” function (over 86%, see page 57), the tables below indicate that many students move toward more complex citation functions over time, incorporating more Building functions in particular as they progress toward their junior year. As this study did not utilize interviews, it is

difficult to note the precise nature of this transition. However, as a FYC instructor, I have regularly taught variations of the “citation sandwich” model, in which a writer introduces a source, references it (usually through a quote or paraphrase), then integrates it with the larger argument. Many students enter FYC knowing this mechanic (something that can be seen in many placement timed writings). Student 95’s writing (see page 110 below) suggests that, as writers become more familiar with a domain, they are able to use and discuss evidence in more complex ways. The relative consistency of the proportion of citations with an increasing amount of Building and other functions suggests that students are learning to use their knowledge with more authority, even if they are continuing to write in a familiar structure.

Growth By Documents Produced

We might delve further by examining students according to the documents they produced – what courses or moments were they written for, and at what stage in the student’s career were they composed. For simplicity’s sake, students are grouped by the amount of coded text collected from them. This study did not collect assignment sheets beyond those included by the students themselves (much of those coming from the impromptu writing exams), so it is not possible to say whether students met, exceeded or fell short of length expectations in their assignments.⁴⁵ Instead, the students with at least three data points between impromptu exams, FYC writing and general education writing were separated into quintiles of words produced and proportions of evidence used over time, with the top, middle and bottom quintiles compared below. Students with fewer than

⁴⁵ Some original documents have hand-written notes from instructors or graders, commenting on the length or complexity of the work. However, because some students printed new copies of their work (making any original comments unavailable) and because there is no standardized commentary language for instructors and graders, these notes are not considered here. It is worth noting that Johnson-Shull and Rysdam (2012) examined work from WSU’s Writing Program archives and found that such comments, when they existed, were often negative. If comments on these documents were examined in the same way, it is expected that any indicators of expected length would imply that the student fell short of more often than they exceeded length expectations.

three of these components are not included in this discussion, as the lack of material makes it difficult to gauge growth.

Data blocks for individual students are listed in descending order of the number of coded units available for that student, and for ease of comparison, values for t-units, claims, and evidence are per 250 words, providing a rough estimate of the occurrence of these items per page of typed text.⁴⁶ Cited evidence (coded using Harwood's framework) is reported as Supporting, Building, and Competency, in addition to a general group of all evidence using citations. Although Harwood's framework offered eleven possible codes, these three accounted for over 80% of all statements with cited evidence. Other citation functions were used infrequently enough that listing them here would not provide much new information. The "Domain" category notes either which course a document was produced in or the disciplines applicable to the timed writing. Appendix A lists this data in full, and notes the author and title of the work of the timed writing prompt.

Top Length Quintile

Students in this group have between 564 and 896 coded units, spread between an estimated 40 and 120 pages of writing. For reference, the students in the top quintile, their majors, and the amount of text produced are noted in Table 10. Note that this is counted by coded units. Individuals like Student 35 produced a large amount of FYC work (all subsumed into a single, averaged column in the tables below), placing them in the top quintile despite relatively little data in other areas. Data is presented with FYC work averaged into a single column to keep that course on similar footing as other general education courses. While History 105 (and its predecessor under the General Education title) is required of all WSU students, and thus represents a large portion of the work

⁴⁶ 250 words per page assumes typed, double-spaced, proportional, 12-point font with one-inch margins on all sides. Not all documents in this data set were produced according to this standard, so this ratio was chosen to give the data a common reference frame.

submitted in Junior Writing Portfolios (Neider et al., 2016), other WSU UCORE courses like Sociology 101 and Biology 107 are also heavily represented in the Writing Portfolio archives. These courses culminate in research writing projects.

Early in this study, I assumed that FYC courses would provide a high-resolution look at the changes a student undergoes during a single course, as each student had three or more pieces of writing produced during a semester. However, submission dates in each paper's heading were erratic – while a large portion of students appear to have dated their papers according to the day a draft was due, some never changed between drafts and others only noted the final portfolio due date. This combined with the instructor commentary on some drafts also made final drafts ambiguous within the set (papers that could not reasonably be identified as final drafts were not examined). As a result, any attempt to study growth within an FYC course would have been limited to a small set of students working under different instructors and completing very different projects. For that reason, FYC is treated as a single composition on the same terms as any General Education course.

Student	Major	Words	Pages
24	Communication	29333	117.3
16	Sport Management	25933	103.7
112	Anthropology	24068	96.3
48	Biology	21230	84.9
5	Elementary Education	17163	68.7
26	English Education	16922	67.7
1	Mechanical Engineering	15337	61.3
32	Communication/Public Relations	13330	53.3
35	Civil Engineering	12864	51.5
51	Marketing	10743	43
55	Human Development	10561	42.2
19	English	10404	41.6
42	Elementary Education	9236	36.9
7	Kinesiology/Movement Studies	7767	31.1
29	Psychology	5190	20.8

Table 10: Students in Top Quintile of Coded Units

Growth at the Bookends

In their timed writings, over half of the top quintile group showed more internalized knowledge (categorized as Domain Knowledge and Procedural Knowledge) as support for their claims than during their Placement Exams. This includes movement away from both purely authority-based knowledge (Distant Outsiders and Local Outsiders) and purely self-authored knowledge (knowledge from Personal Values or Utility/syllogistic reasoning), so we can see students taking authority over their knowledge. Students 48 and 26 exemplify this authority.

Student 48: Biology								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	2	7	8	0	7	7
Domain	Psychology & Culture		English	History	Physics	-	Technology & Culture	
Words	755	193	3338	166.25	889	-	430	282
tUnits	16.4	5.2	43.2	24.4	18.4	-	12.8	8.8
	12.4	2.8	21.7	8	7.2		8	5.6
Claims	(75.6%)	(53.8%)	(50%)	(32.8%)	(39.1%)	-	(62.5%)	(63.6%)
	3.2	2.4	10.36	2.1	11.2		4.4	3.2
Evidence	(19.5%)	(46.2%)	(24%)	(8.6%)	(60.9%)	-	(34.4%)	(36.4%)
Evidence: Outsider	0 (0%)	1.2 (50%)	1.04 (10%)	0 (0%)	0 (0%)	-	0.4 (9%)	0 (0%)
Evidence: Crossroads	0.8 (25%)	1.2 (50%)	2.6 (25%)	1.5 (71%)	9.2 (82%)	-	3.6 (82%)	3.2 (100%)
Evidence: Internal	2.4 (75%)	0 (0%)	2.72 (26%)	0.2 (10%)	2 (18%)	-	0.4 (9%)	0 (0%)
Evidence: Cited	0 (0%)	0 (0%)	4 (39%)	0.4 (19%)	0 (0%)	-	0 (0%)	0 (0%)
Evidence: Cited (Supporting)	0 (0%)	0 (0%)	3.16 (31%)	0.1 (5%)	0 (0%)	-	0 (0%)	0 (0%)
Evidence: Cited (Building)	0 (0%)	0 (0%)	0.72 (7%)	0 (0%)	0 (0%)	-	0 (0%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	0 (0%)	0.1 (5%)	0 (0%)	-	0 (0%)	0 (0%)

For example, Student 48 builds a syllogism (coded as Utility) from a single assumption in his/her Placement Exam, responding to a portion of Walter Kirn's essay, "The Autumn of the Multitaskers." The statement marked with an asterisk indicates the "root" supported by the following evidence:

For simplicities sake lets pretend that 50% of todays youth multitask at every single possibility and the other 50% avoid it like the plague. A teacher may see this as a huge issue, that half his class is not working up to their full potential. [UTILITY] To be truthful, I can however say that it is only so in the short term. [UTILITY] In the long term it may in fact be a blessing. [UTILITY] Let for arguments sake a high school class was assigned an essay, and as aforementioned roughly half are very easily distracted. [CLAIM*] There are those that will tweet on their Facebook, and post on their pods or listen to their favorite new "hippity hop" band on their walkmans while

watching teen mom on the side, or whatever it is the kids are doing nowadays. [UTILITY] Every now and then they or two down on the assignment their oh so cruel teacher assigned. [UTILITY] While as the other half of the class will sit in a sound proof room, and go completely tunnel visioned until it is complete, so they can return to sitting in the corner praying or reading the bible, and donating ever weekend to the salvation army. [UTILITY] When the teacher has the awesome privilege to grade these two gems of literary excellence he will undoubtedly notice the differences. [UTILITY] The former will end all plurals in z for emphasis, have an above necessary reference to your momma, and is fighting tooth and nail to defend Justin Beiber and Selena Gomez crashing that Malibu wedding when the assigned topic was middle east transactions. [UTILITY] The latter will be clear, concise, literate, it will drive home focused thoughts with original thinking, it has an underlying voice and leaves you wanting more. [UTILITY]

And, we can see the same student responding to Nicholas Carr's "Is Google Making Us Stupid?" using internalized knowledge gained from being a student:

Merely googling your quandries cannot inspire the learning needed to advance society. [UTILITY] The internet offers a great many boons; [UTILITY] the ability to share knowledge universally, permanent copies of ones work, + centers to discuss + exchange, [DOMAIN KNOWLEDGE] however, it is not without limits. [UTILITY] The information that can be uploaded + shared is limited to what is known, [UTILITY] + if our wellspring of knowledge is to grow [UTILITY] we cannot depend on google alone. [UTILITY]

Rather than refer to hypothetical individuals whose habits support an argument (e.g. that 50% of students are diligent while 50% are dilettantes), at the junior level, the student refers to known facts about the internet to disprove Carr's argument that Google performs a significant amount of work for us. (And, to reiterate a point from earlier: we are not concerned with whether or not the argument works, only that it is made.)

It is also interesting to look at the nature of cited or paraphrased evidence in these timed writings. Students are given an excerpt of an essay or book and asked to respond, but they are not explicitly told to cite or refer directly to the work in their response.⁴⁷ However, in the tables

⁴⁷ In conversations among readers for these placement and junior timed writing exams, the disciplinary knowledge (of academia) to cite the thing prompting a response is an important component of the assessment. Where an individual

provided in Appendix A, we can see six making strong movement towards increased references to the text in their timed writings, with many of the citations falling under the “Building” citation function (statements in timed writings were coded with Harwood’s framework if they referenced the text directly at all, as citation conventions are not explicit in these tasks). Three make little movement toward or away from this practice, while four cannot be judged for a missing impromptu writing component, leaving only two with movement away from such practices. That a plurality of these students show movement not only toward increased citation (a practice generally recognized as important among academics) but towards increase *Building* citations is very important.

Student 26: English Education								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	1	5	5	5	4	4
Domain	Technology & Culture		English	English	English	English	Advertising & Ethics	
Words	516	407	967.6	1392	1193	4772	430	414

falls on the continuum of citing, quoting, paraphrasing, mentioning or failing to refer to the source material often suggests an assessment result.

tUnits	14	12	33	25.6	36.8	24	13.6	14
	7.2	8	6	17.2	13.6	15.6	5.6	9.2
Claims	(51.4%)	(66.7%)	(18%)	(67.2%)	(37%)	(65%)	(41.2%)	(65.7%)
Evidence	6.8	4	15.2	3.6	2.4	8	8	4.8
	(48.6%)	(33.3%)	(46%)	(14.1%)	(6.5%)	(33.3%)	(58.8%)	(34.3%)
Evidence: Outsider	0	0	1.64	0	0	0	0.8	1.2
	(0%)	(0%)	(11%)	(0%)	(0%)	(0%)	(10%)	(25%)
Evidence: Crossroads	4	3.2	4.72	0	0.1	0.8	6	3.2
	(58.8%)	(80%)	(31%)	(0%)	(4%)	(10%)	(75%)	(67%)
Evidence: Internal	0	0.8	7.24	0.4	0.2	1.6	0	0.4
	(0%)	(20%)	(48%)	(11%)	(8%)	(20%)	(0%)	(8%)
Evidence: Cited	2.8	0	1.6	3.2	2.1	5.6	1.2	0
	(41.2%)	(0%)	(11%)	(89%)	(88%)	(70%)	(15%)	(0%)
Evidence: Cited (Supporting)	0.8	0	0.8	0	2.1	1.2	0	0
	(11.8%)	(0%)	(5%)	(0%)	(88%)	(15%)	(0%)	(0%)
Evidence: Cited (Building)	1.2	0	0.16	1.6	0	4.4	0.8	0
	(17.6%)	(0%)	(1%)	(44%)	(0%)	(55%)	(10%)	(0%)
Evidence: Cited (Competency)	0	0	0.64	0	0	0	0	0
	(0%)	(0%)	(4%)	(0%)	(0%)	(0%)	(0%)	(0%)

As noted earlier, Building citations are not a result of passive deferment of authority: writers use Building citations to justify greater claims beyond the source material. Student 26's Placement Exam shows this while discussing Carr's "Is Google Making Us Stupid?":

At the end of the passage, Carr mentions that to read we have to teach our minds how to translate symbolic characters to be understood in our common language. [BUILDING] Many types of media and technologies can help us to learn and practice different types of reading. [CLAIM] Carr ends the passage saying that different "crafts of reading play an important part in shaping the neural circuits inside our brains." [BUILDING] I think this statement is very important because we can't and grow as writers and readers if we only follow one craft. [CLAIM]

In this example, Student 26 integrates Carr's words with his/her own first by paraphrasing a premise to build upon ("Carr mentions that to read we have to teach our minds how to translate symbolic characters..."), then expanding into a point s/he wishes to expand in this piece of writing ("Many types of media and technologies can help us to learn..."). We then get a direct quote from Carr, which is built into the larger argument that individuals must experience a variety of "crafts" of reading in order to "grow as writers," a claim Carr was not making in the excerpt. Student 26 identifies some truth in the arguments Carr makes and uses it to craft an additional argument on the

importance of reading a variety of types of text. Elsewhere in the timed writing, this student notes the limitations of Carr's argument that reading on the web is "definitely a different type of reading," arguing further that reading on the web "could create 'a new sense of self,' because we are able to be in faster and closer contact with people around us, even if they are far away" (Student 26, Placement Exam).

Following Student 26 to his/her junior year, we can see that the rhetorical moves in the placement exam – identifying relevant portions of the source text and building them into an argument not necessarily contained within that source – occur in the later timed writing. However, Anna Quindlen's "Killing the Consumer" deals with a topic many current college students are less familiar with: cigarette packaging and advertising.⁴⁸ Student 26, like many others, combines the scant historical information Quindlen provides with internalized knowledge of cigarettes and cigarette culture to craft a new argument on the intersection of law and ethics:

Unfortunately, under our constitution, people are allowed to print what they please. Quindlen's point of view and the government's overall viewpoints are similar – Camel No. 9 cigarettes are bad for the consumer, and they are afraid of the repercussions it will have on women's health. The nationwide consensus about cigarettes is similar to Quindlen's and the government's; they are bad for you. Many people know the dangers of smoking but continue this habit anyway, but the only way to resolve the differences of viewpoints is through education. Educating teens and children about the dangers of smoking can help them to quit before they start. Knowledge of these dangers can make young adults less likely to try cigarettes, and it's harder to quit once you've started. (Student 26, Junior Timed Writing, Analytical)

We can see several references to internalized or common knowledge: smoking is a difficult habit to quit, smoking has negative health effects, the government and consumers agree that smoking is bad, and we are all powerless in the face of the Constitution to stop advertisers from advertising harmful

⁴⁸ In this author's experience, and in the fourteen other responses to Quindlen examined in this study, few WSU students in the past decade have had firsthand experience with the pink Camel No. 9 boxes first released in 2007. Many argue in a fashion similar to Student 26 here: relying on internalized ethical knowledge regarding cigarette use and advertising and internalized knowledge of cigarettes' health effects.

products.⁴⁹ We can also see reference to several commonplace arguments: we need to quit bad habits before we start, and education about a social ill is the cure for it.

While the excerpt provided to students is not long enough to provide much detail or much of Quindlen's argument, students are given enough information to know that (a) Camel No. 9 is a new cigarette sold in a bright pink box, (b) Camel No. 9 was heavily advertised in magazines with teen and young adult demographics, and (c) members of Congress wrote letters to those magazines' editors asking them to pull the ads, but were refused. In this particular prompt, the student was asked "Clearly, on this complex issue there are other reasonable viewpoints. HOW DO YOU, PERSONALLY, RESOLVE THE DIFFERENCES AMONG THESE VIEWS?," language we can see re-used within the response.

What is important to note here is that the student is still referencing knowledge from within the excerpted text while still building a larger argument. The argument is not simply to say that Quindlen is right or wrong (a dualist response), just as Carr was not simply right or wrong. However, we saw cited evidence in the Placement passage being used to show that both Carr and the author could make true arguments (reading on the web is "definitely a different type of reading" that can "create a new 'sense of self'"), suggesting that the individual was not ready to discount the authority figure explicitly claiming that the "different" type of reading the web offers is detrimental to traditional reading (suggesting a multiplist or "Trusting External Authority" position). At the junior level, though, we see Student 26 making a stronger stand: the knowledge of the masses that cigarettes are bad, addictive and ubiquitous is less relevant to the discussion than the knowledge that

⁴⁹ The caveat is worth repeating: some of these internalized truths may not be true in reality (the government has restricted where cigarette companies can advertise as well as the possible nature of those advertisements), but they are presented largely as domain knowledge.

educating our youth can help them avoid becoming addicted (suggesting a relativist or “Crossroads” stance).

Domain Authority in Coursework

Looking beyond timed writings, we can see some of these trends occurring in coursework. However, there is not the same pronounced growth toward more varied citation functions: most of the citations are used in a Supporting fashion, placing the authority of knowledge squarely on the cited text. Students breaking this mold are typically writing from within applied-knowledge fields like, Engineering (Student 35), or within fields that rely on authorial interpretation to make arguments, like English (Student 26).

Student 1: Mechanical Engineering								
	Placement Exam: Analytical	Placement Exam: Reflective	BYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	3	3	6	0	8	8
Domain	Psychology & Culture	Psychology & Culture	English	General Education	Entom- ology	-	Climate & Science	Climate & Science
Words	304	133	2795	3025	1731	-	480	181

tUnits	10	5.2	48	67.6	23.2	-	12	4.8
	8	4	15.6	26	12.8		8.8	4
Claims	(80%)	(76.9%)	(32.5%)	(38.5%)	(55.2%)	-	(73.3%)	(83.3%)
	1.6	0.8	20.93	39.2	10.4		3.2	0.8
Evidence	(16%)	(15.4%)	(44%)	(58%)	(44.8%)	-	(26.7%)	(16.7%)
Evidence:	0.4	0	0.4	0	0		1.2	0
Outsider	(25%)	(0%)	(2%)	(0%)	(0%)	-	(38%)	(0%)
Evidence:	0.8	0.4	11.47	14.8	1.6		0	0.4
Crossroads	(50%)	(50%)	(55%)	(38%)	(15%)	-	(0%)	(50%)
Evidence:	0	0.4	4.6	14.4	0		0.4	0.4
Internal	(0%)	(50%)	(22%)	(37%)	(0%)	-	(13%)	(50%)
Evidence: Cited	0.4	0	4.47	10	8.8		1.6	0
	(25%)	(0%)	(21%)	(26%)	(85%)	-	(50%)	(0%)
Evidence: Cited	0.4	0	2.73	6.8	8.4		0	0
(Supporting)	(25%)	(0%)	(13%)	(17%)	(81%)	-	(0%)	(0%)
Evidence: Cited	0	0	1.07	2.4	0.4		1.2	0
(Building)	(0%)	(0%)	(5%)	(6%)	(4%)	-	(38%)	(0%)
Evidence: Cited	0	0	0.27	0	0		0	0
(Competency)	(0%)	(0%)	(1%)	(0%)	(0%)	-	(0%)	(0%)

In these instances, it is especially telling to look at the internalized evidence in use. Student 1's 100-level Entomology paper relies on cited, outsider evidence for five out of every six uses of evidence. This is partly due to the genre of the paper: an analysis of Robert Gottfried's book *The Black Death: Natural and Human Disaster in Medieval Europe*. Much of the discussion centers on explications of the claims that Gottfried makes in the book, coupled with citations to prove that the explication is accurate. However, there are moments when the student breaks into editorial mode, evaluating the work's contribution to a field that the student is only a novice in.

From a scholarly point of view, Gottfried's account of the Plague is among the best, most detailed commentaries of the Plague era, giving contemporary and historical insight into all aspects of the disaster. *Not only does it contain an excellent epidemiological overview of the plague, it wonderfully describes every effect the disease had on the western world.* [Domain Knowledge] The quality of his commentary is top notch and gives a real understanding of every aspect of the Black Death. ... The language used by Gottfried throughout, although not particularly advanced, can be found to be very dry and almost textbook as many pages are a veritable wall of text. *Many sections, specifically chapters three and four, are packed with dates and numbers that can seem to drag on. These chapters, while informative, can feel unnecessary after a time and prove difficult to sift through. This book can be very difficult to get through for anyone not looking for a dense, academic account, even*

for its small size. [Domain Knowledge] This does not detract from its overall quality, however, as, although not a simple read, it is an incredibly informative and incredibly detailed account and should be respected as such. Over all, Gottfried's work makes an excellent academic aid for anyone interested in either medieval Europe or the history of disease and medical entomology. (Student 1, Junior Writing Portfolio Paper 2; emphasis on statements marked as evidence)

Note that, in the first case, the student claims authority over general epidemiological knowledge, stating that Gottfried's book "describes every effect the [Black Death] had on the western world." This is understandable enough: after absorbing the content of the book and participating in a course that included insect-based epidemiology discussion, the student likely felt like s/he had some authority on the matter. However, looking below, we see knowledge coming from a different domain: "Many sections... are packed with dates and numbers that can seem to drag on. These chapters, while informative, can feel unnecessary after a time and prove difficult to sift through. This book can be very difficult to get through for anyone not looking for a dense, academic account..." Here, Student 1 is no longer evaluating Gottfried's work on its epidemiological or entomological content. Instead, we see domain knowledge from composition being used to evaluate the work as "dense" or evaluate specific portions as "packed" with data and "unnecessary."

It's a small move, but it is important. While professional entomologists do care about the surface features of their prose, Student 1 is evaluating the text with page-design criteria. Not only is the student transferring knowledge from another domain to evaluate the book, that knowledge is used to create a sense of authority, noting that this "does not detract" from Gottfried's overall work and that the book "should be respected" for its contribution to the field. Outside of this Entomology paper, Student 1 shows quite a bit of comfort mixing different knowledge types: in English and General Education (roughly equivalent to History), two-thirds of the evidence used is internalized knowledge or Self-Authored knowledge. Cited evidence is spread between Supporting, Building and other functions. By the measure of this study, it's difficult to say whether Student 1

really grows epistemologically over his/her general education coursework as there was never a purely authority-driven or Self-Authorship—driven stance demonstrated in his/her writing.

But, perhaps Student 1 felt comfortable using many ways of knowing in this writing because all were outside of his/her major, Mechanical Engineering. At WSU, Engineering majors are heavily structured and generally require students to commit to a program of study within the first semester in order to graduate within five years.⁵⁰ As Student 1 was taking Entomology in the 6th term at WSU (the end of sophomore year), s/he is likely to already identify him/herself as a Mechanical Engineering student. Muis (2007) has noted that epistemic beliefs within a domain influence an individual's standards for knowledge and learning (see also Muis & Franco, 2009; Muis, Kendeou & Franco, 2011), which may explain Student 1's willingness to "do English" in Entomology: if Student 1 sees him/herself as a Mechanical Engineering student, s/he may not have firm epistemic beliefs in Entomology or may not see a threat in mixing different domains.

We might examine Student 35's work in Physics to see if the nature of his/her self-authored evidence follows with Student 1's work in Entomology.

Student 35: Civil Engineering								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	2	2	4	8	5	5
Domain	None		English	English	History	Physics	Technology & Culture	
Words	-	-	774	3887	3887	281	479	131

⁵⁰ For instance, the Mechanical Engineering recommended course schedule indicates that five courses are prerequisites to seeking certification in the major, and upon finishing them in the third semester, a Mechanical Engineering student's schedule is composed almost entirely of Mechanical Engineering coursework. see <http://catalog.wsu.edu/Pullman/Academics/DegreeProgram/3805>

tUnits	-	-	26.7	76	30.8	8	12.4	3.6
			12.95	27.2	10.8	1.6	8.4	2.4
Claims	-	-	(49%)	(35.8%)	(35.1%)	(20%)	(67.7%)	(66.7%)
			6.16	48.8	20	6.4	3.6	1.2
Evidence	-	-	(23%)	(64.2%)	(64.9%)	(80%)	(29%)	(33.3%)
Evidence: Outsider	-	-	0.08 (1%)	6.8 (14%)	0.4 (2%)	0 (0%)	0 (0%)	0 (0%)
Evidence: Crossroads	-	-	1.44 (23%)	26.8 (55%)	9.2 (46%)	5.2 (81%)	1.2 (33%)	0.4 (33%)
Evidence: Internal	-	-	2.72 (44%)	11.2 (23%)	6 (30%)	1.2 (19%)	0.4 (11%)	0.8 (67%)
Evidence: Cited	-	-	1.92 (31%)	4 (8%)	4.4 (22%)	0 (0%)	2 (56%)	0 (0%)
Evidence: Cited (Supporting)	-	-	0.8 (13%)	3.6 (7%)	4.4 (22%)	0 (0%)	0.4 (11%)	0 (0%)
Evidence: Cited (Building)	-	-	0.8 (13%)	0 (0%)	0 (0%)	0 (0%)	1.6 (44%)	0 (0%)
Evidence: Cited (Competency)	-	-	0 (0%)	0.4 (1%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

As Student 35 is a Civil Engineering student, Physics (a course completed at the end of junior year) is a much closer domain to what s/he is likely to identify as. The paper, a lab report, examines Newton's Third Law (the symmetry principle, stating that all forces act in equal and oppositely directed pairs), which is fundamental for civil engineers to understand concepts like *moment*.⁵¹ The lab itself consisted of students using special sensors to record the impact force between two small, wheeled carts under different conditions: adding weight to one or both carts in some circumstances or connecting the carts with string in others. The report consists of descriptions of each of these conditions and graphs of the data generated by the impact sensors. Student 35 summarizes the results of the data as follows:

⁵¹ In structural engineering, an object's "moment" is the sum of stresses interacting on it. Students taking introductory Physics courses often learn to draw diagrams depicting the various forces acting on an object as a way of explaining movement and acceleration. Structural engineers deal primarily with non-moving structures, so calculating an object or member's moment is a direct application of Newton's Third Law. Non-engineers see the results of this in examples like warning signs before bridges: vehicles with specific weight-to-axle ratios are forbidden from using some routes because they would create a moment exceeding the structure's ability to continue standing.

Cases 1 through 3 showed us that mass did not have an effect on the forces generated from newton's third law. [Domain Knowledge] When the carts have forces pulling them apart they appeared to be equal and negative because they were going away from each other. [Procedural Knowledge] When the carts were pushed together the force was positive and equal on each cart. [Procedural Knowledge] Case 3 was the same as Case 1 results but strings can only pull. [Domain Knowledge] (Student 35, Junior Writing Portfolio Paper 3)

While this summary uses language and knowledge appropriate for Physics, it is important to note that the student described Case 3 just before the summary with terms more appropriate to Civil Engineering courses: "The string only allows us to pull the carts apart to create a force because the string can't be *in compression*." While traits like compression, tension, shear and torsion are not proprietary to Engineering, they are descriptors used to describe particular types of moment forces – e.g. pulling one of the carts created a tensile force in the string which acted upon the second cart. Strings cannot act "in compression" because pushing the carts together would only cause the string to go limp, not push the second cart backwards. In all of this discussion, we see domain and procedural knowledge – the two sources of knowledge associated in this study with the "Crossroads" stance – rather than claims. The student does not tell us what s/he observed as much as convey those observations via the explanations of their mechanics.

Where Student 1 offered some combination of ways of knowing in his/her review of a book about the Black Death, read for a class in Entomology, while s/he was preparing to enter an Engineering program, Student 35 relies only on the knowledge generated through the experiment (Procedural Knowledge) and internalized knowledge about the physical laws of the universe (Domain Knowledge). There is no additional evaluation of the experiment or what s/he may expect if additional variables were added (so, no evidence from logical reasoning/Utility codes). There is no statement that something occurred in a particular way or that something should be expected specifically because an external authority figure said so. Even Newton himself exists only as an

identifier of the physical law, “Newton’s third law.” This is about as empiricist an epistemology as we might find, which fits the lab report genre.

However, if Student 35 is an empiricist when working in a domain adjacent to Engineering and in a genre common to his/her major, we might wonder whether the numbers shown in the tables above indicate that s/he is always an empiricist. His/her English paper submitted as part of the Junior Writing Portfolio examines doomsday scenarios, frequently from the point of view of a scientist/engineer – Global Warming is discussed as a problem of the atmosphere’s ability to process thermal energy, while the “Mayan Calendar” doomsday of 2012 is discussed in terms of increasing earthquake frequency and building design. S/he notes solar storms, predicted to be occur with great intensity in 2012, are a likely doomsday scenario because of our reliance on electronics, but s/he also points to his/her discipline for comfort, saying that “Engineers are working on creating electronics that will not be affected by solar storms.” While the doomsday scenario is real, Student 35 has faith in his/her domain’s ability to solve problems, enough that the scenario is shrugged off within a paragraph.

Student 35, however, does discuss another domain’s methodology in his/her approach to the end of days.

Nostradamus has also predicted that a comet or asteroid will hit Earth in 2012. Nostradamus’ predictions have come true in the past. He predicted the rise and fall of napoleon and Hitler, the bombing of Hiroshima, the assassination of JFK, and the destruction of the World Trade Center towers (Dutta Ratnashri). He stated that a comet or planet called Nibiru will pass Earth after the year 2000. How did he come up with this prediction? He makes his predictions through a combination of astrological study and divine inspiration. He writes these in quatrains, four lined verses. His major work of prophecies is titled “The Prophecies of Michel Nostradamus”, and contains about a thousand quatrains. If his predictions have been coming true, will this surely happen in 2012? It is hard to disagree with someone who has been proven right before. I believe the science. This planet would have to be closer than Saturn is to us now to reach us in less than 2 years. This theory must be a hoax. This is why I do not believe that the world will end on December 21st 2012. (Student 35, Junior Writing Portfolio Paper 2)

In each of Student 35's other discussions, doomsday predictions, however implausible, were discussed with some measure of scientific credibility. Solar storms, for instance, can be predicted, and a large storm was predicted near 2012. However, Nostradamus' predictions are not taken as seriously. Although "it is hard to disagree with someone who has been proven right before," Student 35 "believe[s] the science." It is difficult to say exactly what this means – after all, if someone could consistently predict the future, shouldn't that suggest that there's a science of some kind at work, similar to the way one might "predict" a tornado with enough meteorological knowledge?

Student 35's difficulty with Nostradamus comes with an implied critique of the prognosticator's methodology: "[Nostradamus] writes these [predictions] in quatrains, four lined verses. His major work of prophecies... contains about a thousand quatrains." Of a thousand quatrains, we are told about five that have "come true." Student 35 implies that this may simply be an effect of the law of large numbers before moving into a more robust scientific explanation: if the object coming to strike the Earth was a planet, it would need to meet certain criteria in order to be on its way here, and no one has observed evidence of any celestial body meeting those criteria.

Again, we see an individual whose knowledge values do not show much change over time. Aside from this English paper, much of Student 35's non-cited evidence tends to come from internalized knowledge and logical reasoning. Cited evidence tends to be used for building arguments as often as simply supporting them, with the exception of writing in History. This may be a result of the paper topic and approach: Student 35 discusses global trade and life in general as inherently unfair and not something we should attempt to make fair. It proceeds from the assumption that attempting to impose fairness through tariffs and other protectionist policies only damages global trade practices, and much of the cited evidence used is statistics on either the effects of trade regulations or the additional tax rates various countries impose on imported goods. While

this evidence could be used to Build a new argument or to show general Competency in the subject (not to mention other functions Harwood defines), it is used entirely in direct support of claims that the world is not fair and that trade regulation attempting to create fairness does not work as planned.

Growth in Impromptu Writing, Display of Authority in Coursework

Previous research suggests that, over time, we should expect students to make two transitions in their use of knowledge to support arguments: we should see evidence of movement toward what Perry called “multiplicity” and “relativism” (1999), and we should see evidence of movement toward what Baxter Magolda termed the “Crossroads” and “Self-Authorship” (Baxter Magolda & King, 2012; Baxter Magolda, 2002). Both of these cases should manifest through increasing proportions of evidence coming from internalized domain and procedural knowledge (described as “Evidence: Crossroads” in the tables above) and decreasing proportions of Supporting citations as students take more authority over the knowledge they use to craft arguments. Essentially, students should begin taking the reins, rather than simply deferring authority on a topic to some external figure. We see this growth particularly in the timed writings bookending the students’ writing experience.

Middle Length Quintile

Students in the middle length quintile have between 299 and 424 coded units, representing 20 to 50 pages of writing in this study. Some students in this group – like Students 8 and 84 – had several long FYC works coded and few other works. It is interesting to note the range of majors represented in this group. Although students are typically just entering their major by the time they reach the Junior Writing Portfolio, some programs like Engineering, Business, and Apparel Merchandising, Design and Textiles have structured sequences that require a student to begin these

courses before the junior year. It is interesting to note that the middle quintile, like the top, is not dominated by any particular major or type of major.

Student	Major	Words	Pages
8	Business & Finance (Double Major)	12803	51.2
100	Apparel Merchandising, Design and Textiles	9789	39.2
84	Agriculture Technology and Production Management	9691	38.8
70	Communication	9223	36.9
91	Accounting	9102	36.4
12	Mechanical Engineering	8209	32.8
92	Sport Management	8110	32.4
67	Movement Studies	8051	32.2
85	Social Sciences	7604	30.4
33	Management and Operations	6805	27.2
3	Mechanical Engineering	6577	26.3
111	Entrepreneurship	6540	26.2
68	Apparel Merchandising, Design and Textiles	6167	24.7
58	Wildlife Ecology	6007	24
25	Psychology	4957	19.8

Table 11: Students in the Middle Quintile of Coded Units

Epistemological Stability and Disciplinary Amateurs

Students in this quintile can generally be seen adhering to the stances they entered WSU with, and their overall proportions of claims and evidence types are similar to their peers in the top quintile. While students in this quintile generally produce the same amount of text per document as those in the top quintile, they have fewer coded units, suggesting either a sentence structure featuring longer clauses or fewer pieces of writing in the FYC category. As both the top and middle quintiles have about 45% of their coded units in FYC writing on average, it seems that clause length is the likely cause of the difference.

This is an interesting point to note: Halliday (2004) has described two major clause structures in English grammar: doric and attic. Halliday described doric grammar as colloquial and

informal in nature. Doric grammar uses subordination to abstract individual conceptual components of an idea, turning complex ideas into a series of simple ideas, increasing clause length. In comparison, attic grammar is scientific and compact, typically using nominalization to compound a series of concepts into one complex concept.

Halliday argues that, grammatically, the nominalization process of attic grammar comes after the simple mapping process of doric grammar (2004, p. 107). Further, that the concepts represented by a grammatical chunk represent individual “happenings” in human experience (p. 109), similar to what diSessa (1993) called p-prims. Condensing complex ideas into a single nominalized unit may be an indicator of a conceptual framework advancing towards what Vosniadou called a “scientific” framework. In terms of student writing (or writing in general), this would mean that a greater proportion of subordination moves – what we may call “choppy” writing – signals that the writer is still trying to incorporate some concept into his/her conceptual frame.

We can see the concept at work in student writing. While students in the middle quintile are by no means identified by this move in particular, their increased t-unit length suggests that they may be a fruitful group to identify this kind of intellectual move. We might look at Student 67 as an example: this writer had 16 t-units per 250 words in his/her Placement Exam timed writing and 45 t-units per 250 words in his/her Human Development 202 research paper. While some of this may be due to the genre or the coder, such a wide disparity is worth investigating,

Student 67: Movement Studies								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tr. Wrt.: Analytical	Junior Tr. Wrt.: Reflective
Term	0	0	1	3	0	0	6	6
Domain	Climate & Rhetoric		English	Human Dev.	-	-	Technology & Education	
Words	845	312	119	2342	-	-	851	344
tUnits	16.4	6	16.8	45.6	-	-	19.6	9.2
	9.6	4.8	4.9	14			12	6
Claims	(58.5%)	(80%)	(29%)	(30.7%)	-	-	(61.2%)	(65.2%)
	6.8	1.2	1.75	31.6			7.6	3.2
Evidence	(41.5%)	(20%)	(10%)	(69.3%)	-	-	(38.8%)	(34.8%)
Evidence: Outsider	0.4 (5.9%)	0.4 (33.3%)	0 (0%)	0 (0%)	-	-	0.8 (11%)	0 (0%)
Evidence: Crossroads	4 (58.8%)	0.8 (66.7%)	0.2 (11%)	0 (0%)	-	-	3.6 (47%)	3.2 (100%)
Evidence: Internal	0.8 (11.8%)	0 (0%)	0.2 (11%)	6.8 (22%)	-	-	0.4 (5%)	0 (0%)
Evidence: Cited	1.6 (23.5%)	0 (0%)	1.35 (77%)	24.8 (78%)	-	-	2.8 (37%)	0 (0%)
Evidence: Cited (Supporting)	0.4 (5.9%)	0 (0%)	0.75 (43%)	24.8 (78%)	-	-	0 (0%)	0 (0%)
Evidence: Cited (Building)	1.2 (17.6%)	0 (0%)	0.45 (26%)	0 (0%)	-	-	0 (0%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	0.05 (3%)	0 (0%)	-	-	0 (0%)	0 (0%)

Although Student 67 had not yet certified into Movement Studies, the degree program is competitive. The WSU catalog notes that “Applicants who meet the minimum requirements are eligible for consideration, but not assured admission. Enrollment is limited and admission competitive.” Although Human Development 202 focuses on interpersonal communication, Movement Studies is a degree program that leads to professions that put the individual in intimate contact with others, such as physical therapy and fitness training. By contrast, Student 67’s

placement exam focused on rhetorics surrounding climate change, specifically Michael Pollan's essay "Why Bother?" If this student's writing features more doric grammar, this epistemological or conceptual mismatch could be one reason. We might also assume that, because the student took Human Development 202 a year after the placement exam, the increased t-unit count is a signal of growth in writing complexity over all. However, looking at the student's junior timed writing, we can see that s/he is producing roughly 20 t-units per 250 words when discussing an excerpt from an article on video games as an effective education tool.

In the first paragraph of Student 67's analytical portion of the placement exam, we can see quite a few uses of internalized domain knowledge about rhetoric and climate change, but they are largely surface-level.

Climate change is a current issue of the world which has many different approached from people of different communities, states and nations. [CLAIM] It is a global concern to the world as it effects nearly every region on the Earth. [CLAIM] I will focus on this issue by looking at the reading material "Why Bother," written by Michael Pollan and his view of the topic. [CLAIM] I will also discuss other views and ideas that people may have on the issue of climate change, and what may be the best way to approach this complex issue. [CLAIM] Either way [illegible] stop it or every little bit work. [CLAIM] Climate change has become a well known political and social topic over the last decade. [DOMAIN KNOWLEDGE] It is the concern of a global shift in climatic conditions, which is having a negative effect on our natural environment, due to the industrialization and CO2 emissions people of the world have created. [DOMAIN KNOWLEDGE] Michael Pollan has written about this issue and has described his view on the topic, inferring in his passage that this issue is now so large, how can just one person influence and change the problem. [BUILDING] For example, in the passage Pollan writes "the magnitude of the problem Gore had described and the puniness of what he was asking us to do about it was enough to sink your heart." [SUPPORTING] This proves that Pollan believes that we can only do a little to try and help stop and reverse this huge issue that we are facing. [CLAIM] Also in the passage "Why Bother," Pollan suggests that even if we do try and help a little, all our efforts will be un done by another individual who will not even try to think about stopping or reducing CO2 emissions, that are causing climate change. [CLAIM] Pollan refers to this person as his "evil twin" which again re-enforces his attitude that there is no point trying to change now because other people are just going to keep crossing out all the hard work you put in. [BUILDING]

This student is aware of some conventions of academic writing and of timed writing exams. S/he refers to the provided text several times, correctly referencing the author and title, and uses quotation marks to signal phrases that have been used from the text. Although it does not rely on the kind of “patchwriting” Rebecca Moore Howard describes (1999), we can see the author patching together concepts that Pollan refers to directly and the concepts s/he is bringing to the discussion.

In particular:

Also in the passage "Why Bother," Pollan suggests that even if we do try and help a little, all our efforts will be undone by another individual who will not even try to think about stopping or reducing CO2 emissions, that are causing climate change. Pollan refers to this person as his "evil twin" which again re-enforces his attitude that there is no point trying to change now because other people are just going to keep crossing out all the hard work you put in.

We could collapse the eighty-five words of these two lengthy sentences into a single, twenty-five word statement:

Pollan suggests that individual efforts to reduce CO2 emissions could be undone by an “evil twin,” reinforcing the attitude that individuals cannot make a difference.

The point to consider here is that Student 67 is grappling with a conception of the climate change topic that requires more than individual efforts to reduce waste. It cannot be known for certain whether s/he had ever been asked to consider the magnitude of the climate change problem and what an individual’s role could be in affecting it. But, we can see in this passage and the shorter excerpt above that it takes many words and phrases to address the issue Pollan identifies.

The first paragraph of Student 67’s placement exam analytical writing spans 333 words. Long paragraphs are not uncommon for the timed writing exams; some students even write a single paragraph of several hundred words for the entire prompt. In comparison, the first 328 words of his/her Human Development 202 writing comprises two full paragraphs (including a 60 word block quote). In this research paper, we get a greater emphasis on cited evidence rather than the student’s

internalized knowledge, which should be expected for the genre. However, consider the sentence lengths in this excerpt:

Discrimination is a word heavily avoided by politicians and governing bodies. [CLAIM] Openly expressing discrimination in American society is frowned upon. [CLAIM] Yet, it is hard to believe that this is true when discrimination is written into Federal Legislation. [CLAIM] The federal legislation Defense of Marriage Act (DOMA) was passed in an effort to "defend the institution of traditional heterosexual marriage" (Clarkson-Freeman 2). [SUPPORTING] In doing so, this legislation has further polarized and diminished the rights of the lesbian, gay, bisexual and transgendered community (LGBT). [UTILITY] In particular, this federal legislation is damaging to military service members, their partners and bi-national same-sex couples applying for immigration. [UTILITY] I will outline the operation and effects of the DOMA, particularly in regard to its discriminatory effect in light of these two specific areas. [CLAIM] I will then demonstrate that the current proposals for law reform of the DOMA are favorable, and need to be undertaken in order to improve the lives of individuals in this minority group. [CLAIM]

The DOMA was signed on September 21, 1996 by the then President Bill Clinton (Clarkson-Freeman 2). [SUPPORTING] This law explicitly defines marriage as a legal union between "one man and one woman" (Clarkson-Freeman 3; Smith 308). [SUPPORTING] In addition, the DOMA outlines that if the word spouse appears within any federal law or regulation, it is referring solely to a member of a mixed-sex marriage (Smith 308). [SUPPORTING] The construction of the DOMA had two main purposes as outlined by Clarkson-Freeman's article "The Defense of Marriage Act":

The purpose the DOMA is (1) To defend the institution of traditional heterosexual marriage, and (2) To protect the right of the States to formulate their own public policy regarding the legal recognition of same-sex unions, free from any federal constitutional implications that might attend the recognition by one State of the right for homosexual couple to acquire marriage licenses. [SUPPORTING]

Therefore, the DOMA federally bars recognition of same-sex marriage as carried out by individual states that grant same-sex couples the right to marriage. [UTILITY] Military personnel and couples seeking immigration approval are greatly affected by implementation of this legislation. [CLAIM]

Perhaps because this is written in a much more procedural fashion, or perhaps because the student has a greater awareness of the topic, we see much shorter sentences. While many are complex sentences, this complexity is generated by introductory words and phrases, like "yet," "therefore" and "in doing so." Concepts are clearly delimited with minimal elaboration.

This shift between the placement exam writing and the Human Development writing may signal a difference in disciplinary membership. Student 67's FYC papers were likewise from outside the domain of Kinesiology: they largely focused on standardized testing and educational policy. While the student was able to use personal knowledge and experience to support claims in these papers, they likewise required quite a bit of doric elaboration to connect concepts and ideas.

What Does This Tell Us?

Howard (1999) suggested that student writers may struggle with awkward sentence constructions and “patch-written” passages as they internalize knowledge from other sources. In this view, doric grammar can be an indicator of a student attempting to discuss unfamiliar knowledge before fully assimilating it. Examining student work at this level identifies domains in which the writer is more comfortable expressing his/her knowledge, and comparing it longitudinally to other works identifies. Student 67 is an extreme example of a student writing in very different styles for different domains, but the pronounced shift towards more compact clauses, even when working with cited evidence, suggests more successful internalization and operationalization of relevant knowledge.

While we might consider this sentence-level focus the purview of Student 67's instructors, irregularities in t-unit length between documents raised concerns over the nature of those papers. Halliday's work was not part of the original theoretical framework for this study, but it does provide a useful lens for understanding individuals like Student 67, who have very different writing styles and structures for different tasks, particularly when it comes to subjects that fall beyond their major's domain. Unfortunately, data collection for this study did not include identifying these grammatical shifts along with epistemological moves. Future work on this data set should pursue the possibility

of grammatical shifts indicating an individual's disciplinary membership or internalization of knowledge.

Bottom Length Quintile

Students in the bottom length quintile have between 10 and 25 pages of writing represented in this study. Six students were removed from this quintile because too large a majority of their work (and, in the case of Student 66, all of the work) came from one or more data points in a single course. Most often, this was FYC work, but some students also submitted several Junior Writing Portfolio papers from the same course. The students represented in this quintile are not poor writers, they are simply the group with the fewest coded statements. This may be because their work tended to use long or complex sentences (e.g. Student 13 averaged 10 t-units per page, as compared to Student 7 in the top quintile, who averaged around 20 t-units per page) or because fewer of their works were usable (e.g. only one of Student 117's FYC papers could be used in this study, as compared to four for Student 108, in the second quintile).

Student	Major	Words	Pages
78	History	6367	25.5
117	Basic Medical Sciences	6199	24.8
95	Architecture	5714	22.9
62	Chemical Engineering	5097	20.4
94	Computer Science	4668	18.7
98	English	4032	16.1
47	Communication	3715	14.9
13	Social Studies	3153	12.6

Table 12: Students in the Bottom Quintile of Coded Units

A Convenience Sample of Convenience Samples?

The qualities of the writing produced by students in this bottom quintile are largely similar to their peers in the other quintiles. Of the usable writing for this study, 10 of the students in the top quintile had at least one piece of writing produced within their major, and 4 in the middle and

bottom quintiles. While it is rare and counter to design that a student would turn in two or more pieces of general education coursework from within his or her major area, many students are able to find at least one piece of writing from within their intended domain, as most⁵² degree programs offer lower-division courses for non-majors and prospective majors seeking to fulfill general education or elective credit.

While internal research at WSU has shown that students who keep track of pieces of writing for the Junior Writing Portfolio tend to perform better in the Junior Writing Portfolio process (Bill Condon, personal communication), the assumption has always been that such a level of preparation allows the student to choose documents that will best represent his/her writing. The alternative phrasing of the assumption is that students scrambling to gather material in the semester or two before the portfolio is due may be submitting any writing their professors assign (such as a short answer exam or hand-written lab report). We might also consider the kairos of the general education curriculum's intersection with the Junior Writing Portfolio deadline: most students are only just beginning to certify into their majors at this point, so the writing submitted may not align with their own personal epistemologies or interests (affecting the internalized knowledge available to the writer). Given the nature of the writing submitted in this quintile, this group may have also needed to approach their portfolio process as a convenience sample, simply using whatever writing they had available.⁵³

⁵² To my knowledge, all degree programs have some introductory course in the first- or second-year. Even programs, like English, that use a 300-level course introducing the major have some lower level course for majors and prospective majors. For example, three students in this set submitted the final reflection paper (the only writing assignment) from Engineering 120, a sixteen-week overview of the engineering majors available at WSU.

⁵³ Alternative explanations include transfer students, students who may not be particularly strong writers, or students who managed to complete between two and three years of work at WSU without completing many writing assignments. Even in these cases, these students may have ultimately found themselves searching for any kinds of writing that satisfied the Writing Program's requirements.

In the top quintile, two students earned a Pass with Distinction, while the other thirteen earned a Pass. In the middle quintile, two earned an Incomplete, one a Distinction, and the other twelve a Pass. In the bottom quintile, only one student earned an Incomplete, while the rest earned a Pass. None of these rates within quintiles falls far outside the study-wide Pass rate of just over 80% (Table 3), and as noted in Chapter 3, those rates do not fall far from the university average for the period in which these portfolios were completed.

Aside from the domain mismatches between major and general education coursework that occur more frequently than with students in the top quintile, this group is not substantially different from the other quintiles except that it has fewer coded units and shorter pieces of writing. However, the generally reduced text length highlights areas that might bear some fruit if examined along these lines of epistemological mismatching. In examining self-regulated learning strategies, Muis et al. (2009) found that self-regulated learning, including task evaluation, was enhanced when an individual was performing in a task in line with his/her epistemic beliefs. Klaczynski and Lavalley's earlier work (2005) found that epistemic beliefs can create reasoning biases against domains outside an individual's domain-specific identify development. For these reasons, we might expect longer or more complex writing to be associated with an area in which the student is more engaged or has internalized more of the domain's knowledge and practices, especially as compared to areas that the individual has less domain-specific identify development.

Student 95 is noteworthy in this respect. As an Architecture major, Student 95 enrolled in the somewhat-introductory Architecture 202 during the same semester s/he enrolled in FYC. Architecture 202 focuses on theories and practices of architectural design, while his/her FYC course focused on elements of culture that influences him/her, like music. Of particular importance here is a pair of writing assignments produced that semester for these classes: the FYC instructor assigned a

short, written response to every draft the student produced during the course, while the Architecture instructor assigned a written response to a guest lecturer.

Student 95: Architecture								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	2	2	0	0	7	7
Domain	Technology & Culture		English	Arch.	-	-	Psychology & Culture	
Words	465	237	551	534	-	-	585	202
tUnits	11.6	8.4	10.6	11.6	-	-	13.2	4.8
Claims	6.8 (58.6%)	5.2 (61.9%)	8 (75%)	4.8 (41.4%)	-	-	6.4 (48.5%)	3.6 (75%)
Evidence	4.8 (41.4%)	3.2 (38.1%)	2.6 (25%)	6.8 (58.6%)	-	-	6.8 (51.5%)	1.2 (25%)
Evidence: Outsider	0.4 (8.33%)	0 (0%)	0.2 (8%)	5.2 (76%)	-	-	0 (0%)	0 (0%)
Evidence: Crossroads	3.6 (75%)	1.2 (37.5%)	0.8 (31%)	1.6 (24%)	-	-	4.4 (65%)	0.8 (67%)
Evidence: Internal	0 (0%)	2 (62.5%)	1.6 (62%)	0 (0%)	-	-	0.4 (6%)	0.4 (33%)
Evidence: Cited	0.8 (16.7%)	0 (0%)	0 (0%)	0 (0%)	-	-	2 (29%)	0 (0%)
Evidence: Cited (Supporting)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	-	-	1.2 (18%)	0 (0%)
Evidence: Cited (Building)	0.8 (16.7%)	0 (0%)	0 (0%)	0 (0%)	-	-	0.8 (12%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	-	-	0 (0%)	0 (0%)

These two documents are worth examining further as a pair. They are roughly the same length (between 500 and 600 words, right around 11 t-units per 250 words). They are both reflections, one (FYC) reflecting on the composition process for a particular paper and the other (Architecture) reflecting on the connections between a lecturer's statements and course material. The one key difference between the two is that the FYC writing is in the domain of composing

processes, and it asks the writer to call upon his/her knowledge of what makes a good piece of college writing, while the Architecture piece is in the domain of urban planning. Delving deeper, we find subtle qualitative differences between the two.

Student 95: FYC Reflection

By continuing to work on these writing components, my critical thinking and rhetorical awareness will get better and I will become a well developed writer. [Claim] Although it was a challenging part of the whole process, it has helped me greatly in regard of choosing the right and legitimate resources. [Claim] Meeting in the library to learn about their service also was very helpful [Claim] I've learned how to gather resources using worldcat. [Procedural Knowledge] It helped me with find the scholarly articles that I needed with my research paper. [Claim]

I would say that the least useful about this assignment would be the proposal. [Claim] I don't think it serves no purpose but it didn't help me with the rest of my research paper because I had to change my topic. [Utility] All the changes I've made along the process had made my proposal less effective because it was no use for me to reference it. [Claim] Some of the changes were my argument. [Claim] In my proposal, I did not include any argument, [Claim] which caused me to put forth an argument in the next set of drafts to fulfill the parameter of this assignment. [Claim]

The peer review session for the research paper has helped me produced a good research paper. [Claim] Some of their reviews included: my paper's lack of focus, argument were not clear enough, and problem needed to be eradicated were not mentioned on my paper making it unsuccessful. [Claim] It benefitted my paper by helping me put forth an argument, and have focus in my paper. [Procedural Knowledge]

Revision played an important role in my project. ----- mentioned how my drafts seem incomplete and under developed. She also mentioned how my introduction was not doing much in regard of my argument. [Distant Outsider] Her feedbacks really helped me write a more successful research paper. [Claim] My final paper seems a lot more developed and complete than my first set of rough drafts. [Claim] My introduction on my first draft did not really serve any use. [Claim] To fix that, I took my introduction completely out of my paper and replaced it with my second paragraph which seemed more appropriate as an introduction because it contains the topic and my argument. [Domain Knowledge]

The easiest part the process was choosing a topic. [Claim] I'm really interested in architecture so choosing a topic was really easy for me. [Claim] The hardest part would be working on my final draft. [Claim] I was told by ----- that my paper was more of a report. [Claim] It was difficult for me revise my paper because of all the

major revisions that needed to make such as putting forth an argument, and having it well supported. [Claim]

My favorite part of my essay would be my introduction. Despite the problems it has, I was able to fix it and turn it into an effective introduction. [Claim] I am proud of my whole essay because I believe that I have put many supporting details that support my argument. [Claim]

This project really challenged my ability to think critically. [Claim] My first set of drafts weren't as successful as I wanted them to be because I wasn't to put forth an argument and my draft were rather underdeveloped. [Domain Knowledge] After peer reviews and revisions, I was able to write a paper that has a focus and I believe is well supported. [Claim] As a student, I grew more passion for architecture. [Claim] I was able to use what I've learned from my architecture classes and incorporate them well with my research paper. [Claim]

Student 95: Architecture Reflection

Mike Jobs' "Future Primitive" was a very informative lecture that focused on combining nature and urban places/city together to create a living city. [Claim] This idea was the product of Jobs' deep admiration on both natural wild/nature and the city. [Claim] His lecture was not only very informative but also relevant to me as I am currently learning about the built environment in Professor ----'s Arch202 class. [Claim]

Throughout Michael Jobs' lecture, He talked about many ideas that I could relate to Arch 202. [Claim] These ideas were: urban renewal, technology, strip mall, tourist bubble and city planning. [Distant Outsider]

Urban renewal, according to Professor ----'s lecture is " a joint effort between state and federal agencies to clean the cities and give it a new life" . [Distant Outsider] The main idea behind urban renewal is turning a problematic area, mostly over-industrialized places, and turning them into a better place. [Domain Knowledge] for example, During the Expo 74 in Spokane, Washington, an industrialized area was turned into park to give Spokane a better atmosphere/harmony or new life. [Domain Knowledge]

Same idea as Urban Renewal was discussed in Mike Jobs' lecture. [Claim] Jobs talk about bringing the natural environment into the city to create a living city. [Distant Outsider] Jobs' and his firms' idea was to help the environment by promoting sustainability. [Distant Outsider] They could accomplish this by bringing the natural elements in the environment into the city to create a harmonious living city or urban wild. [Claim] An example that Mike Jobs talk about was the idea of salmon spawning in the city. [Distant Outsider] This idea was to incorporate a river full of fish into the city to give it more dynamic feel and more sustainable. [Distant Outsider]

The next important idea that was I could relate to arch202 was the idea of technology. [Claim] In arch202 class discussions, readings, and lectures, we've discussed the role of technology today. [Domain Knowledge] From the inventions of kitchen tools/machines to the discovery of online shopping and faster communication, technology have come a long way. [Claim]

In mike Jobes' lecture, role of technology was seen in a different way. [Distant Outsider] because of the idea of sustainability, technology is underappreciated. [Claim] In contrast with all the we've talked about in class, such as the rapid advancements in technology, Mike Jobes's talked about a new way of seeing and using technology. [Distant Outsider] He saw high technology as a roadblock to promoting sustainability. [Distant Outsider] In order for a living city to be successful, it must tolerate the use of low technology instead if over-using high technology things. [Distant Outsider] The only exception that I saw in his lecture was the usage of technology in aquaponics vegetation. [Claim]

Lastly, the idea of tourist bubble was also imminent in both arch202 and the built environment lecture(s). [Claim] The idea of tourist bubble is to create a fun place where tourists can go and enjoy. [Domain Knowledge] Mike Jobes living city will create many visitors around the world wanting to witness how it is like to be in a place with both natural and urban elements. [Distant Outsider]

Urban renewal, technology, and tourist bubble are just some of the ideas that are relevant to me as an arch202 student. [Claim] Going to his lecture made me realize how these different ideas were being used in our world today. [Claim]

One striking difference between these two documents is the prevalence of supporting data as compared to claims. Even as the student notes being told that his/her writing "was more of a report," much of this reflection is simply reporting the process of composing and revising the paper the student is discussing. There are a few explicit connections to the composition knowledge that the student should be developing in FYC. The student claims that meeting in the library was helpful, and this claim is supported by the student's internalized procedural knowledge of the database system. In paragraph 4, we are told that the paper is much better, specifically because the student acted on the advice his/her instructor gave to make the paper better. At the end of the paragraph, we get some sense of internalization, that a paper ought to begin with a clear statement of a topic and argument. We see the student using the language of composition courses – development, critical

thinking and rhetorical awareness. But, there are no ties to specific moves or revisions the student has made. Much of the evidence supporting claims of what made the paper better over time come from peers or the instructor saying that certain improvements needed to be made.

Compare this to the lecture response for the lower-division Architecture class. While paragraph 4 is mostly a report of what Mike Jobes said in the lecture, the structure of the paragraph walks the reader through a series of connections: the controlling claim of the paragraph is that the same concept of urban renewal discussed in class (paragraph 3) was found in the lecture, as seen in a series of examples Jobes gave, each example linking to the student's domain knowledge of urban renewal as "turning a problematic area... into a better place." Paragraphs 5 and 6 follow a similar model, with the former briefly discussing a class concept (technology) and providing a concrete example, then the latter using Jobes' lecture to expand on that concept.

The student clearly and deliberately uses the language of the course to describe Jobes' lecture. But, where this student used two composition terms in the first sentence (critical thinking and rhetorical awareness, two assessment criteria in FYC) and the third in the final paragraph (development), we see the architecture terms sprinkled throughout the document. The student engages with them individually to discuss how Jobes' talk links to those concepts, and how those concepts linked to the course overall. The lecture response covers three broad areas of urban planning: renewal, technology and the tourist bubble, while the FYC reflection focuses almost entirely on the student's revised introduction.

Authority and Domain Identity?

While this critique is missing some crucial components of these assignments (namely, assignment prompts and any explicit templates the student may have been given), it is important to note that Student 95 matches his/her peers' general knowledge moves in many ways. Authority-

based knowledge is reduced between placement and junior timed writings, and the prompts themselves served primarily as grounds to Build an argument (especially at the junior level) rather than simple data to Support claims. Between placement and junior year, when FYC and Architecture 202 were taking place, we can see quite a bit of movement towards internalized knowledge as the primary source of evidence. The major split in this case is that self-authored knowledge seems to come out of claims where the student was less sure of the domain. Where Student 95 had some expert knowledge, we see very clear and easy connections between the lecture and course content. Where Student 95 had less authority (perhaps the result of an assignment that focused on the impact others have had on improving his/her writing), we see more reliance on syllogism, e.g. "I don't think [the proposal assignment] serves no purpose but it didn't help me with the rest of my research paper because I had to change my topic." In other words, the proposal assignment was less valuable due to the student's particular result. We also see increased reliance on Procedural Knowledge, identifying the techniques the student was supposed to learn in this assignment, without any additional discussion of why those techniques are useful or valuable (something that might extend from the student's composition domain knowledge or more detailed paraphrasing of peer and instructor comments).

These moves are similar to those demonstrated by other students discussed above. For example, Student 35's lab report, like many lab reports, is full of procedural knowledge. While scholarly lab findings might incorporate more domain knowledge (to connect findings with general theories, expectations or assumptions) or more citations (to connect findings to the larger scholarly conversation), student lab reports are often focused on specific ways of doing science or specific bits of domain knowledge (in Student 35's case, demonstrating conservation of energy by measuring impact forces). However, the major difference is in what the student does around those uses of

knowledge and in the ways that knowledge is (or is not) connected to the rest of the writing. Student 95's claim-heavy FYC reflection reported many of the things s/he was supposed to be doing during the writing process, but at a surface level. That same student's reflective writing in his/her major showed deeper, more complex connections.

Is there Growth?

The excerpts discussed above were chosen as clear examples of trends within each quintile. However, they are not indicative only of their quintiles. Student 67 is very similar to students throughout this data set, if only a more extreme difference in coursework writing statement length and impromptu writing statement length. Student 95's very different reflections between an in-major and general education course echoes findings in an earlier version of this study (Frye, 2013). While the top quintile most strongly showed growth in complexity between their timed writings and authority within their disciplines while writing for their general coursework, this may have been a result of the type of writing used for the Junior Writing Portfolio. Students in the bottom quintile, again, were not poor writers – many simply submitted documents that could not be easily scanned or coded in this study.

Most interesting in this data is the suggestion that domain specificity plays a powerful role in the epistemology a student displays in his/her writing. Student 95 showed a deep engagement with his/her discipline and the course when reflecting on a special lecture, while a teacher's and peers' revision comments on a large project in a general education course were generally just reported to the reader. Student 35 used language appropriate to his/her Engineering major in a Physics lab report, while Student 1 (another Engineer) relied on composition knowledge to evaluate an academic book in an Entomology class.

Qualities of Evidence Used

All of the large-scale, quantitative data points in one direction: undergraduates do show some development during their general education coursework, but that development tends to be an entrenchment in existing epistemological moves. Growth seems to be limited to some small movement towards increased reliance on internalized knowledge and some more complex uses of cited sources, but by and large, many students perform the same types of moves at the junior year that they did as incoming first-year students.

In examining the qualities of individual student writing, we can see some shifts in the complexity of evidence use. Simply quantifying the number of times a writer offered a claim or a piece of evidence did not provide the additional detail into what the student was actually doing in his/her writing. Student 95's Architecture writing featured much a lower proportion of Claims, but the nature of those claims was also different. In FYC, a course outside the student's major, claims existed as their own arguments, occasionally bolstered by uses of some other evidence. In Architecture, claims served as a launching point to discuss the student's internalized knowledge or the lecture's content, sometimes even as the connection between the two.

Perhaps that observation is due to the courses included here. Students not demonstrating much growth may have opted to take courses that aligned with their epistemological stances. Students unaware of a discipline's epistemological commitments may have only retained the papers for courses that aligned with their own epistemological stances. General education instructors, including those in FYC, may not have asked students to perform epistemologies beyond the students' own stances. In the case of highly structured majors like those in Engineering or Nursing, it could simply be that students entered WSU prepared to be that kind of thinker, and their general education coursework may not have encouraged them to stray far from those bounds. A host of

reasons may account for the entrenchment or minor growth demonstrated by students in this data set. But, is this so bad?

Yes. Of course it is. General education, or a liberal arts education, is expected to extend an individual's epistemological and intellectual boundaries (a notion that extends back from Bean [2016] and Kohn [1999], through Adler [1982] and Dewey [1902], back to the classical trivium), such that an Engineer is capable of thinking like a Historian or a Poet when the need arises,⁵⁴ or that the Poet can appreciate the Engineer's drive for mechanization and quantification when appropriate. WSU's general education curriculum is designed to expose students to a wide variety of ways of thinking and knowing. However, the data described above only describes the source and function of knowledge used by students in their writing. While further research would benefit from additional course documents, exams and observations to see what kinds of knowledge students are not only exposed to and using in their courses, but also the knowledge that they are encouraged to value.

A conclusion

As writing instructors, writing program administrators and academics in general, what do we do with this information? Chapter 5 explores these details further, but one clear implication of this data is that we must be very conscious of the epistemologies students are exposed to. In only collecting data between the placement exam and the Junior Writing Portfolio, this study effectively ceased its data collection at the point a student would certify into a major. Each individual's major is described as declared on their portfolio cover sheet. Because a majority of students complete this process by the first semester of their junior year (Neider et al., 2016), it is difficult to say whether

⁵⁴ In this case, one might look to Timothy Davis's excellent work on the history of the U.S. National Parks' road systems (2016). In the development of these transportation systems, Civil Engineers on the job were required to design roadways that emphasized nature's splendor, roadways that were minimally invasive, and roadways that were largely invisible when viewed from other points in the park.

these epistemologies continued until graduation or whether the individual changed majors before then.⁵⁵ But, we can note what was happening at the point at which many students declare or certify into their major: the majority of students observed favor evidence from the social sciences, evidence that favors complexity and interpretation over simple, observed facts.

This is in line with Baxter Magolda's model (Baxter Magolda & King, 2012), as well as with Perry's (1998) and Belenky et al.'s (1986) models. By the time they reach their major, students are less likely to be dualists. They make moves in writing that demonstrate their disciplinary authority, whether by applying extra-disciplinary analytical lenses as Student 1 did in Entomology, or they work explicitly with the disciplinary know-how (procedural knowledge) appropriate to the task at hand, as Student 35 did in a Physics lab report.

While one might raise the concern that these students were performing the tasks demanded of them, it is unlikely that a writing assignment set explicit rules for the acceptable knowledge types and techniques for using that knowledge. Student 1's Entomology paper could just as easily have discussed the compositional features of the text via the opinion of some other authority. For instance, Student 1 criticizes the book for being "packed with dates and numbers that can seem to drag on... This book can be very difficult to get through for anyone not looking for a dense, academic account, even for its small size" (Student 1, Junior Writing Portfolio Paper 2). While this may seem like a common complaint about any assigned text, consider this portion of a caustic review by economic historian Stuart Jenks, discussing the text's footnoting practices and the author's apparent penchant for paraphrasing a little too closely from the original sources:

⁵⁵ For instance, students report leaving the Engineering discipline after reaching a point at which their own self-images or understanding of an engineer's ways of knowing cease to align with their coursework (Seymour, 2000). Some students may have noted a major and later transferred to another, but no data was collected in this study to know for sure.

Although such examples of erroneous citation could be multiplied, it would be false to say that they are common because 63 percent of his citations in the footnotes lack indication of which pages he [Gottfried] is referring to (285 of 455 citations). This is, to be sure, not always necessary. But when the reader is asked to plunge through three fat volumes of van der Wee's *Growth of the Antwerp Market* (n. 37 on p. 183) in order to find out just what that scholar said about the development of the textile industry in the Low Countries (see Gottfried, p. 141), it is the wrong side of enough. Gottfried consistently cited articles in scholarly journals and volumes of essays without indicating pagination. There are also examples of citations of articles without the year (p. 178 n. 15), without the author (p. 179 n. 29) and without the volume number of the journal or the pages (p. 181 n. 20). (Jenks, 1986, p. 817)

Jenks may have been looking for a “dense, academic account,” but he found only density. Jenks’ criticism of Gottfried’s writing certainly displays more knowledge of the academic writing domain, but Student 1 and Jenks effectively make the same critique: Gottfried’s work is “packed” with citations and seems to “drag on.” For Jenks, it drags on due to a lack of new contributions to history on the Black Plague, with the economic historian referring to his review as “the dolorous task of this reviewer to state that this book is neither particularly new nor very convincing” (p. 816), a critique that can only come from a scholar within that discourse community. For someone in an introductory level Entomology class, though, the density of quotes and notes is the most notable feature.

Chapter 5:

What Do I Do on Monday?: Applications and Implications of the Data

Introduction

Over the last few years collecting, sorting and analyzing this data, I have taken bits of it to conferences, used portions it to justify additional research projects, and benefited from the examples of student writing and assignment types when designing my own courses. However, all of these benefits fail to answer the one pressing exigency that should guide this kind of local research:

Just what can other people do with this information?

This chapter attempts to answer that question by focusing on some of the applications I have discussed in conference presentations and workshops. Although this data is localized to a single institution and drawn from periods with different demographics and academic structures than WSU now bears, the data collected suggests a variety of classroom and curricular practices that can best foster conceptual change in the domain of composition.

An Implication for Pedagogy: We Ought Promote Epistemological Awareness

I will admit that this section title is a bit of a cheat – I do mean to use “ought” in the ethicist’s sense, not merely that it would behoove us to promote epistemological awareness in all of our courses, but that it is a responsibility of the teacher’s ethos.⁵⁶ Paul and Marfo’s (2004) call to train post-graduate students in a wide variety of methodologies and their epistemological commitments should not stop at some barrier between a bachelor’s and a master’s degree. While they argued that much advanced research is completed with the methodologies that require the least

⁵⁶ And, to add another layer, I am borrowing from Carolyn Miller’s (2004, p. 198) discussion of ethos as doubly defined when we talk about it in English. First, with an initial eta, meaning an individual’s character or disposition, and second, with an initial epsilon, referring to a communal gathering place. It is within the common character of a teacher to want to expand the intellectual horizons of his/her students, but we also know that we are members of a broad profession, and our students were once in another class and they’ll continue on to yet more. Our expectation that these boundaries be pushed is the nature of any curriculum.

additional learning on the part of the researcher (p. 537), we can see some of this at the undergraduate level as well. Consider Student 1's Entomology 101 paper in Chapter 4 (page 93). As a Mechanical Engineering major, Student 1 would have been taking this class to fulfill a general education requirement. As Student 1 took this class in the end of his/her second year (the sixth academic term, including Summers, since his/her Placement Exam), this was likely one of the last non-major courses the student was taking before moving into only in-major courses.⁵⁷ It is worth taking notice, then, that the student opted for a surface-level summary for much of the paper, with the only in-depth engagement shown in the excerpt provided. Very little entomological or epidemiological knowledge is demonstrated beyond simple summary statements. Instead, the whole analysis is more like a book report, bearing many of the disciplinary moves of an English course, particularly in the praise of the book's organization and clarity and criticism of its dense statistic and citation blocks.

The student him/herself defines the assignment in the Junior Writing Portfolio cover sheet as "A review of *The Black Death*. Pick a book from the list of readings, read it and write a review of it." There are no comments or grades on the draft as submitted by the student, only the note that it is "Acceptable" for the Junior Writing Portfolio (a rating that Neider et al. [2016] note is vaguely defined). While we do not have access to the original assignment sheet, it seems odd that a reading list from a course with very specialized knowledge, like entomology (as opposed to the larger biological sciences it is a part of), would not require engagement with the book's content from the conceptual framework of an entomologist.

⁵⁷ While these requirements have changed some since Student 1 completed his/her Junior Writing Portfolio, the current Mechanical Engineering program of study listed on the department's website is very similar to what Student 1 would have been expected to complete. <http://www.mme.wsu.edu/academics/notes/UCORE%20Prerequisites.pdf>

Further, the samples from Student 95 (page 110) follow the same model, as do the rest of the student's samples in the data set. While writing in the discipline of his/her major, connections are made between internalized knowledge and the knowledge provided by external authorities. The writing itself flows easily between knowledge from class sessions, the student's own understanding of the material, and Mike Jobes' lecture. By contrast, while writing outside of that setting, the student's FYC writing identifies a series of discrete events that are related to the process of drafting and revision, without the same depth of discussion tying those events to claims that his/her writing is necessarily better, except in deferring to the instructor's statements to that effect.

Certainly, some students in this data set do show epistemological breadth (at least, in terms of the disciplinary sources of knowledge). But, as many students enter their first years and leave their third years demonstrating only a little growth in the preferred types of knowledge sources, it is difficult to say whether these individuals entered WSU ready to use a wider array of ways of knowing.⁵⁸ However, there are no explicit structures in the general education curriculum to enforce this kind of development, but there are techniques that individual instructors can use in writing assignments to encourage it.

Pedagogical Applications: Marking the Way

When Hansel and Gretel were left to find their own way out of the woods, Hansel improvised a solution by leaving trails of pebbles (and, in the failed attempt, breadcrumbs) back to the children's home. This metaphor, used in this section, suggests that we are leaving our students

⁵⁸ While there are more students and more writing than I have the chance to discuss in depth in this dissertation, I would like to draw attention to Student 49 as an example here. This individual would eventually become a Communication major (and indicated that was his/her plan in FYC writing during the first term at WSU). While this student's documents all deal with social, political and philosophical issues, they do also represent a wide range of sources of evidence, from psychological explanations of the damage over-sexualized advertisements can have on younger viewers (FYC Paper 1) to philosophical examinations of the nature of death (JWP Paper 3).

stranded ever further in an unknown forest, and that is fairly apt. Except for writing assignments with very clear answers and structures (e.g. “Write an essay using our class materials to show that this concept is true”), we do draw upon Vygotsky’s “zone of proximal development” (Vygotskii & Cole, 1978) when designing writing tasks that stretch our students’ intellectual boundaries. However, we often judge the success of our students’ adventure by the state in which they reach home, rather than by each of the decisions they make along the way. Indeed, until fairly recently in the history of college, it has been difficult to identify those decisions in any systematic way.

Following Dana Ferris’ (2011) suggestion for teachers of L2 students struggling with language barriers, I suggest the use of a common feature of word processors today: the comment.⁵⁹ Ferris advises teachers of L2 students to work with the individuals to identify particular pieces of language that they struggle with (e.g. grammar rules, mechanics, spellings) and keep a detailed journal or “error log” discussing every time they encounter this problem (p. 27-28). In error logs, students are advised to record the original error or faulty statement, their revised version and an explanation of the change. For teachers, this tool helps catalog the particular misconceptions each student struggles with and provides a foundation for moving forward. If a student struggles with plurals and non-counting nouns, the error log tracks it. If a student struggles with citation formatting, the error log tracks it. Because the onus is placed on the student to keep track of these issues, dissatisfaction and, one hopes, fruitful alternatives (cf. Posner, 1982; Chi, 2003) do not require as much direct intervention on the part of the teacher.

We might adapt the same technique for epistemological as well as ontological change.

Several years ago, I had the opportunity to present a workshop at the Pacific Northwest’s Two Year

⁵⁹ While the Microsoft Office suite has become the standard recommended suite for document production (featuring an “Add Comment” tool in almost every document-composing program), other common suites like Google Drive, Apache Libre Office and Apple iWork all feature a Comment tool as well.

College Association Regional Conference using a modification of Ferris' error logs (Frye, 2014). Rather than view epistemological moves (faulty or otherwise) as errors, I encourage students to simply look at them as choices. Just as Harwood (2010) asked fellow academics to consider the functions of the citations they used, I ask students to identify the functions of their uses of evidence (cited or not) using Comments, explaining why that function matches their purpose and audience.⁶⁰

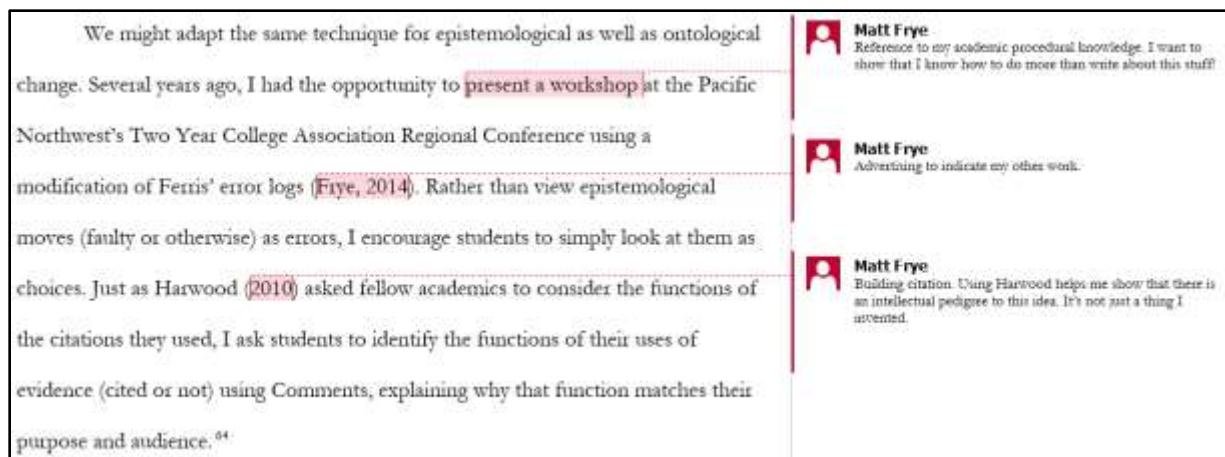


Figure 5: Sample of Author-Commented Work

Although it is a simple addition to a writing assignment, metacognitive engagement with the writing process opens the possibility for generating dissatisfaction with old techniques for generating text: individuals relying too much on internalized knowledge or inappropriate authorities can more mechanically separate their purpose (convincing an audience in a particular domain of an argument) from their means (using inexpedient or inappropriate knowledge types or sources). Following Hennessey (2003), I later ask students to reflect on those comments rather than the writing itself. However, where Hennessey explicitly requires her students to identify their moment of dissatisfaction, describe the intelligible alternative they discovered, and discuss why they found it

⁶⁰ The example is drawn from this document because I do not have permission from former students to distribute copies of their work.

plausible and later fruitful (p. 116-117), I ask students to consider the rhetoric of the choices they have made and in what ways their choices would be different for a different audience or purpose.

No long-term data has been collected systematically following the implementation of this assignment design, only the anecdotal evidence of students saying they came to appreciate the assignment when writing for other courses. If it were possible, this study and this assignment design would benefit from a closer examination of these students' writing.

Administrative Implications and Application: General Education as Tourism

But, individual courses can only do so much to encourage epistemological breadth during an undergraduate career. Nowacek (2011) found that students demonstrated successful knowledge transfer when they were encouraged to create connections between their courses. But, even then, the setting she studied was a single interdisciplinary seminar, in which a small group of students took three back to back classes in the same room, from a set of professors who planned some level of integration between their course material (occasionally team-teaching some days). At an institution the size and complexity of WSU, such a course design is impractical. While the Freshman Focus program⁶¹ ensures that a cohort of students takes several overlapping courses and has the chance to meet and discuss their coursework outside of class, there is no larger institutional push to encourage students to find or create connections between their educational experiences.

And, this lack of a knowledge-transfer–encouraging apparatus is not uncommon. With over twenty-thousand undergraduates on its main campus, WSU cannot coordinate an interdisciplinary general education experience in the same manner as the institution of Nowacek's study (a small,

⁶¹ If this is developed, as planned, into a full article, this section will feature a one or two paragraph description of the Freshman Focus and Common Reading programs.

private, religious liberal arts college). Instead, general education is closer to a “tourism”⁶² model, where students encounter a series of ways of knowing other than the one that will become their major. But, if it could develop some apparatus, the data in this study suggests a direction.

WSU’s Common Reading program gives each incoming student a copy of a book, typically a popular-academic book, while encouraging faculty teaching common first-year and introductory courses to incorporate it into their courses.⁶³ The program has been in place since 2007, so all students in this study were exposed to it in some way. However, the nature of the book changes each year. 2010 saw Michael Pollan’s *Omnivore’s Dilemma*, a look at the US’s industrial farming system, while 2011 saw Richard Muller’s *Physics for Future Presidents*, is an explanation of many common physics problems and issues in language appropriate for non-physicists.

This program in itself provides some grounds for transfer. Nowacek saw students transfer knowledge between domains when given the opportunity to apply multiple conceptual frameworks to a single problem (p. 119-121). Similarly, Student 45 uses Muller’s text in four out of nine citations in a General Education/History research paper looking at several environmental disasters throughout history (once to explain the concept of “carbon fixing” in current climate change discussions, and three other times to discuss Thomas Malthus’ “Essay on the Principle of Population,” which discusses general principles of population growth. Unfortunately, Student 45’s two other papers did not lend themselves to the use of Muller’s work – one was a discussion of serial killers, the other was a basic Physics lab report (a simplified version of the lab Student 35 discusses in Chapter 4). While Muller’s work may have been useful in the latter, the writer only cites

⁶² While I prefer the idea of “tourism” to focus on the student experience, Donald Campbell’s (1986) description of the university’s disciplines being like “fish-scales” is also an apt metaphor. From this perspective, we might see our job as helping students understand the places where disciplinary ways of knowing overlap with each other and, in the places they don’t overlap, why they are different.

⁶³ See <https://commonreading.wsu.edu/overview/>

two brief articles on the Work-Energy Theorem being tested in the lab. It is unclear whether they were assigned readings or additional research done by the writer.

In examining a limited number of subordinate clauses (indicative of doric grammar and a still-building conceptual framework, see Halliday [2004] and my page 101), it was found that students continued to use a specific variety of ways of knowing in their general education coursework (Frye, 2016). In particular, knowledge appropriate to Sociology and History occurred frequently more frequently than the proportion of papers from those disciplines throughout the General Education coursework submitted by students, particularly for cohorts who would have been given *Omnivore's Dilemma* (Pollan, 2006) and *Stones Into Schools* (Mortenson, 2009). Both lend themselves well to cultural research and build their arguments around the actions of humans and societies. In “because” statements in particular (a subordinating conjunction that notes direct causal links between the evidence provided and the claim it follows), a quarter of 43 observations came from Historical or Sociological procedural and domain knowledge. In contrast, just over a third came from technical/scientific procedural or domain knowledge.

While the knowledge represented in subordinate clauses came frequently from these domains, there was not much evidence to demonstrate causality or a strong correlation between these specific texts and the types of knowledge used by students later in their academic careers. The finding that Social Scientific and Historical knowledge were so frequently used, even outside courses in those domains, did raise questions about the types of epistemologies students are exposed to early in their academic careers. However, coders were not asked to evaluate the domain from which a student drew knowledge. A more detailed look at the writing is required before conclusions can be drawn.

However, in the short term, the Common Reading program is already helping build the ontological structures Chi focuses on in her approach to conceptual change (2003). In Chi's model, conceptual change and learning occur in one of two fashions: a given concept may have its ontology slightly refined (p. 67-70) or the entire ontology surrounding a concept may need to be restructured to accommodate a radically new understanding of it (p. 70-72). Chi discusses examples like force in physics, noting that physics learners may understand force only slightly incorrectly – perhaps that two equal forces acting in opposite directions on a body “cancel” each other out. (Anyone who has been squeezed into a bus or subway car knows this isn't the case!) In this case, conceptual change only requires the individual to modify his or her ontology of force to note that it cannot be “cancelled” out or destroyed by any means (a la conservation of energy). In a more extreme example requiring restructuring, an individual may perceive force as a substance or quality that an object contains, e.g. a baseball flying toward the outfield “has” some amount of force propelling it. In this case, larger restructuring is required to conceive of force as only the impact of the bat, and the movement of the ball a result of momentum.

In writing and argument, we see this through Howard's concept of patchwriting (1999). As students learn the vagaries of citation formats and of the content they are interacting with, citations, quotes and paraphrases will be messy. Students write inconsistently between their own voice and the voices of their sources as they build these ontological structures. Sometimes, in the process of writing, a student encounters a misconception that requires only minor adjustment, perhaps the common realization that the same evidence carries different weight for different audiences, so the chapters of *Omnivore's Dilemma* that worked so well in a History class might not bear the same weight in an Agricultural Economics class. Alternatively, a misconception may require larger restructuring,

such as noting that there is a difference between academic and non-academic sources – or that academic writing typically requires external sources of some kind.

While it typically falls to composition courses to meet the demands of the later misconception, the former is in the domain of most classes that ask for writing. Much of the research writing produced by students in this study uses resources that are appropriate to the discipline. The odd appearances of epistemologies appropriate to History and the Social Sciences were inside subordinate clauses, suggesting that students were reaching for any internalized explanation for concepts they were discussing. But, as noted in the applications for pedagogy above, there are unobtrusive methods to asking students in general education classes to consider themselves “tourists” and reflect on the exotic locales of Entomology 101 or Sociology 101 and compare them to the life back home in Mechanical Engineering or Business Administration. Students in Nowacek’s study (2011) demonstrated stronger levels of transfer when they were in forums that allowed them to converse with authorities (their professors) from multiple domains and identify the ways in which each group communicated and valued knowledge differently. While the Common Reading program opens the door for students to have these conversations or realizations on their own, a well-defined structure or forum for these discussions (even if only an encouragement to have them in classes in the first place) can be the catalyst to developing stronger ties to epistemologies within a student’s major and an understanding of the ways of knowing appropriate to other fields.

Chapter 6

Unexpected Expectations: Concluding Thoughts on a Project That Evolved with Every Data Point

Introduction; or, “Whither Dumptruck?”

This all began with a glance at a single youth’s explanation of why he decided to spend his Mage’s specialization points in the Frost tree in *World of Warcraft* (Steinkuehler & King, 2009). In Steinkuehler and King’s study, otherwise academically underperforming students developed literacies important to playing *World of Warcraft* alongside scientific habits of mind (see also Steinkuehler & Duncan, 2008). Steinkuehler and her colleagues’ research found that all learners tended toward growth in epistemological complexity as they engaged with some field of study. While the researchers sought to understand how games contributed to the development of information literacy and critical thinking, Dumptruck’s thought process, as described in the game chat, is just one version of my object of study. Again, assuming conceptual change does occur in the college years, how do we identify it in college student writing?

Dumptruck demonstrated his own learning to Keerah by explaining the source of his evidence and his line of reasoning: more experienced players had made decisions in developing their characters that he could then adopt for his own character (relying on Outsider or Authority-based knowledge), and a website helped Dumptruck model the effects of choosing certain specialization tracks (relying on Syllogistic Reasoning to decide that an increase in certain character statistics would yield a more entertaining play experience). We see this demonstration in explicit calls to sources of knowledge – those other Mages in the game-city of Orgrimmar, the web-tool WoWHead, and the personal assertion that it’s “better to be 100 percent something cuz the stats are way better” (Steinkuehler & King, 2009, p. 52).

Similarly, college students have been shown, in interviews, to develop personal epistemologies that favor increasing domain complexity and personal authority (Perry, 1998; Belenky et al., 1986; Baxter Magolda & King, 2012; Baxter Magolda, 2002). Previous research has found that students tend to perform better and feel more comfortable in domains that align with their personal epistemologies (Muis, Bendixen & Haerle, 2006). In interviews about knowledge in general, individuals demonstrate these moves with such regularity that scholars have proposed a new stage of postformal thought to the Piagetian framework (see Griffin, Gooding, Semesky & Farmer, 2009, for a literature review and applications).

In the writing collected for this study, we can see moves in this direction as well. As noted in Chapter 4, students at their junior level favor relying on internalized knowledge. This is especially true in timed writings, where any knowledge beyond that shown in the prompt must be supplied by the writer, but it is often true in coursework. Many students used internalized knowledge from both the discipline at hand (whether in the form of domain knowledge – “knowing that” – or procedural knowledge – “knowing how”). Reliance on external authority figures decreased over time. Even in citations, a component of academic writing in which individuals are forced to use knowledge delivered by external authorities, we see a limited but general trend away from Supporting functions, where the authority’s words stand as the data (cf. Toulmin, 1958) for the writer’s claims, towards Building functions, where the authority’s words serve as examples or guidance towards a larger argument of the writer’s design.

Big conclusions

Growth: It’s Part of the Process

Preliminary studies supporting this dissertation and the data discussed in previous chapters do indicate that epistemological growth can be observed in student writing. Further, that growth

tends to be within the domains that the student is exposed to most heavily. As all WSU students are required to take FYC and History 105 (both of which are focused on social science and humanistic ways of knowing), and as many introductory classes use each academic year's Common Reading (which tend to favor topics and methodologies in the social sciences), we can see students favoring those ways of knowing in a variety of courses. Within individual disciplines, we do see students taking on a mantle of expertise, showing increased reliance on internalized domain and procedural knowledge over the words of experts or textbooks to support claims or explain phenomena.

Much of this should be expected. Professors and instructors want students to make these moves.⁶⁴ In FYC, we explicitly teach these moves as a core component of the academic writing process. In particular, FYC instructors regularly discuss their methods for teaching synthesis and source integration, as these concepts occupy a central enough role in our courses that any new tip or technique for teaching them better can be a huge boon. While other courses may not place as much emphasis on the mechanics and rhetorics of summarizing and commenting upon cited sources or other inartificial evidence, Junior Writing Portfolio readers from many disciplines are as apt as their colleagues from English to find fault with "data dump" writing (where a student provides a list of statements or data from other sources with very little commentary) or writing that uses little or no data beyond the writer's opinions and assertions.

In gaining access to the college writing discourse, students learn these rules (cf. Lave & Wenger, 1991). Although Wardle calls the "research paper" a "mutt-genre" (2009), students

⁶⁴ This data comes from my own experiences in the composition and writing programs at WSU. FYC conversations occur during the English department's weekly professional development meetings, around the microwave in the graduate student office area of Avery Hall, and in informal get-togethers off campus. Writing program conversations are those overheard during training and norming sessions for portfolio and placement readings, as well as during the assessment itself.

understand it as a real conceptual framework.⁶⁵ While part of our task as writing instructors is to help students move from what Vosniadou would call a naïve or synthetic framework to a scientific or expert framework (Vosniadou, Vamvakoussi & Skopelleti, 2008) for academic writing, even at that limited, synthetic level, students know the basic moves that are expected of them in writing, and they can be seen performing them in increasingly complex ways in this study.

Implications: Pedagogical

However, this performance, while demonstrating increasing legitimacy within the discourse of academic writing (Lave & Wenger, 1991), may indicate the same “guinea pig” effect (Lincoln & Guba, 1985, p. 94) that this study sought to circumvent by examining writing as opposed to interviews. Although students were not writing for this study and thus could not produce texts (intentionally or not) that showed the growth I sought to measure, they were certainly performing for their instructors. The impact of this “guinea pig” effect is assumed to be minimal, though, as few students submitted work for multiple courses in a sequence. Any epistemological growth shown between courses can be safely assumed as independent of any scaffolding or plans on the part of instructors.

As such, this study underscores the importance of deliberate general education practices, the curriculum integration that James Bean describes as “concerned with enhancing the possibilities for personal and social integration through the organization of curriculum around significant problems and issues... without regard for subject-area boundaries” (2016). If students carry more than the domain knowledge gained from individual classes, if they are also imprinted with disciplinary epistemologies, then curricula ought to be designed to ensure that students gain more than just

⁶⁵ As evidence, I offer the common experience of any teacher who assigns writing: students asking “will this be a research paper?” when given a long writing assignment, and students not asking for more definition when told that an assignment will be a research paper.

procedural access to those epistemologies. As I tell my FYC students, “what works in History may not work here, and what works here may not work in Biology.” Although I put quite a bit of effort into describing the different epistemological frames that cause those differences between subject-areas, I cannot say whether other courses compare their disciplinary epistemologies to others that students may be exposed to in their undergraduate careers. Curriculum designers ought to consider whether we discuss disciplinary epistemologies during “micro-insertions” (Riley, Davis, Jackson & Maciukenas, 2009),⁶⁶ or leave it up to individual courses or instructors to teach that material, potentially linking such discussions to a particular domain.

Implications: Administrative

Discussions of the importance of an educational and professional portfolio and its development during the college years is not new (Hamp-Lyons & Condon, 1999; Belanoff & Dickson, 1991; Yancy & Weiser, 1997; Paulson, Paulson & Meyer, 1991), nor is the call to put those portfolios on a web-connected server somewhere on campus (Cambridge, 2001; Jafari & Kaufman, 2006). In fact, it was research on the importance of portfolios that initiated (see Haswell, 2001, for a history) and has since maintained both the Junior Writing Portfolio assessment program and the FYC portfolio system at WSU.

However, the majority of the work during this study was spent in data preparation:

⁶⁶ Briefly, a micro-insertion is a short discussion or application of a pedagogical element as part of another lesson. Riley et al. discuss the importance of micro-inserting ethical lessons into engineering curricula, so that engineering students learn to think of ethical considerations as a normal consideration in the profession, on the same level as considering the most expedient material for a design. In discussing epistemologies, instructors could likewise discuss the disciplinary epistemological commitments in a particular assignment or procedure as compared to other disciplines, such that students learn to see these considerations – e.g. I do *this* in History because that’s what a Historian would do – as a normal part of the academic routine.

- Collecting physical FYC portfolios and matching the names of the authors to those students who had completed their Junior Writing Portfolio (and, later, removing those students with similar names who turned out to not be the same person);
- Scanning those physical documents into PDF files, using OCR software to convert those PDFs into text files, and manually “cleaning” those text files of errors produced by the OCR software;
- Checking final text files to remove any that could not be used in this study;
- Anonymizing and sorting those files for distribution to coders;
- Compiling coder data into a database

While much of this work is normal for a study like this (distributing text to coders and recompiling their work into a database), it is important to note that the initial preparation – up to the anonymization step – took three years to gather writing from 118 students (as the first few were collected for preliminary studies), and another eighteen months to finally process and sort coded data for the students discussed in this study.

As a program assessment tool, the data collected in this study is valuable. At WSU, little data is collected as to the qualitative nature of the writing students produce for their portfolios, primarily because there is not an existing apparatus to collect and store that data in a meaningful way. In a setting where this data was kept digitally in a parseable format, much of the analysis performed in this study could be done routinely on documents produced by students. Johnson-Shull and Rysdam (2012) found, by digging through the collection of physical portfolios at WSU, that a large majority of teacher comments on writing are at best incomprehensible or, when understandable to a reader, negative, but that study, like this one, took a significant amount of effort just to prepare the documents for analysis. As we enter an era with greater focus on analytics and “big data,”

institutions with archives like these would benefit from following the model of institutions with electronic portfolio systems, such that we can escape the anecdotal traps laid by Hirsch (1996) and Bauerlein (2008), which might lead us to believe that student writing or thinking bears some traits simply because we were exposed to a few memorable examples.

Contribution to WID/WAC Scholarship

Several years ago, Chris Anson called for writing programs to not only assess themselves more robustly, but to perform “RAD Research” – replicable, aggregable, and data-supported research – on their institutions (2008; his “RAD Research” discussion stems from a 2005 article by Haswell⁶⁷ on the NCTE and CCCC’s shift of focus away from this kind of research). This study meets those criteria. A web-based version of the Coder program used in this study is currently in development to begin aggregating similar data in future research.

While this does support Strickland’s (2011) argument that the composition profession has a managerial impulse, I do not view that impulse negatively. The “intellectual bureaucrat” that Richard Miller defends (1998) seems to be the adaptation of the day. Although k12 standards and assessment systems like the Common Core and the legal-economic apparatus that supports them (i.e. the No Child Left Behind Act of 2001) are rumored to be losing sway over the national education system (Wong, 2015), the education-testing still has plenty of power. As more students, parents and legislators look for ways to “test out” of introductory classes, and as more students complete their general education coursework at community colleges before moving onto university (Smith, 2015), creating a robust system for assessing and understanding student writing beyond simply asking

⁶⁷ Haswell, R. (2005). NCTE/CCCC’s recent war on scholarship. *Written Communication*, 22(2). 198-223.

professors whether it was “acceptable or outstanding” will be foundational to a curriculum that responds to its student population.

Miller’s “intellectual bureaucrat” was a scholar that knew how to work the local system to greater educational advantage: rather than keep teaching separate from administration and assessment, it would behoove us, as teachers, to understand how our assignments and courses fit within the larger educational whole. If we cannot count on FYC and other introductory courses to serve as a foundation to a local institution’s curriculum, we will need the tools to understand our students on a more qualitative level than simply a measure of what prerequisites they have filled. Electronic portfolio systems or some other systematized database of student work from which composition instructors or other researchers can collect aggregable data are one way “intellectual bureaucrats” or those with a managerial impulse can keep control of the systems in which they work.

Future work

Limitations

This study had several limitations, many of which arose during the data collection and preparation stage. Little control could be maintained over the student work collected without opting for a smaller data set. Because the Junior Writing Portfolio and the FYC portfolio are both very flexible in the kinds of writing accepted, it was not possible to ensure that all documents collected fit some criteria chosen for this study. As noted in Chapter 2 and 4, some student work was eventually removed from the data set for being too much of an outlier: documents may have been extremely short (e.g. short answer tests and reflections), skewing the ratio of claims and evidence; documents may have been difficult or impossible to scan (e.g. hand written lab reports, worksheets); the text in a document may have been illegible to both the OCR program and myself; or the genre may have

been so far from the norm that the analysis would have yielded no generalizable data (e.g. computer science program documentation).

Further, this study was limited in its convenience sampling. Although roughly half of the students in this study took their placement exam in the summer of 2011 and completed their Junior Writing Portfolio in the 2013 academic year, this was by coincidence rather than design. Further, data collection did not include demographic traits from the registrar. It did not seem appropriate to collect that data for the same reason that exam readers for the writing program are dissuaded from investigating a writer's primary language or other demographic data before reading their work: the focus of the study is on what was written and the epistemologies demonstrated in that writing. Predicating any analysis on demographic features beyond that reported by the student would have required additional controls on the sample collection process, and there were already few enough students whose work I was able to gather.

Finally, every researcher dreams of more time. Although ABBYY FineReader did save a significant amount of time over hand-typing all of the collected samples, inaccuracies in the conversion process and the software's inability to even read, let alone convert, several types of assignments increased the amount of time necessary to prepare documents. In particular, all timed writings were typed out rather than converted via software. While this preparation process did yield some interesting insights, it did detract from time that could have been spent analyzing text and codes further.

Expansion

Future work with this coding framework will focus on the broader categories of author-provided evidence (e.g. Authority Based, Internalized Knowledge, Self-Authored Knowledge), and fewer of Harwood's functions, most notably the Supporting, Building and Competency functions

(which were the most commonly used in this data set). The subordinate-clause analysis discussed in Chapter 4 has been presented at the annual conference of the American Association for Applied Linguistics, and more work will be done with this data set examining the various disciplines and domains that internalized knowledge seems to be stemming from.

Future writing will be collected through a web-based version of the Coder program, currently in the late stages of development (pending IRB approval, of course). The writing for this study was stored in a local machine database and analyzed using Microsoft Excel. While Excel offers a variety of analytical tools for numbers and text, it was not an efficient system for storing and retrieving data, especially if researchers other than myself were interested in the texts. During the life of this study, early versions of other data storage and analysis systems were explored. It is hoped that these systems will yield a more efficient, more public corpus to allow for larger sets of student writing to be analyzed at a wider variety of granularities.

Appendix A: Individual Student Evidence Use

Top Quintile

Student 24: Communication								
Term	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Trm. Wrt.: Analytical	Junior Trm. Wrt.: Reflective
	0	0	2	0	16	8	8	8
Domain	Psychology & Culture	English	-	Comm. and Society	Criminal Justice	Technology & Culture		
Words	648	164	1474	-	860	3646	462	266
tUnits	17.6	6.8	15.64	-	48.4	70.8	10.8	7.6
Claims	8.8 (50%)	4 (58.8%)	6.88 (44%)	-	28 (57.9%)	13.2 (18.6%)	5.6 (51.9%)	4.8 (63.2%)
Evidence	8 (45.5%)	2.4 (35.3%)	4.38 (28%)	-	5.1 (10.5%)	57.6 (81.4%)	5.2 (48.1%)	2.8 (36.8%)
Evidence: Outsider	0.4 (5%)	0.4 (16.7%)	0.49 (11%)	-	0 (0%)	5.2 (9%)	0 (0%)	1.2 (43%)
Evidence: Crossroads	5.2 (65%)	2 (83.3%)	1.46 (33%)	-	2 (39%)	1.2 (2%)	3.2 (62%)	1.6 (57%)
Evidence: Internal	0.4 (5%)	0 (0%)	0.74 (17%)	-	0.3 (6%)	48 (83%)	0 (0%)	0 (0%)
Evidence: Cited	2 (25%)	0 (0%)	1.69 (39%)	-	2.8 (55%)	3.2 (6%)	2 (38%)	0 (0%)
Evidence: Cited (Supporting)	0 (0%)	0 (0%)	0.52 (12%)	-	2.6 (51%)	3.2 (6%)	0 (0%)	0 (0%)
Evidence: Cited (Building)	0 (0%)	0 (0%)	0.52 (12%)	-	0 (0%)	0 (0%)	0.4 (8%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	0.37 (8%)	-	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Student 16: Sport Management								
Term	0	0	1	8	0	0	7	7
Domain	Technology & Culture		English	Soc.	-	-	Economics & Politics	
Words	414	420	1846	2993	-	-	716	466
tUnits	10	12	17.1	43.4	-	-	13.2	8.8
	7.2	6.8	10	24.2			7.2	4.8
Claims	(72%)	(56.7%)	(58%)	(55.8%)	-	-	(54.5%)	(54.5%)
	2.8	5.2	4.2	9.8			6	4
Evidence	(28%)	(43.3%)	(25%)	(22.6%)	-	-	(45.5%)	(45.5%)
Evidence: Outsider	0	0.4	0.57	0	-	-	0	1.6
	(0%)	(7.7%)	(14%)	(0%)			(0%)	(40%)
Evidence: Crossroads	0.8	4.4	0.63	0.93	-	-	2	2
	(28.6%)	(84.6%)	(15%)	(10%)			(33%)	(50%)
Evidence: Internal	0.4	0.4	1.86	4.6	-	-	0.8	0
	(14.3%)	(7.7%)	(44%)	(47%)			(13%)	(0%)
Evidence: Cited	1.6	0	1.14	4.27	-	-	3.2	0.4
	(57.1%)	(0%)	(27%)	(44%)			(53%)	(10%)
Evidence: Cited (Supporting)	0	0	1.03	3.13	-	-	1.2	0.4
	(0%)	(0%)	(24%)	(32%)			(20%)	(10%)
Evidence: Cited (Building)	0	0	0.06	0.53	-	-	0.8	0
	(0%)	(0%)	(1%)	(5%)			(13%)	(0%)
Evidence: Cited (Competency)	0	0	0	0	-	-	0	0
	(0%)	(0%)	(0%)	(0%)			(0%)	(0%)

Student 112: Anthropology								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	-	12	0	0	5	5
Domain	Climate & Politics		English	Anthro.	-	-	Climate & Rhetoric	
Words	752	232	-	3791	-	-	1066	507
tUnits	22.4	9.2	-	60	-	-	20.4	10.8
	13.6	7.6		37.4			12.4	7.6
Claims	(60.7%)	(82.6%)	-	(62.3%)	-	-	(60.8%)	(70.4%)
	7.6	1.6		12.44			8	3.2
Evidence	(33.9%)	(17.4%)	-	(20.7%)	-	-	(39.2%)	(29.6%)
Evidence:	0.8			0.56				
Outsider	(10.5%)	0 (0%)	-	(5%)	-	-	0.4 (5%)	0 (0%)
Evidence:	5.2	1.6		5.48			5.6	2.8
Crossroads	(68.4%)	(100%)	-	(44%)	-	-	(70%)	(88%)
Evidence:	1.2			0.96			0.8	0.4
Internal	(15.8%)	0 (0%)	-	(8%)	-	-	(10%)	(13%)
Evidence: Cited	0.4			5.44			1.2	
	(5.2%)	0 (0%)	-	(44%)	-	-	(15%)	0 (0%)
Evidence: Cited				3.84				
(Supporting)	0 (0%)	0 (0%)	-	(31%)	-	-	0.4 (5%)	0 (0%)
Evidence: Cited				0.52				
(Building)	0 (0%)	0 (0%)	-	(4%)	-	-	0 (0%)	0 (0%)
Evidence: Cited								
(Competency)	0 (0%)	0 (0%)	-	0.2 (2%)	-	-	0 (0%)	0 (0%)

Student 48: Biology								
Term	0	0	2	7	8	0	7	7
Domain	Psychology & Culture		English	History	Physics	-	Technology & Culture	
Words	755	193	3337.7	166.25	889	-	430	282
tUnits	16.4	5.2	43.2	24.4	18.4	-	12.8	8.8
	12.4	2.8	21.7	8	7.2		8	5.6
Claims	(75.6%)	(53.8%)	(50%)	(32.8%)	(39.1%)	-	(62.5%)	(63.6%)
	3.2	2.4	10.36	2.1	11.2		4.4	3.2
Evidence	(19.5%)	(46.2%)	(24%)	(8.6%)	(60.9%)	-	(34.4%)	(36.4%)
Evidence:	0	1.2	1.04	0	0		0.4	0
Outsider	(0%)	(50%)	(10%)	(0%)	(0%)	-	(9%)	(0%)
Evidence:	0.8	1.2	2.6	1.5	9.2		3.6	3.2
Crossroads	(25%)	(50%)	(25%)	(71%)	(82%)	-	(82%)	(100%)
Evidence:	2.4	0	2.72	0.2	2		0.4	0
Internal	(75%)	(0%)	(26%)	(10%)	(18%)	-	(9%)	(0%)
Evidence: Cited	0	0	4	0.4	0		0	0
	(0%)	(0%)	(39%)	(19%)	(0%)	-	(0%)	(0%)
Evidence: Cited (Supporting)	0	0	3.16	0.1	0		0	0
	(0%)	(0%)	(31%)	(5%)	(0%)	-	(0%)	(0%)
Evidence: Cited (Building)	0	0	0.72	0	0		0	0
	(0%)	(0%)	(7%)	(0%)	(0%)	-	(0%)	(0%)
Evidence: Cited (Competency)	0	0	0	0.1	0		0	0
	(0%)	(0%)	(0%)	(5%)	(0%)	-	(0%)	(0%)

Student 5: Elementary Education								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	1	7	0	16	8	8
Domain	Climate & Politics		English	Teaching and Learning	-	Teaching and Learning	Economics & Politics	
Words	422	104	1162	556	-	2592	400	306
tUnits	12	2.8	21.6	41.2	-	45.6	10	9.2
	6	2.8	10.55	11.2		24	6.4	6.4
Claims	(50%)	(100%)	(49%)	(27.2%)	-	(52.6%)	(64%)	(69.6%)
	6	0	5.68	4.5		8.8	3.6	2.8
Evidence	(50%)	(0%)	(26%)	(10.9%)	-	(19.3%)	(36%)	(30.4%)
Evidence:	0.4	0	0.32	0		0.2	0	0.4
Outsider	(6.7%)	(0%)	(6%)	(0%)	-	(2%)	(0%)	(14%)
Evidence:	5.2	0	0.52	1.6		2.33	0.8	2.4
Crossroads	(86.7%)	(0%)	(9%)	(36%)	-	(27%)	(22%)	(86%)
Evidence:	0	0	1.24	2.7		3	0.4	0
Internal	(0%)	(0%)	(22%)	(60%)	-	(34%)	(11%)	(0%)
Evidence: Cited	0.4	0	3.6	0.2		3.27	2.4	0
	(6.7%)	(0%)	(63%)	(4%)	-	(37%)	(67%)	(0%)
Evidence: Cited (Supporting)	0	0	3.52	0		2.13	0	0
	(0%)	(0%)	(62%)	(0%)	-	(24%)	(0%)	(0%)
Evidence: Cited (Building)	0.4	0	0.08	0		0.4	1.6	0
	(6.7%)	(0%)	(1%)	(0%)	-	(5%)	(44%)	(0%)
Evidence: Cited (Competency)	0	0	0	0		0	0	0
	(0%)	(0%)	(0%)	(0%)	-	(0%)	(0%)	(0%)

Student 26: English Education								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	1	5	5	5	4	4
Domain	Technology & Culture			English	English	English	Advertising & Ethics	
Words	516	407	968	1392	1193	4772	430	414
tUnits	14	12	33	25.6	36.8	24	13.6	14
Claims	7.2 (51.4%)	8 (66.7%)	6 (18%)	17.2 (67.2%)	13.6 (37%)	15.6 (65%)	5.6 (41.2%)	9.2 (65.7%)
Evidence	6.8 (48.6%)	4 (33.3%)	15.2 (46%)	3.6 (14.1%)	2.4 (6.5%)	8 (33.3%)	8 (58.8%)	4.8 (34.3%)
Evidence: Outsider	0 (0%)	0 (0%)	1.64 (11%)	0 (0%)	0 (0%)	0 (0%)	0.8 (10%)	1.2 (25%)
Evidence: Crossroads	4 (58.8%)	3.2 (80%)	4.72 (31%)	0 (0%)	0.1 (4%)	0.8 (10%)	6 (75%)	3.2 (67%)
Evidence: Internal	0 (0%)	0.8 (20%)	7.24 (48%)	0.4 (11%)	0.2 (8%)	1.6 (20%)	0 (0%)	0.4 (8%)
Evidence: Cited	2.8 (41.2 %)	0 (0%)	1.6 (11%)	3.2 (89%)	2.1 (88%)	5.6 (70%)	1.2 (15%)	0 (0%)
Evidence: Cited (Supporting)	0.8 (11.8%)	0 (0%)	0.8 (5%)	0 (0%)	2.1 (88%)	1.2 (15%)	0 (0%)	0 (0%)
Evidence: Cited (Building)	1.2 (17.6%)	0 (0%)	0.16 (1%)	1.6 (44%)	0 (0%)	4.4 (55%)	0.8 (10%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	0.64 (4%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Student 1: Mechanical Engineering								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	3	3	6	0	8	8
Domain	Psychology & Culture		English	Gen. Educ.	Entem-ology	-	Climate & Science	
Words	304	133	2795	3025	1731	-	480	181
tUnits	10	5.2	48	67.6	23.2	-	12	4.8
	8	4	15.6	26	12.8		8.8	4
Claims	(80%)	(76.9%)	(32.5%)	(38.5%)	(55.2%)	-	(73.3%)	(83.3%)
		0.8						
Evidence	1.6 (16%)	(15.4%)	20.93 (44%)	39.2 (58%)	10.4 (44.8%)	-	3.2 (26.7%)	0.8 (16.7%)
Evidence: Outsider	0.4 (25%)	0 (0%)	0.4 (2%)	0 (0%)	0 (0%)	-	1.2 (38%)	0 (0%)
Evidence: Crossroads	0.8 (50%)	0.4 (50%)	11.47 (55%)	14.8 (38%)	1.6 (15%)	-	0 (0%)	0.4 (50%)
Evidence: Internal	0 (0%)	0.4 (50%)	4.6 (22%)	14.4 (37%)	0 (0%)	-	0.4 (13%)	0.4 (50%)
Evidence: Cited	0.4 (25%)	0 (0%)	4.47 (21%)	10 (26%)	8.8 (85%)	-	1.6 (50%)	0 (0%)
Evidence: Cited (Supporting)	0.4 (25%)	0 (0%)	2.73 (13%)	6.8 (17%)	8.4 (81%)	-	0 (0%)	0 (0%)
Evidence: Cited (Building)	0 (0%)	0 (0%)	1.07 (5%)	2.4 (6%)	0.4 (4%)	-	1.2 (38%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	0.27 (1%)	0 (0%)	0 (0%)	-	0 (0%)	0 (0%)

Student 32: Communication/Public Relations								
Term	0	0	2	0	5	4	8	8
Domain	Technology & Culture	English	-	Comm.	Women's Studies	Technology & Culture		
Words	370	176	1651	-	247	905	332	257
tUnits	12.4	5.2	39.6	-	6	23.6	8.8	7.6
Claims	6	4.4	10.87	-	2.4	6.8	4.4	4
	(48.4%)	(84.6%)	(27%)	-	(40%)	(28.8%)	(50%)	(52.6%)
Evidence	6.4	0.8 (15.4%)	10.73	-	3.6	16.8	4.4	3.6
	(51.6%)		(27%)	-	(60%)	(71.2%)	(50%)	(47.4%)
Evidence: Outsider	0.8	0 (0%)	1.53	-	1.2	3.2	0 (0%)	0 (0%)
	(12.5%)		(14%)	-	(33%)	(19%)		
Evidence: Crossroads	3.6	0.8	1.91	-	2.4	8 (48%)	2.8	3.6
	(56.3%)	(100%)	(18%)	-	(67%)		(64%)	(100%)
Evidence: Internal	0 (0%)	0 (0%)	5 (47%)	-	0 (0%)	3.6	0 (0%)	0 (0%)
				-		(21%)		
Evidence: Cited	2	0 (0%)	2.29	-	0 (0%)	2 (12%)	1.6	0 (0%)
	(31.3%)		(21%)	-			(36%)	
Evidence: Cited (Supporting)	0.4	0 (0%)	2.13	-	0 (0%)	2 (12%)	0.4 (9%)	0 (0%)
	(6.25%)		(20%)	-				
Evidence: Cited (Building)	1.6	0 (0%)	0 (0%)	-	0 (0%)	0 (0%)	0.8	0 (0%)
	(25%)			-			(18%)	
Evidence: Cited (Competency)	0 (0%)	0 (0%)	0.13	-	0 (0%)	0 (0%)	0 (0%)	0 (0%)
			(1%)	-				

Student 35: Civil Engineering								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	2	2	4	8	5	5
Domain	None	English	English	History	Physics	Technology & Culture		
Words	-	-	774	3887	3887	281	479	131
tUnits	-	-	26.7	76	30.8	8	12.4	3.6
			12.95	27.2	10.8	1.6	8.4	2.4
Claims	-	-	(49%)	(35.8%)	(35.1%)	(20%)	(67.7%)	(66.7%)
			6.16	48.8	20	6.4	3.6	1.2
Evidence	-	-	(23%)	(64.2%)	(64.9%)	(80%)	(29%)	(33.3%)
Evidence: Outsider	-	-	0.08 (1%)	6.8 (14%)	0.4 (2%)	0 (0%)	0 (0%)	0 (0%)
Evidence: Crossroads	-	-	1.44 (23%)	26.8 (55%)	9.2 (46%)	5.2 (81%)	1.2 (33%)	0.4 (33%)
Evidence: Internal	-	-	2.72 (44%)	11.2 (23%)	6 (30%)	1.2 (19%)	0.4 (11%)	0.8 (67%)
Evidence: Cited	-	-	1.92 (31%)	4 (8%)	4.4 (22%)	0 (0%)	2 (56%)	0 (0%)
Evidence: Cited (Supporting)	-	-	0.8 (13%)	3.6 (7%)	4.4 (22%)	0 (0%)	0.4 (11%)	0 (0%)
Evidence: Cited (Building)	-	-	0.8 (13%)	0 (0%)	0 (0%)	0 (0%)	1.6 (44%)	0 (0%)
Evidence: Cited (Competency)	-	-	0 (0%)	0.4 (1%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Student 51: Marketing								
Term	0	0	2	0	5	7	7	7
Domain	Technology & Culture		English	-	Soc	Acctg	Technology & Culture	
Words	447	142	696	-	4913	421	577	284
tUnits	13.2	4	34.8	-	48	58	15.2	8
	7.2	2	7.8		30	8.6	8.4	4
Claims	(54.5%)	(50%)	(22%)	-	(62.5%)	(14.8%)	(55.3%)	(50%)
	5.6	2	8.4		16.8	10.2	6.8	3.6
Evidence	(42.4%)	(50%)	(24%)	-	(35%)	(17.6%)	(44.7%)	(45%)
Evidence:	0	0	0.53		0.8	0	0	0.4
Outsider	(0%)	(0%)	(6%)	-	(5%)	(0%)	(0%)	(11%)
Evidence:	4.8	2	3.2		7.2	7.2	4.4	3.2
Crossroads	(85.7%)	(100%)	(38%)	-	(43%)	(71%)	(65%)	(89%)
Evidence:	0.4	0	0.93		1.6	3	0	0
Internal	(7.1%)	(0%)	(11%)	-	(10%)	(29%)	(0%)	(0%)
Evidence: Cited	0.4	0	3.73		7.2	0	2.4	0
	(7.1%)	(0%)	(44%)	-	(43%)	(0%)	(35%)	(0%)
Evidence: Cited (Supporting)	0	0	3.27		4.8	0	0	0
	(0%)	(0%)	(39%)	-	(29%)	(0%)	(0%)	(0%)
Evidence: Cited (Building)	0	0	0.13		2.4	0	2.4	0
	(0%)	(0%)	(2%)	-	(14%)	(0%)	(35%)	(0%)
Evidence: Cited (Competency)	0	0	0		0	0	0	0
	(0%)	(0%)	(0%)	-	(0%)	(0%)	(0%)	(0%)

Student 55: Human Development								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	-1	5	0	0	7	7
Domain	Climate & Rhetoric		English	Human Develop ment	-	-	Advertising & Ethics	
Words	333	594	686	49	-	-	456	443
tUnits	5.6	14.4	37.44	0.8	-	-	8.4	9.2
	4	9.2 (63.	6.72	0.8			4.8	5.6
Claims	(71.4%)	9%)	(18%)	(100%)	-	-	(57.1%)	(60.9%)
	1.6 (28.	5.2	5.98				3.6	3.6
Evidence	6%)	(36.1%)	(16%)	0 (0%)	-	-	(42.9%)	(39.1%)
Evidence: Outsider	0 (0%)	0 (0%)	0.2 (3%)	0 (0%)	-	-	0 (0%)	0 (0%)
Evidence: Crossroads	0.8 (50%)	5.2 (100%)	1 (17%)	0 (0%)	-	-	0.8 (22%)	3.6 (100%)
Evidence: Internal	0.4 (25%)	0 (0%)	3.1 (52%)	0 (0%)	-	-	0.8 (22%)	0 (0%)
Evidence: Cited	0.4 (25%)	0 (0%)	1.68 (28%)	0 (0%)	-	-	2 (56%)	0 (0%)
Evidence: Cited (Supporting)	0 (0%)	0 (0%)	1.36 (23%)	0 (0%)	-	-	0 (0%)	0 (0%)
Evidence: Cited (Building)	0 (0%)	0 (0%)	0.02 (0%)	0 (0%)	-	-	2 (56%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	0.16 (3%)	0 (0%)	-	-	0 (0%)	0 (0%)

Student 19: English								
Term	0	0	1	4	0	0	7	7
Domain	Technology & Culture		English	Env. Science	-	-	Technology & Culture	
Words	342	201	1284	441	-	-	739	268
tUnits	11.2	6.4	47.5	36.4	-	-	18.4	6.4
	6.4	3.6	13.3	12.2			9.2	4
Claims	(57.1%)	(56.25%)	(28%)	(33.5%)	-	-	(50%)	(62.5%)
	4.8 (42.9%)	2.8 (43.75%)	19.76 (42%)	2.9 (8%)	-	-	9.2 (50%)	2 (31.3%)
Evidence:	0.4		0.08				1.2	
Outsider	(8.33%)	0 (0%)	(0%)	0.1 (3%)	-	-	(13%)	0 (0%)
Evidence:	3.2	2.4	2.76	0.5			4.4	1.6
Crossroads	(66.7%)	(85.7%)	(14%)	(17%)	-	-	(48%)	(80%)
Evidence:		0.4 (14.3%)	4.64	0.7				0.4
Internal	0 (0%)	3%	(23%)	(24%)	-	-	0.8 (9%)	(20%)
Evidence: Cited	1.2		12.28	1.6			2.8	
	(25%)	0 (0%)	(62%)	(55%)	-	-	(30%)	0 (0%)
Evidence: Cited (Supporting)			1.68	1.6				
	0 (0%)	0 (0%)	(9%)	(55%)	-	-	0.4 (4%)	0 (0%)
Evidence: Cited (Building)	0.4		0.12					
	(8.33%)	0 (0%)	(1%)	0 (0%)	-	-	0.4 (4%)	0 (0%)
Evidence: Cited (Competency)			2.32					
	0 (0%)	0 (0%)	(12%)	0 (0%)	-	-	0 (0%)	0 (0%)

Student 42: Elementary Education								
	Placement Exam: Reflective Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	0	0	0	0	0	0
Domain	None	None	English	Special Educ.	Teaching and Learning	Teaching and Learning		None
Words	-	-	919 24.1333	1468	539	79	-	-
tUnits	-	-	3333	30	84.4	4.8	-	-
Claims	-	-	13 (54%)	23.2 (77.3%)	17 (20.1%)	1.2 (25%)	-	-
Evidence	-	-	4.85 (20%)	7 (23.3%)	12.5 (14.8%)	1.6 (33.3%)	-	-
Evidence: Outsider	-	-	0.15 (3%)	0.13 (2%)	0 (0%)	0 (0%)	-	-
Evidence: Crossroads	-	-	0.9 (19%)	0.27 (4%)	0.5 (4%)	1.6 (100%)	-	-
Evidence: Internal	-	-	2.5 (52%)	0.6 (9%)	4.5 (36%)	0 (0%)	-	-
Evidence: Cited	-	-	1.3 (27%)	6 (86%)	7.5 (60%)	0 (0%)	-	-
Evidence: Cited (Supporting)	-	-	1 (21%)	0.8 (11%)	3.1 (25%)	0 (0%)	-	-
Evidence: Cited (Building)	-	-	0.2 (4%)	4.53 (65%)	0.1 (1%)	0 (0%)	-	-
Evidence: Cited (Competency)	-	-	0 (0%)	0.27 (4%)	0.3 (2%)	0 (0%)	-	-

Student 7: Kinesiology/Movement Studies								
Term	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
	0	0	4	4	0	0	8	8
Domain	Technology & Education		English	English	-	-	Technology & Culture	
Words	335	176	844	314	-	-	634	314
tUnits	10.4	4.8	43.3	52.4	-	-	14	8
	6.4	1.6	9.55	12.6			8.4	
Claims	(61.5%)	(33.3%)	(22%)	(24%)	-	-	(60%)	6 (75%)
	4 (38.	3.2	11.84	6.4			5.6	
Evidence	5%)	(66.7%)	(27%)	(12.2%)	-	-	(40%)	2 (25%)
Evidence: Outsider	0 (0%)	0 (0%)	0.4 (3%)	0 (0%)	-	-	0 (0%)	0 (0%)
Evidence: Crossroads	2.4 (60%)	0.8 (25%)	4 (34%)	6.4 (100%)	-	-	3.2 (57%)	1.6 (80%)
Evidence: Internal	0.4 (10%)	0 (0%)	1.92 (16%)	0 (0%)	-	-	0.4 (7%)	0.4 (20%)
Evidence: Cited	1.2 (30%)	2.4 (75%)	5.52 (47%)	0 (0%)	-	-	2 (36%)	0 (0%)
Evidence: Cited (Supporting)	0 (0%)	2.4 (75%)	4.6 (39%)	0 (0%)	-	-	0 (0%)	0 (0%)
Evidence: Cited (Building)	0.4 (10%)	0 (0%)	0.04 (0%)	0 (0%)	-	-	2 (36%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	0.4 (3%)	0 (0%)	-	-	0 (0%)	0 (0%)

Student 29: Psychology								
Term	0	0	-	0	5	7	7	7
Domain	Technology & Education	English	-	Biology	Psychology	Climate & Science		
Words	411	156	-	-	1015	297	662	203
tUnits	11.2	4.4	-	-	208.4	5.6	16.4	5.6
	7.6	3.6			25.6	2	9.6	4.4
Claims	(67.9%)	(81.8%)	-	-	(12.3%)	(35.7%)	(58.5%)	(78.6%)
	3.6	0.8 (18.			38.6	2.8	6.8	1.2
Evidence	(32.1%)	2%)	-	-	(18.5%)	(50%)	(41.5%)	(21.4%)
Evidence:	1.2						0.8	
Outsider	(33.3%)	0 (0%)	-	-	0.3 (1%)	0 (0%)	(12%)	0 (0%)
Evidence:	1.6	0.8					4.4	1.2
Crossroads	(44.4%)	(100%)	-	-	6 (16%)	0 (0%)	(65%)	(100%)
Evidence:								
Internal	0 (0%)	0 (0%)	-	-	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Evidence: Cited	0.8				32.3	2.8	1.6	
	(22.2%)	0 (0%)	-	-	(84%)	(100%)	(24%)	0 (0%)
Evidence: Cited					5.9	2.8		
(Supporting)	0 (0%)	0 (0%)	-	-	(15%)	(100%)	0.4 (6%)	0 (0%)
Evidence: Cited	0.8							
(Building)	(22.2%)	0 (0%)	-	-	0.1 (0%)	0 (0%)	0.4 (6%)	0 (0%)
Evidence: Cited					23.1			
(Competency)	0 (0%)	0 (0%)	-	-	(60%)	0 (0%)	0 (0%)	0 (0%)

Middle Quintile

Student 8: Business & Finance								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	2	8	8	0	7	7
Domain	Technology & Culture		English	Anthrop ology	Anthrop ology	-	Advertising & Ethics	
Words	471	292	2529	756	1003	-	626	340
tUnits	9.6	5.6	28.8	16	14.8	-	13.6	8.4
	6.4	3.2	12.4	1.2	14.8		8.4	4.4
Claims	(66.7%)	(57.1%)	(43%)	(7.5%)	(100%)	-	(61.8%)	(52.4%)
	3.2	2.4	16.4	8.4			5.2	4
Evidence	(33.3%)	(42.9%)	(57%)	(52.5%)	0 (0%)	-	(38.2%)	(47.6%)
Evidence:	0.8	0.8	1.47					
Outsider	(25%)	(33.3%)	(9%)	0 (0%)	0 (0%)	-	0 (0%)	0 (0%)
Evidence:	1.6	0.8	5.73					4
Crossroads	(50%)	(33.3%)	(35%)	0 (0%)	0 (0%)	-	4 (77%)	(100%)
Evidence:		0.8	6.93					
Internal	0 (0%)	(33.3%)	(42%)	4 (48%)	0 (0%)	-	0.4 (8%)	0 (0%)
	0.8		2.27	4.4			0.8	
Evidence: Cited	(25%)	0 (0%)	(14%)	(52%)	0 (0%)	-	(15%)	0 (0%)
Evidence: Cited	0.4		2.27					
(Supporting)	(12.5%)	0 (0%)	(14%)	0 (0%)	0 (0%)	-	0 (0%)	0 (0%)
Evidence: Cited	0.4			1.6			0.8	
(Building)	(12.5%)	0 (0%)	0 (0%)	(19%)	0 (0%)	-	(15%)	0 (0%)
Evidence: Cited								
(Competency)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	-	0 (0%)	0 (0%)

Student 100: Apparel Merchandising, Design and Textiles								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	2	4	5	0	7	7
Domain	Advertising & Ethics			English	English	AMDT	Technology & Culture	
Words	421	284	577	1122	973	-	552	405
tUnits	13.2	10.4	4.6	20.4	70.8	-	15.6	9.6
	10.8	7.6	1.6	10.8	19		11.2	8
Claims	(81.8%)	(73.1%)	(35%)	(52.9%)	(26.8%)	-	(71.8%)	(83.3%)
	2.4	2.8	1.4	3.27	8		4.4	1.6
Evidence	(18.2%)	(26.9%)	(30%)	(16%)	(11.3%)	-	(28.2%)	(16.7%)
Evidence: Outsider	0 (0%)	0.4 (14.3%)	0 (0%)	0.13 (4%)	0.3 (4%)	-	0 (0%)	0 (0%)
Evidence: Crossroads	0.4 (16.7%)	1.6 (57.1%)	0 (0%)	0.33 (10%)	2.1 (26%)	-	0.4 (9%)	1.6 (100%)
Evidence: Internal	1.6 (66.7%)	0.8 (28.6%)	1.2 (86%)	0.73 (22%)	2.2 (28%)	-	1.2 (27%)	0 (0%)
Evidence: Cited	0.4 (16.7%)	0 (0%)	0.2 (14%)	2.07 (63%)	3.4 (43%)	-	2.8 (64%)	0 (0%)
Evidence: Cited (Supporting)	0 (0%)	0 (0%)	0 (0%)	1.73 (53%)	2.3 (29%)	-	0 (0%)	0 (0%)
Evidence: Cited (Building)	0 (0%)	0 (0%)	0 (0%)	0.13 (4%)	0 (0%)	-	0.8 (18%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	-	0 (0%)	0 (0%)

Student 84: Agriculture Technology and Production Management								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Trm. Wrt.: Analytical	Junior Trm. Wrt.: Reflective
Term	0	0	1	8	0	0	7	7
Domain	Economic				Technology & Culture			
	Climate & Rhetoric	English	Sciences	-	-	-	-	-
Words	294	451	1459	530	-	-	536	383
tUnits	7.2	15.2	15.2	11.2	-	-	15.2	11.6
	4	9.6	9.4	10.8			9.6	7.2
Claims	(55.6%)	(63.2%)	(62%)	(96.4%)	-	-	(63.2%)	(62.1%)
	3.2	5.6	5.5				5.2	4
Evidence	(44.4%)	(36.8%)	(36%)	0 (0%)	-	-	(34.2%)	(34.5%)
Evidence: Outsider	0 (0%)	0.8 (14.3%)	0.7 (13%)	0 (0%)	-	-	0 (0%)	0 (0%)
Evidence: Crossroads	2 (62.5%)	4.4 (78.6%)	2.9 (53%)	0 (0%)	-	-	2.4 (46%)	4 (100%)
Evidence: Internal	0 (0%)	0.4 (7.1%)	1.1 (20%)	0 (0%)	-	-	0 (0%)	0 (0%)
Evidence: Cited	1.2 (37.5%)	0 (0%)	0.8 (15%)	0 (0%)	-	-	2.8 (54%)	0 (0%)
Evidence: Cited (Supporting)	0 (0%)	0 (0%)	0.5 (9%)	0 (0%)	-	-	0.8 (15%)	0 (0%)
Evidence: Cited (Building)	0.8 (25%)	0 (0%)	0.1 (2%)	0 (0%)	-	-	2 (38%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	0.1 (2%)	0 (0%)	-	-	0 (0%)	0 (0%)

Student 70: Communication								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Trm. Wrt.: Analytical	Junior Trm. Wrt.: Reflective
Term	0	0	1	14	0	0	8	8
Domain	Technology & Culture		English	Math	-	-	Climate & Rhetoric	
Words	381	283	943	2198	-	-	618	189
tUnits	12.8	9.2	21.6	23.8	-	-	14.8	5.6
	7.6	5.6	3.2	21.6			10.4	4
Claims	(59.4%)	(60.9%)	(15%)	(90.8%)	-	-	(70.3%)	(71.4%)
	3.6	3.6	9.6	11.8				1.6
Evidence	(28.1%)	(39.1%)	(44%)	(49.6%)	-	-	4 (27%)	(28.6%)
Evidence:	0.8		1.2					
Outsider	(22.2%)	0 (0%)	(13%)	2 (17%)	-	-	0 (0%)	0 (0%)
Evidence:	0.8	2.8	2.8	1.8			1.2	1.6
Crossroads	(22.2%)	(77.8%)	(29%)	(15%)	-	-	(30%)	(100%)
Evidence:		0.8	5.6	3.6			1.6	
Internal	0 (0%)	(22.2%)	(58%)	(31%)	-	-	(40%)	0 (0%)
	2			4.4			1.2	
Evidence: Cited	(55.6%)	0 (0%)	0 (0%)	(37%)	-	-	(30%)	0 (0%)
Evidence: Cited	0.4			2.6			0.4	
(Supporting)	(11.1%)	0 (0%)	0 (0%)	(22%)	-	-	(10%)	0 (0%)
Evidence: Cited				1.8			0.8	
(Building)	0 (0%)	0 (0%)	0 (0%)	(15%)	-	-	(20%)	0 (0%)
Evidence: Cited								
(Competency)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	-	-	0 (0%)	0 (0%)

Student 91: Accounting								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	1	7	7	7	7	7
Domain	Technology & Culture			English	Mgmt.	Mgmt.	Mgmt.	Psychology & Culture
Words	292	305	1306	1129	1129	1342	582	266
tUnits	9.6	11.2	26.4	9.2	14.4	27.2	14.4	6.8
Claims	6 (62.5%)	6.4 (57.1%)	15.4 (58%)	1.6 (17.4%)	2 (13.9%)	15.6 (57.4%)	8 (55.6%)	4.4 (64.7%)
Evidence	3.2 (33.3%)	4.8 (42.9%)	11 (42%)	7.2 (78.3%)	11.6 (80.6%)	11.2 (41.2%)	6 (41.7%)	2.4 (35.3%)
Evidence: Outsider	0 (0%)	0.8 (16.7%)	1 (9%)	0 (0%)	5.2 (45%)	1.2 (11%)	0.8 (13%)	0 (0%)
Evidence: Crossroads	1.6 (50%)	4 (83.3%)	6.2 (56%)	6.4 (89%)	0 (0%)	3.6 (32%)	3.6 (60%)	1.6 (67%)
Evidence: Internal	0 (0%)	0 (0%)	1.8 (16%)	0.8 (11%)	3.6 (31%)	6.4 (57%)	0 (0%)	0.8 (33%)
Evidence: Cited	1.6 (50%)	0 (0%)	2 (18%)	0 (0%)	2.8 (24%)	0 (0%)	1.6 (27%)	0 (0%)
Evidence: Cited (Supporting)	0 (0%)	0 (0%)	1.8 (16%)	0 (0%)	2.4 (21%)	0 (0%)	0 (0%)	0 (0%)
Evidence: Cited (Building)	1.6 (50%)	0 (0%)	0.2 (2%)	0 (0%)	0 (0%)	0 (0%)	1.2 (20%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Student 12: Mechanical Engineering								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Trm. Wrt.: Analytical	Junior Trm. Wrt.: Reflective
Term	0	0	2	0	0	0	7	7
Domain	Technology & Culture			English	-	-	-	Economics & Politics
Words	421	264	1850	-	-	-	434	211
tUnits	10.8	7.2	30.3	-	-	-	11.2	4.4
	6	6	18.93				6.4	2.4
Claims	(55.6%)	(83.3%)	(63%)	-	-	-	(57.1%)	(54.5%)
	4.8	1.2	10.27				4.8	2
Evidence	(44.4%)	(16.7%)	(34%)	-	-	-	(42.9%)	(45.5%)
Evidence: Outsider	0 (0%)	0 (0%)	0.27 (3%)	-	-	-	0 (0%)	0 (0%)
Evidence: Crossroads	4.4 (91.7%)	0.4 (33.3%)	1.87 (18%)	-	-	-	3.6 (75%)	1.6 (80%)
Evidence: Internal	0.4 (8.33%)	0.8 (66.7%)	0.27 (3%)	-	-	-	0.4 (8%)	0.4 (20%)
Evidence: Cited	0 (0%)	0 (0%)	7.87 (77%)	-	-	-	0.8 (17%)	0 (0%)
Evidence: Cited (Supporting)	0 (0%)	0 (0%)	6.4 (62%)	-	-	-	0 (0%)	0 (0%)
Evidence: Cited (Building)	0 (0%)	0 (0%)	0.4 (4%)	-	-	-	0 (0%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	0.13 (1%)	-	-	-	0 (0%)	0 (0%)

Student 92: Sport Management								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	2	0	0	0	5	5
Domain	Technology & Culture			English	-	-	-	Technology & Culture
Words	412	300	1521	-	-	-	645	417
tUnits	9.2	6.8	28.5	-	-	-	14.4	8
	4.4	4.4	15.6				7.2	4.8
Claims	(47.8%)	(64.7%)	(55%)	-	-	-	(50%)	(60%)
	4.8	2.4	12.8				7.2	3.2
Evidence	(52.2%)	(35.3%)	(45%)	-	-	-	(50%)	(40%)
Evidence:	0.4	0.4	0.27					0.8
Outsider	(8.3%)	(16.7%)	(2%)	-	-	-	0 (0%)	(25%)
Evidence:	1.2	1.2	6.93					1.6
Crossroads	(25%)	(50%)	(54%)	-	-	-	4 (56%)	(50%)
Evidence:		0.8	4.13					0.8
Internal	0 (0%)	(33.3%)	(32%)	-	-	-	0.4 (6%)	(25%)
	3.2		1.47				2.8	
Evidence: Cited	(66.7%)	0 (0%)	(11%)	-	-	-	(39%)	0 (0%)
Evidence: Cited	1.6							
(Supporting)	(33.3%)	0 (0%)	1.2 (9%)	-	-	-	0.4 (6%)	0 (0%)
Evidence: Cited	1.6							
(Building)	(33.3%)	0 (0%)	0 (0%)	-	-	-	2 (28%)	0 (0%)
Evidence: Cited			0.27					
(Competency)	0 (0%)	0 (0%)	(2%)	-	-	-	0 (0%)	0 (0%)

Student 67: Movement Studies								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	1	3	0	0	6	6
Domain	Climate & Rhetoric	English	Human Development		-	-	Technology & Education	
Words	845	312	119	2342	-	-	851	344
tUnits	16.4	6	16.8	45.6	-	-	19.6	9.2
	9.6	4.8	4.9	14			12	6
Claims	(58.5%)	(80%)	(29%)	(30.7%)	-	-	(61.2%)	(65.2%)
	6.8	1.2	1.75	31.6			7.6	3.2
Evidence	(41.5%)	(20%)	(10%)	(69.3%)	-	-	(38.8%)	(34.8%)
Evidence:	0.4	0.4					0.8	
Outsider	(5.9%)	(33.3%)	0 (0%)	0 (0%)	-	-	(11%)	0 (0%)
Evidence:	4	0.8	0.2				3.6	3.2
Crossroads	(58.8%)	(66.7%)	(11%)	0 (0%)	-	-	(47%)	(100%)
Evidence:	0.8		0.2	6.8				
Internal	(11.8%)	0 (0%)	(11%)	(22%)	-	-	0.4 (5%)	0 (0%)
	1.6		1.35	24.8			2.8	
Evidence: Cited	(23.5%)	0 (0%)	(77%)	(78%)	-	-	(37%)	0 (0%)
Evidence: Cited	0.4		0.75	24.8				
(Supporting)	(5.9%)	0 (0%)	(43%)	(78%)	-	-	0 (0%)	0 (0%)
Evidence: Cited	1.2		0.45					
(Building)	(17.6%)	0 (0%)	(26%)	0 (0%)	-	-	0 (0%)	0 (0%)
Evidence: Cited			0.05					
(Competency)	0 (0%)	0 (0%)	(3%)	0 (0%)	-	-	0 (0%)	0 (0%)

Student 85: Social Sciences								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Trm. Wrt.: Analytical	Junior Trm. Wrt.: Reflective
Term	0	0	4	4	0	0	8	8
Domain	Economics & Politics			English	English	-	-	Sociology & Culture
Words	327	143	738	4770	-	-	348	230
tUnits	9.2	3.2	13.2	79.2	-	-	8	6.8
	7.2	2	11.2	43.6				4.4
Claims	(78.3%)	(62.5%)	(85%)	(55.1%)	-	-	4 (50%)	(64.7%)
	2	1.2		31.2			3.6	2.4
Evidence	(21.7%)	(37.5%)	1.2 (9%)	(39.4%)	-	-	(45%)	(35.3%)
Evidence: Outsider	0 (0%)	0 (0%)	0 (0%)	6.4 (21%)	-	-	0.4 (11%)	0 (0%)
Evidence: Crossroads	1.6 (80%)	1.2 (100%)	0 (0%)	9.2 (29%)	-	-	1.2 (33%)	2 (83%)
Evidence: Internal	0 (0%)	0 (0%)	1.2 (100%)	7.6 (24%)	-	-	0.8 (22%)	0.4 (17%)
Evidence: Cited	0.4 (20%)	0 (0%)	0 (0%)	8 (26%)	-	-	1.2 (33%)	0 (0%)
Evidence: Cited (Supporting)	0 (0%)	0 (0%)	0 (0%)	8 (26%)	-	-	0 (0%)	0 (0%)
Evidence: Cited (Building)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	-	-	0.8 (22%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	-	-	0 (0%)	0 (0%)

Student 33: Management and Operations								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	-	8	0	0	7	7
Domain	Technology & Culture		English	Human Develop ment	-	-	Technology & Culture	
Words	503	393	-	3219	-	-	544	353
tUnits	16.4	14	-	68	-	-	14.4	8
	10	10.8		18.8			7.2	6.8
Claims	(61.0%)	(77.1%)	-	(27.6%)	-	-	(50%)	(85%)
	6.4	3.2 (22.		49.2			7.2	1.2
Evidence	(39.0%)	9%)	-	(72.4%)	-	-	(50%)	(15%)
Evidence: Outsider	0 (0%)	0 (0%)	-	3.2 (7%)	-	-	0 (0%)	0 (0%)
Evidence: Crossroads	4 (62.5%)	3.2 (100%)	-	20.4 (41%)	-	-	4.4 (61%)	1.2 (100%)
Evidence: Internal	0.8 (12.5%)	0 (0%)	-	9.6 (20%)	-	-	0.4 (6%)	0 (0%)
Evidence: Cited	1.6 (25%)	0 (0%)	-	16 (33%)	-	-	2.4 (33%)	0 (0%)
Evidence: Cited (Supporting)	0 (0%)	0 (0%)	-	9.2 (19%)	-	-	0 (0%)	0 (0%)
Evidence: Cited (Building)	1.2 (18.8%)	0 (0%)	-	0.4 (1%)	-	-	2 (28%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	-	6.4 (13%)	-	-	0 (0%)	0 (0%)

Student 3: Mechanical Engineering								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	1	0	0	7	7	7
Domain	Technology & Culture		English	-	-	Sociology	Climate & Science	
Words	503	174	560	-	-	190	663	359
tUnits	12	6	22.9	-	-	17.6	17.6	8
	6.4	3.6	6.2			0.6	9.6	5.2
Claims	(53.3%)	(60%)	(27.2%)	-	-	(3.4%)	(54.5%)	(65%)
	5.6	2.4	3.88			3.4	8	2.8
Evidence	(46.7%)	(40%)	(17%)	-	-	(19.3%)	(45.5%)	(35%)
Evidence: Outsider	0 (0%)	0 (0%)	0 (0%)	-	-	0.1 (3%)	0.4 (5%)	0 (0%)
Evidence: Crossroads	5.2 (92.9%)	2.4 (100%)	1.32 (34%)	-	-	1 (29%)	6.4 (80%)	1.6 (57%)
Evidence: Internal	0.4 (7.1%)	0 (0%)	0.72 (19%)	-	-	2.1 (62%)	0.8 (10%)	1.2 (43%)
Evidence: Cited	0 (0%)	0 (0%)	1.84 (47%)	-	-	0.2 (6%)	0.4 (5%)	0 (0%)
Evidence: Cited (Supporting)	0 (0%)	0 (0%)	1.84 (47%)	-	-	0 (0%)	0 (0%)	0 (0%)
Evidence: Cited (Building)	0 (0%)	0 (0%)	0 (0%)	-	-	0.2 (6%)	0.4 (5%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	0 (0%)	-	-	0 (0%)	0 (0%)	0 (0%)

Student 111: Entrepreneurship								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Trm. Wrt.: Analytical	Junior Trm. Wrt.: Reflective
Term	0	0	-1	0	0	0	7	7
Domain	Technology & Education		English	-	-	-	Climate & Politics	
Words	532	148	1011	-	-	-	740	334
tUnits	16	3.6	24.9	-	-	-	18	10
	11.2	3.6	13.6				11.2	7.6
Claims	(70%)	(100%)	(55%)	-	-	-	(62.2%)	(76%)
	4.8		10.93				6.8	2.4
Evidence	(30%)	0 (0%)	(44%)	-	-	-	(37.8%)	(24%)
Evidence:	0.8							0.4
Outsider	(16.7%)	0 (0%)	0.8 (7%)	-	-	-	0.4 (6%)	(17%)
Evidence:	2.8		4.8				3.2	
Crossroads	(58.3%)	0 (0%)	(44%)	-	-	-	(47%)	2 (83%)
Evidence:	0.4		2.8					
Internal	(8.33%)	0 (0%)	(26%)	-	-	-	2 (29%)	0 (0%)
Evidence: Cited	0.8		2.53				1.2	
	(16.7%)	0 (0%)	(23%)	-	-	-	(18%)	0 (0%)
Evidence: Cited	0.4		1.73					
(Supporting)	(8.33%)	0 (0%)	(16%)	-	-	-	0.4 (6%)	0 (0%)
Evidence: Cited	0.4		0.67					
(Building)	(8.33%)	0 (0%)	(6%)	-	-	-	0 (0%)	0 (0%)
Evidence: Cited								
(Competency)	0 (0%)	0 (0%)	0 (0%)	-	-	-	0 (0%)	0 (0%)

Student 68: Apparel Merchandising, Design and Textiles								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Trm. Wrt.: Analytical	Junior Trm. Wrt.: Reflective
Term	0	0	2	5	0	0	7	7
Domain	Technology & Culture		English	Communication	-	-	Climate & Science	
Words	467	178	691	1289	-	-	551	206
tUnits	11.6	4.4	42.8	30	-	-	13.6	6
	7.2	4	8.7	16.8			10.8	4.4
Claims	(62.1%)	(90.9%)	(20%)	(56%)	-	-	(79.4%)	(73.3%)
	4.4	0.4	11.73	6.8			2.8	1.6
Evidence	(37.9%)	(9.1%)	(27%)	(22.7%)	-	-	(20.6%)	(26.7%)
Evidence: Outsider	0 (0%)	0.4 (100%)	1.07 (9%)	0 (0%)	-	-	0 (0%)	0 (0%)
Evidence: Crossroads	2 (45.5%)	0 (0%)	8.2 (70%)	0 (0%)	-	-	1.2 (43%)	1.2 (75%)
Evidence: Internal	0 (0%)	0 (0%)	1.13 (10%)	0 (0%)	-	-	0.4 (14%)	0.4 (25%)
Evidence: Cited	2.4 (54.5%)	0 (0%)	1.33 (11%)	6.8 (100%)	-	-	1.2 (43%)	0 (0%)
Evidence: Cited (Supporting)	0 (0%)	0 (0%)	0.67 (6%)	6.8 (100%)	-	-	0.8 (29%)	0 (0%)
Evidence: Cited (Building)	2 (45.5%)	0 (0%)	0 (0%)	0 (0%)	-	-	0 (0%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	0.47 (4%)	0 (0%)	-	-	0 (0%)	0 (0%)

Student 58: Wildlife Ecology								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	2	4	0	0	7	7
Domain	Technology & Culture		English	Nat. Res. Sci.	-	-	Technology & Culture	
Words	435	270	1130	324	-	-	747	501
tUnits	12.8	6.4	32.8	50.8	-	-	16.8	13.2
	6.8	2.4	12.8	4.67			11.6	7.2
Claims	(53.1%)	(37.5%)	(39%)	(9.2%)	-	-	(69%)	(54.5%)
	6	4	20	3.64			5.2	6
Evidence	(46.9%)	(62.5%)	(61%)	(7.2%)	-	-	(31%)	(45.5%)
Evidence:	0.4			0.04				
Outsider	(6.7%)	0 (0%)	1.2 (6%)	(1%)	-	-	0 (0%)	0 (0%)
Evidence:	4.8	4	14	3.11			4	5.6
Crossroads	(80%)	(100%)	(70%)	(85%)	-	-	(77%)	(93%)
Evidence:			4.8	0.13			0.8	
Internal	0 (0%)	0 (0%)	(24%)	(4%)	-	-	(15%)	0.4 (7%)
Evidence: Cited	0.8			0.36			0.4	
(Supporting)	(13.3%)	0 (0%)	0 (0%)	(10%)	-	-	(8%)	0 (0%)
Evidence: Cited	0.4			0.36			0.4	
(Building)	(6.7%)	0 (0%)	0 (0%)	(10%)	-	-	(8%)	0 (0%)
Evidence: Cited	0.4			0 (0%)			0 (0%)	
(Competency)	(6.7%)	0 (0%)	0 (0%)	0 (0%)	-	-	0 (0%)	0 (0%)
	0 (0%)	0 (0%)	0 (0%)	0 (0%)	-	-	0 (0%)	0 (0%)

Student 25: Psychology								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Trm. Wrt.: Analytical	Junior Trm. Wrt.: Reflective
Term	0	0	2	0	0	0	7	7
Domain	Technology & Education		English	-	-	-	Technology & Culture	
Words	214	165	417	-	-	-	541	306
tUnits	6	4.8	33.9	-	-	-	13.6	7.2
	3.6	2.8	10.9				8.4	5.6
Claims	(60%)	(58.3%)	(32%)	-	-	-	(61.8%)	(77.8%)
	2.4	2					5.2	1.6
Evidence	(40%)	(41.7%)	2.9 (9%)	-	-	-	(38.2%)	(22.2%)
Evidence: Outsider	0 (0%)	0 (0%)	0.13 (5%)	-	-	-	0 (0%)	0 (0%)
Evidence: Crossroads	2 (83.3%)	2 (100%)	1.7 (59%)	-	-	-	3.6 (69%)	1.6 (100%)
Evidence: Internal	0.4 (16.7%)	0 (0%)	0.37 (13%)	-	-	-	0.4 (8%)	0 (0%)
Evidence: Cited	0 (0%)	0 (0%)	0.7 (24%)	-	-	-	1.2 (23%)	0 (0%)
Evidence: Cited (Supporting)	0 (0%)	0 (0%)	0.57 (20%)	-	-	-	0.4 (8%)	0 (0%)
Evidence: Cited (Building)	0 (0%)	0 (0%)	0.03 (1%)	-	-	-	0 (0%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	0 (0%)	-	-	-	0 (0%)	0 (0%)

Bottom Quintile

Student 78: History								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	4	0	0	0	8	8
Domain	Climate & Rhetoric		English	-	-	-	Psychology & Culture	
Words	319	109	1497	-	-	-	321	189
tUnits	8.8	3.2	15.2	-	-	-	6	2.8
	6 (68.2%)	2.8 (87.5%)	12.93 (85%)	-	-	-	3.2 (53.3%)	2 (71.4%)
Claims	2.8 (31.8%)	0.4 (12.5%)	2.27 (15%)	-	-	-	2.8 (46.7%)	0.8 (28.6%)
Evidence:	0.8 (28.6%)	0 (0%)	0 (0%)	-	-	-	0 (0%)	0 (0%)
Outsider	0 (0%)	0.4 (100%)	0.27 (12%)	-	-	-	2 (71%)	0.8 (100%)
Evidence:	1.6 (57.1%)	0 (0%)	0 (0%)	-	-	-	0 (0%)	0 (0%)
Crossroads	0.4 (14.3%)	0 (0%)	2 (88%)	-	-	-	0.8 (29%)	0 (0%)
Evidence: Cited	0.4 (14.3%)	0 (0%)	1.2 (53%)	-	-	-	0 (0%)	0 (0%)
(Supporting)	0 (0%)	0 (0%)	0.13 (6%)	-	-	-	0 (0%)	0 (0%)
Evidence: Cited	0 (0%)	0 (0%)	0.13 (6%)	-	-	-	0 (0%)	0 (0%)
(Building)	0 (0%)	0 (0%)	0.13 (6%)	-	-	-	0 (0%)	0 (0%)
Evidence: Cited	0 (0%)	0 (0%)	0.13 (6%)	-	-	-	0 (0%)	0 (0%)
(Competency)	0 (0%)	0 (0%)	0.13 (6%)	-	-	-	0 (0%)	0 (0%)

Student 117: Basic Medical Sciences								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	2	7	0	0	8	8
Domain	Economics & Politics		English	Psychology	-	-	Technology & Culture	
Words	310	271	809	662	-	-	492	298
tUnits	9.2	7.2	13.6	20.8	-	-	10.4	8
Claims	6 (65.2%)	4.4 (61.1%)	6.4 (47%)	4.8 (23.1%)	-	-	6.8 (65.4%)	6 (75%)
Evidence	3.2 (34.8%)	2.8 (38.9%)	6.8 (50%)	3.3 (15.9%)	-	-	3.2 (30.8%)	2 (25%)
Evidence: Outsider	0.4 (12.5%)	0 (0%)	1.6 (24%)	0 (0%)	-	-	0.4 (13%)	0 (0%)
Evidence: Crossroads	0 (0%)	2.4 (85.7%)	0 (0%)	-	-	-	0.4 (13%)	1.6 (80%)
Evidence: Internal	1.2 (37.5%)	0.4 (14.3%)	4 (59%)	0.9 (27%)	-	-	0.4 (13%)	0.4 (20%)
Evidence: Cited	1.6 (50%)	0 (0%)	1.2 (18%)	1.4 (42%)	-	-	2 (63%)	0 (0%)
Evidence: Cited (Supporting)	0 (0%)	0 (0%)	0 (0%)	0.4 (12%)	-	-	0 (0%)	0 (0%)
Evidence: Cited (Building)	1.6 (50%)	0 (0%)	0.8 (12%)	0.8 (24%)	-	-	2 (63%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	0.4 (6%)	0 (0%)	-	-	0 (0%)	0 (0%)

Student 95: Architecture								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	2	2	0	0	7	7
Domain	Technology & Culture		English	Architecture	-	-	Psychology & Culture	
Words	465	237	551	534	-	-	585	202
tUnits	11.6	8.4	10.6	11.6	-	-	13.2	4.8
	6.8	5.2	8	4.8			6.4	3.6
Claims	(58.6%)	(61.9%)	(75%)	(41.4%)	-	-	(48.5%)	(75%)
	4.8	3.2 (38.	2.6	6.8			6.8	1.2
Evidence	(41.4%)	1%)	(25%)	(58.6%)	-	-	(51.5%)	(25%)
Evidence:	0.4		0.2	5.2				
Outsider	(8.33%)	0 (0%)	(8%)	(76%)	-	-	0 (0%)	0 (0%)
Evidence:	3.6	1.2	0.8				4.4	0.8
Crossroads	(75%)	(37.5%)	(31%)	-	-	-	(65%)	(67%)
Evidence:		2	1.6				0.4	0.4
Internal	0 (0%)	(62.5%)	(62%)	0 (0%)	-	-	(6%)	(33%)
Evidence: Cited	0.8							
	(16.7%)	0 (0%)	0 (0%)	0 (0%)	-	-	2 (29%)	0 (0%)
Evidence: Cited							1.2	
(Supporting)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	-	-	(18%)	0 (0%)
Evidence: Cited	0.8						0.8	
(Building)	(16.7%)	0 (0%)	0 (0%)	0 (0%)	-	-	(12%)	0 (0%)
Evidence: Cited								
(Competency)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	-	-	0 (0%)	0 (0%)

Student 62: Chemical Engineering								
Term	0	0	-	5	8	0	7	7
Domain	Advertising & Ethics		English	Chem	Soc.	-	Advertising & Ethics	
Words	566	304	-	705	830	-	516	395
tUnits	12.4	8.4	-	14	16.8	-	13.6	10
Claims	6.4 (51.6%)	5.2 (61.9%)	-	3.2 (22.9%)	5.6 (33.3%)	-	6.4 (47.1%)	6 (60%)
Evidence	5.6 (45.2%)	3.2 (38.1%)	-	10.8 (77.1%)	11.2 (66.7%)	-	6.4 (47.1%)	4 (40%)
Evidence: Outsider	1.2 (21.4%)	0 (0%)	-	0 (0%)	1.2 (11%)	-	0 (0%)	0 (0%)
Evidence: Crossroads	3.6 (64.3%)	3.2 (100%)	-	-	4.4 (39%)	-	6 (94%)	3.2 (80%)
Evidence: Internal	0 (0%)	0 (0%)	-	0 (0%)	5.6 (50%)	-	0 (0%)	0.8 (20%)
Evidence: Cited	0.8 (14.3%)	0 (0%)	-	0 (0%)	0 (0%)	-	0.4 (6%)	0 (0%)
Evidence: Cited (Supporting)	0 (0%)	0 (0%)	-	0 (0%)	0 (0%)	-	0 (0%)	0 (0%)
Evidence: Cited (Building)	0 (0%)	0 (0%)	-	0 (0%)	0 (0%)	-	0.4 (6%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	-	0 (0%)	0 (0%)	-	0 (0%)	0 (0%)

Student 94: Computer Science								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	2	0	0	0	7	7
Domain	Economics & Politics			English	-	-	-	Economics & Politics
Words	346	167	1224	-	-	-	338	259
tUnits	10.4	4	24	-	-	-	10	6
	6.8		8.4				7.2	2.4
Claims	(65.4%)	2 (50%)	(35%)	-	-	-	(72%)	(40%)
	3.6		12.8				2.8	3.6
Evidence	(34.6%)	2 (50%)	(53%)	-	-	-	(28%)	(60%)
Evidence: Outsider	0 (0%)	0 (0%)	2.6 (20%)	-	-	-	0 (0%)	0 (0%)
Evidence: Crossroads	0 (0%)	1.6 (80%)	4.6 (36%)	-	-	-	0 (0%)	3.6 (100%)
Evidence: Internal	1.2 (33.3%)	0.4 (20%)	2.2 (17%)	-	-	-	0.4 (14%)	0 (0%)
Evidence: Cited	2.4 (66.7%)	0 (0%)	3.4 (27%)	-	-	-	2.4 (86%)	0 (0%)
Evidence: Cited (Supporting)	0 (0%)	0 (0%)	2.8 (22%)	-	-	-	0 (0%)	0 (0%)
Evidence: Cited (Building)	2.4 (66.7%)	0 (0%)	0.6 (5%)	-	-	-	1.6 (57%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	0 (0%)	-	-	-	0 (0%)	0 (0%)

Student 98: English								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	-	7	0	0	7	7
	Psychology & Culture			Economics & Politics				
Domain			English	English	-	-		
Words	387	268	-	1074	-	-	555	269
tUnits	12.4	6	-	17.2	-	-	10.4	4.4
	5.6	4		8.8			5.6	1.2
Claims	(45.2%)	(66.7%)	-	(51.2%)	-	-	(53.8%)	(27.3%)
	6.8	2		7.6			4.8	3.2
Evidence	(54.8%)	(33.3%)	-	(44.2%)	-	-	(46.2%)	(72.7%)
Evidence:				2.4				0.8
Outsider	0 (0%)	0 (0%)	-	(32%)	-	-	0 (0%)	(25%)
Evidence:	6	1.2						
Crossroads	(88.2%)	(60%)	-	-	-	-	2 (42%)	2 (63%)
Evidence:		0.8		1.6			0.8	0.4
Internal	0 (0%)	(40%)	-	(21%)	-	-	(17%)	(13%)
Evidence: Cited	0.8							
(Supporting)	(11.8%)	0 (0%)	-	2 (26%)	-	-	2 (42%)	0 (0%)
Evidence: Cited								
(Building)	0 (0%)	0 (0%)	-	2 (26%)	-	-	0.4 (8%)	0 (0%)
Evidence: Cited	0.4						1.6	
(Competency)	(5.9%)	0 (0%)	-	0 (0%)	-	-	(33%)	0 (0%)
	0 (0%)	0 (0%)	-	0 (0%)	-	-	0 (0%)	0 (0%)

Student 47: Communication								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	4	0	5	0	8	8
Domain	Psychology & Culture		English	-	History	-	Psychology & Culture	
Words	242	164	160	-	859	-	546	236
tUnits	4.8	3.2	6.2	-	13.2	-	10.8	4.8
	2	1.2	3.5		2		4.4	2
Claims	(41.7%)	(37.5%)	(56%)	-	(15.2%)	-	(40.7%)	(41.7%)
	2.8	2	0.33		11.2		6	2.8
Evidence	(58.3%)	(62.5%)	(5%)	-	(84.8%)	-	(55.6%)	(58.3%)
Evidence:					3.2			0.8
Outsider	0 (0%)	0 (0%)	0 (0%)	-	(29%)	-	0.4 (7%)	(29%)
Evidence:	2	1.2	0.33				2.8	1.6
Crossroads	(71.4%)	(60%)	(100%)	-	0.8 (7%)	-	(47%)	(57%)
Evidence:		0.8			4.4			0.4
Internal	0 (0%)	(40%)	0 (0%)	-	(39%)	-	0 (0%)	(14%)
Evidence: Cited	0.8 (28.6%)	0 (0%)	0 (0%)	-	2.8 (25%)	-	2.8 (47%)	0 (0%)
Evidence: Cited (Supporting)	0.4 (14.3%)	0 (0%)	0 (0%)	-	1.2 (11%)	-	0.4 (7%)	0 (0%)
Evidence: Cited (Building)	0.4 (14.3%)	0 (0%)	0 (0%)	-	0 (0%)	-	2.4 (40%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	0 (0%)	-	1.6 (14%)	-	0 (0%)	0 (0%)

Student 13: Social Studies								
	Placement Exam: Analytical	Placement Exam: Reflective	FYC	General Education #1	General Education #2	General Education #3	Junior Tm. Wrt.: Analytical	Junior Tm. Wrt.: Reflective
Term	0	0	-	8	0	0	7	7
Domain	Technology & Culture	Technology & Culture	English	Asian Studies	-	-	Technology & Culture	Technology & Culture
Words	248	205	-	412	-	-	373	338
tUnits	5.2	4.4	-	24.8	-	-	8	7.2
	2.8	2.8		8.8			3.2	4.8
Claims	(53.8%)	(63.6%)	-	(35.5%)	-	-	(40%)	(66.7%)
	1.6							
	(30.8%)	1.6		1.8			4.8	2.4
Evidence		(36.4%)	-	(7.3%)	-	-	(60%)	(33.3%)
Evidence: Outsider	0 (0%)	0 (0%)	-	0 (0%)	-	-	0 (0%)	0.4 (17%)
Evidence: Crossroads	1.2 (75%)	1.6 (100%)	-	0 (0%)	-	-	2 (42%)	2 (83%)
Evidence: Internal	0 (0%)	0 (0%)	-	0 (0%)	-	-	0.4 (8%)	0 (0%)
Evidence: Cited	0.4 (25%)	0 (0%)	-	1.8 (100%)	-	-	2.4 (50%)	0 (0%)
Evidence: Cited (Supporting)	0 (0%)	0 (0%)	-	1.8 (100%)	-	-	0 (0%)	0 (0%)
Evidence: Cited (Building)	0.4 (25%)	0 (0%)	-	0 (0%)	-	-	2.4 (50%)	0 (0%)
Evidence: Cited (Competency)	0 (0%)	0 (0%)	-	0 (0%)	-	-	0 (0%)	0 (0%)

Appendix B: Students Receiving the Same Prompt for Placement and Junior

Timed Writings

Student Major Placement Prompt		Placement: Analytical	Placement: Reflection	Timed Writing: Analytical	Timed Writing: Reflection
Student 19 English Passage from Sherry Turkle's "Can You Hear Me Now?"	T-Units	28	16	46	16
	Claims	16 (57.14%)	9 (56.25%)	23 (50%)	10 (62.5%)
	Evidence	11 (39.29%)	7 (43.75%)	20 (43.48%)	5 (31.25%)
	No Citation	8 (28.57%)	7 (43.75%)	13 (28.26%)	5 (31.25%)
	Cited	3 (10.71%)	0 (0%)	7 (15.22%)	0 (0%)
	Term	0	0	7	7
Student 20 Sport Management Passage from Sherry Turkle's "Can You Hear Me Now?"	T-Units	20	24	35	15
	Claims	13 (65%)	13 (54.17%)	21 (60%)	8 (53.33%)
	Evidence	7 (35%)	11 (45.83%)	13 (37.14%)	6 (40%)
	No Citation	7 (35%)	11 (45.83%)	11 (31.43%)	6 (40%)
	Cited	0 (0%)	0 (0%)	2 (5.71%)	0 (0%)
	Term	0	0	8	8
Student 45 Animal Science Passage from Sherry Turkle's "Can You Hear Me Now?"	T-Units	21	28	36	27
	Claims	13 (61.9%)	14 (50%)	22 (61.11%)	18 (66.67%)
	Evidence	6 (28.57%)	12 (42.86%)	13 (36.11%)	7 (25.93%)
	No Citation	2 (9.52%)	12 (42.86%)	7 (19.44%)	7 (25.93%)
	Cited	4 (19.05%)	0 (0%)	6 (16.67%)	0 (0%)
	Term	0	0	7	7

Student Major Placement Prompt		Placement: Analytical	Placement: Reflection	Timed Writing: Analytical	Timed Writing: Reflection
Student 47 Communication Passage from Walter Kirn's "Autumn of the Multitaskers"	T-Units	12	8	27	12
	Claims	5 (41.67%)	3 (37.5%)	11 (40.74%)	5 (41.67%)
	Evidence	7 (58.33%)	5 (62.5%)	14 (51.85%)	5 (41.67%)
	No Citation	5 (41.67%)	5 (62.5%)	7 (25.93%)	5 (41.67%)
	Cited	2 (16.67%)	0 (0%)	7 (25.93%)	0 (0%)
	Term	0	0	8	8
Student 49 Communication and Society Passage from Sherry Turkle's "Can You Hear Me Now?"	T-Units	44	29	30	27
	Claims	23 (52.27%)	16 (55.17%)	17 (56.67%)	13 (48.15%)
	Evidence	19 (43.18%)	13 (44.83%)	12 (40%)	13 (48.15%)
	No Citation	17 (38.64%)	13 (44.83%)	6 (20%)	13 (48.15%)
	Cited	2 (4.55%)	0 (0%)	6 (20%)	0 (0%)
	Term	0	0	7	7
Student 51 Marketing Passage from Sherry Turkle's "Can You Hear Me Now?"	T-Units	33	10	38	20
	Claims	18 (54.55%)	5 (50%)	21 (55.26%)	10 (50%)
	Evidence	14 (42.42%)	5 (50%)	17 (44.74%)	8 (40%)
	No Citation	13 (39.39%)	5 (50%)	11 (28.95%)	8 (40%)
	Cited	1 (3.03%)	0 (0%)	6 (15.79%)	0 (0%)
	Term	0	0	7	7
Student 62 Chemical Engineering Passage from Anna Quindlen's "Killing the Consumer"	T-Units	31	21	34	25
	Claims	16 (51.61%)	13 (61.9%)	16 (47.06%)	15 (60%)
	Evidence	11 (35.48%)	8 (38.1%)	16 (47.06%)	10 (40%)
	No Citation	9 (29.03%)	8 (38.1%)	15 (44.12%)	10 (40%)
	Cited	2 (6.45%)	0 (0%)	1 (2.94%)	0 (0%)
	Term	0	0	7	7

Student	Placement:	Placement:	Timed	Timed
---------	------------	------------	-------	-------

Major Placement Prompt		Analytical	Reflection	Writing: Analytical	Writing: Reflection
Student 80 Biology Passage from Graeme Wood's "Re-Engineering the Earth"	T-Units	20	17	30	14
	Claims	14 (70%)	12 (70.59%)	20 (66.67%)	7 (50%)
	Evidence	5 (25%)	5 (29.41%)	10 (33.33%)	6 (42.86%)
	No Citation	2 (10%)	5 (29.41%)	8 (26.67%)	6 (42.86%)
	Cited	3 (15%)	0 (0%)	2 (6.67%)	0 (0%)
	Term	0	0	7	7
Student 81 Biochemistry Passage from Steven Johnson's "Your Brain on Video Games"	T-Units	17	12	33	38
	Claims	10 (58.82%)	9 (75%)	19 (57.58%)	24 (63.16%)
	Evidence	7 (41.18%)	3 (25%)	10 (30.3%)	12 (31.58%)
	No Citation	4 (23.53%)	3 (25%)	6 (18.18%)	12 (31.58%)
	Cited	3 (17.65%)	0 (0%)	4 (12.12%)	0 (0%)
	Term	0	0	5	5
Student 87 Nursing Passage from Sherry Turkle's "Can You Hear Me Now?"	T-Units	25	15	39	18
	Claims	13 (52%)	8 (53.33%)	19 (48.72%)	12 (66.67%)
	Evidence	11 (44%)	7 (46.67%)	17 (43.59%)	6 (33.33%)
	No Citation	8 (32%)	7 (46.67%)	11 (28.21%)	6 (33.33%)
	Cited	3 (12%)	0 (0%)	6 (15.38%)	0 (0%)
	Term	0	0	8	8
Student 92 Sport Management Passage from Nicholas Carr's "Is Google Making Us Stupid?"	T-Units	23	17	36	20
	Claims	11 (47.83%)	11 (64.71%)	18 (50%)	12 (60%)
	Evidence	11 (47.83%)	5 (29.41%)	18 (50%)	6 (30%)
	No Citation	3 (13.04%)	5 (29.41%)	11 (30.56%)	6 (30%)
	Cited	8 (34.78%)	0 (0%)	7 (19.44%)	0 (0%)
	Term	0	0	5	5

Student Major	Placement: Analytical	Placement: Reflection	Timed Writing:	Timed Writing:
---------------	-----------------------	-----------------------	----------------	----------------

Placement Prompt				Analytical	Reflection
Student 94 Computer Science Passage from Paul Krugman’s “Confronting Inequality”	T-Units	26	10	25	15
	Claims	17 (65.38%)	5 (50%)	18 (72%)	6 (40%)
	Evidence	9 (34.62%)	5 (50%)	7 (28%)	9 (60%)
	No Citation	3 (11.54%)	5 (50%)	1 (4%)	9 (60%)
	Cited	6 (23.08%)	0 (0%)	6 (24%)	0 (0%)
	Term	0	0	7	7
Student 103 Interior Design Passage from Anna Quindlen’s “Killing the Consumer”	T-Units	44	21	26	38
	Claims	33 (75%)	17 (80.95%)	17 (65.38%)	24 (63.16%)
	Evidence	10 (22.73%)	3 (14.29%)	8 (30.77%)	14 (36.84%)
	No Citation	8 (18.18%)	3 (14.29%)	8 (30.77%)	14 (36.84%)
	Cited	2 (4.55%)	0 (0%)	0 (0%)	0 (0%)
	Term	0	0	7	7
Student 108 Elementary Education Passage from Nicholas Carr’s “Is Google Making Us Stupid?”	T-Units	32	17	35	22
	Claims	22 (68.75%)	13 (76.47%)	19 (54.29%)	16 (72.73%)
	Evidence	10 (31.25%)	4 (23.53%)	15 (42.86%)	6 (27.27%)
	No Citation	6 (18.75%)	4 (23.53%)	13 (37.14%)	6 (27.27%)
	Cited	4 (12.5%)	0 (0%)	2 (5.71%)	0 (0%)
	Term	0	0	4	4

References

- AAUP. (2014). On Trigger Warnings. Retrieved from <http://www.aaup.org/report/trigger-warnings>
- Addison, J., McGee, S. J. (2015). To the Core: College Composition Classrooms in The Age of Accountability, Standardized Testing, and Common Core State Standards. *Rhetoric Review*, 24(2). 200-218
- Adler, Mortimer J. (1982). *The Paideia Proposal: An Educational Manifesto*. New York: Simon & Schuster.
- Ananthaswamy, A. (2010). *The Edge of Physics: A journey to the Earth's extremes to unlock the secrets of the universe*. Boston: Houghton Mifflin Harcourt.
- Anson, C. M. (2008). The intelligent design of writing programs: Reliance on belief or a future of evidence. *Writing Program Administration*, 32(1). 11-36
- Arum, R., & Roksa, Josipa. (2011). *Academically adrift : Limited learning on college campuses*. Chicago: University of Chicago Press.
- Bandura, A. (1971). *Psychological modeling: conflicting theories*. Chicago: Aldine·Atherton.
- Basseches, M. A. (1984). Dialectical thinking as a metasystemic form of cognitive organization. In M. L. Commons, F. A. Richards, C. Armon (Eds.) *Beyond formal operations: Late adolescent and adult cognitive development*. New York: Praeger Special Studies. 216-328.
- Bauerlein, M. (2008). The dumbest generation: How the digital Age Stupefies Young Americans and Jeopardizes Our Future (Or, Don 't Trust Anyone Under 30). New York: Penguin.
- Baxter Magolda, M. B. (2002). Epistemological reflection: The evolution of epistemological assumptions from age 18 to 30. In B. K. Hofer and P. R. Pintrich (Eds.) *Personal epistemology: The psychology of beliefs about knowledge and knowing*. New York: Lawrence Erlbaum Associates. 89-102
- Baxter Magolda, M. B., King, P. M. (2012). Nudging minds to life: Self-authorship as a foundation for learning. *ASHE Higher Education Report*, 38(3). 1-138.
- Bean, J. A. (2016). *Curriculum Integration: Designing the Core of Democratic Education*. New York: Teachers College Press. Kindle Edition.
- Belanoff, P., Dickson, M. (Eds.) (1991). *Portfolio: Process and product*. Portsmouth, NH: Boynton/Cook.
- Belenky, M. F., Clinchy, B. M., Goldberger, N. R., & Tarule, J. M. (1986). Women's ways of knowing: The development of self-voice and mind. New York: Basic Books.

- Belenky, M. F., McVicker Clinchy, B., Goldberger, N. R., Tarule, J. M. (1986). *Women's ways of knowing: The development of self, voice, and mind*. BasicBooks, Inc. Kindle edition.
- Cambridge, B. (2001). *Electronic portfolios: Emerging practices in student, faculty, and institutional learning*. Washington, DC: AAHE.
- Campbell, D. T. (1986). Ethnocentrism of Disciplines and the Fish Scale Model of Omniscience. In Chubin, D. E. (Ed.) *Interdisciplinary Analysis and Research: Theory and Practice of Problem-Focused Research and Development*. Mt. Airy, Md: Lomond. 19-46
- Carnap, R. (1939:1970). Theories as Partially Interpreted Formal Systems. In *Foundations of Logic and Mathematics*. Chicago: Chicago University Press. 5-12.
- Carr, N. (2008). Is Google Making Us Stupid? *The Atlantic*. Retrieved at <https://www.theatlantic.com/magazine/archive/2008/07/is-google-making-us-stupid/306868/>
- Chi, M. T. H. (2008). Three types of conceptual change: Belief revision, mental model transformation, and categorical shift. In S. Vosniadou (Ed.), *Handbook of research on conceptual change*. Hillsdale, NJ: Erlbaum. 61-82
- Clark, C. L. (2011). *Praxis: A brief rhetoric*. El Paso: Fountainhead Press.
- Commons, M. L., Richards, F. A., Armon, C. (1984). Perspectives on the development of thought in late adolescence and adulthood: An introduction. In M. L. Commons, F. A. Richards, C. Armon (Eds.) *Beyond formal operations: Late adolescent and adult cognitive development*. New York: Praeger Special Studies. xiii-xxviii.
- Connors, R. J., & Lunsford, A. A. (1988). Frequency of formal errors in current college writing, or Ma and Pa Kettle do research. *College Composition and Communication*, 39(4), 395-409.
- Davis, T. (2016). *National Park Roads: A Legacy in the American Landscape*. Charlottesville: University of Virginia Press.
- deLeeuw, N. and Chi, M. (2002) Self-Explanation: Enriching a Situation Model or Repairing a Domain Model? In G. M. Sinatra & P. R. Pintrich (Eds.) *Intentional Conceptual Change*. Mahwah, NJ: Lawrence Erlbaum Associates. 55-78.
- Dewey, J. (1902). *The Child and the Curriculum*. Chicago: University of Chicago Press.
- diSessa, A. (1993). Toward an Epistemology of Physics. *Cognition and Instruction*, 10(2-3), 105-225.
- Downs, D., Wardle, E. (2007). Teaching about writing, righting misconceptions:(Re) envisioning “first-year composition” as “Introduction to Writing Studies”. *College Composition and Communication*, 58(4). 552-584.

- Ede, L. (2014). *The academic writer: A brief guide*. 3rd edition. Boston: Bedford/St. Martin's.
- Ede, L., Lunsford, A.. (2003). Audience Addressed/Audience Invoked: The Role of Audience in Composition Theory and Pedagogy. In V. Villanueva (Ed.) *Cross-Talk in Composition Theory* 2nd. Urbana, IL: NCTE Press. 77-96
- Emig, J. (1971). *The Composing Process of Twelfth Graders*. Urbana, Illinois: NCTE Press.
- Erikson, E. H. (1950). *Childhood and Society*. W. W. Norton & Company, Inc. New York.
- Fanetti, S., Bushrow, K. M. & DeWeese, D. L. (2010) Closing the Gap between High School Writing Instruction and College Writing Expectations. *English Journal*, 99(4). 77-83
- Ferris, D. (2011). *Treatment of error in Second Language Student Writing*. Ann Arbor: University of Michigan Press.
- Flesch, R. (1981). *Why Johnny Still Can't Read: A New Look at the Scandal of Our Schools*. New York: Harper Collins.
- Foucault, M. (1972). *The archaeology of knowledge*. Trans. A. Sheridan. New York: Pantheon Books.
- Freelon, D. (2010). ReCal: Intercoder reliability calculation as a web service. *International Journal of Internet Science*, 5(1), 20-33.
- Frye, M. (2012). "Documenting Change in Student *Ethos*: A Longitudinal Study of Reflective Writing." Delivered at the Council of Writing Program Administrators annual conference in Savannah, GA, 2013.
- (2014). Exploring Discipline-Specific Writing Feedback/Assessment Aids for Local Learning Objectives. Delivered at the Pacific Northwest Two-Year College Association/Pacific Northwest Writing Centers Association annual conference in Vancouver, WA.
- (2016). Writing in the Disciplines as Performance: Identifying Epistemological Growth and Complexity in Undergraduate Writing. Delivered at the annual American Association of Applied Linguistics Conference in Orlando, FL.
- Frye, M. and Hunsu, N. (2014). *Washington State University Writing Portfolio: Tenth Findings, June 2011 – May 2013*. Office of Writing Assessment, Washington State University.
- Gee, J. P. (1999). *Introduction to Discourse Analysis: Theory and Method*. New York: Routledge.
- Griffin, J., Gooding, S., Semesky, M., and Farmer, B. (2009). Four Brief Studies of Relations Between Postformal Thought and Non-Cognitive Factors: Personality, Concepts of God, Political Opinions, and Social Attitudes. *Journal of Adult Development*, 16. 173-182.
- Halliday, M. A. K. (2004). The Grammatical Construction of Scientific Knowledge: The Framing of the English Clause. *The Language of Science*, New York: Continuum 102-134.

- Hamp-Lyons, L., Condon, W. (1999). *Assessing the portfolio : Principles for practice, theory, and research*. Cresskill, N.J.: Hampton Press.
- Harwood, N. (2010). Research-based materials to demystify academic citation for postgraduates. In *English Language Teaching Materials: Theory and Practice*. Cambridge: Cambridge University Press. 301-321.
- Hassel, Holly, & Giordano, Joanne Baird. (2009). Transfer Institutions, Transfer of Knowledge: The Development of Rhetorical Adaptability and Underprepared Writers. *Teaching English in the Two-Year College*, 37(1). 24-40.
- Haswell, R. H. (2000). Documenting Improvement in College Writing: A Longitudinal Approach. *Written communication*, 17(3), 307-352.
- Haswell, R. H. (Ed.). (2001). Beyond outcomes: Assessment and instruction within a university writing program. Westport, CT: Ablex Publishing.
- Hayes, A. F., & Krippendorff, K. (2007). Answering the call for a standard reliability measure for coding data. *Communication methods and measures*, 1(1), 77-89.
- Hennesy, M. (2003). Metacognitive aspects of students' reflective discourse: Implications for intentional conceptual change teaching and learning. In G. M. Sinatra & P. R. Pintrich (Eds.) *Intentional Conceptual Change* . Mahwah, NJ: Lawrence Erlbaum Associates.103-132.
- Herrnstein, R., Murray, C. A. (1994). *The bell curve : Intelligence and class structure in American life*. New York: Free Press.
- Hirsch Jr, E. D. (2009). *What your first grader needs to know: Fundamentals of a good first-grade education*. Delta.
- Hirsch, E. (1996). *The schools we need and why we don't have them*. New York: Doubleday.
- Howard, R. M. (1999). *Standing in the shadow of giants: Plagiarists, Authors, Collaborators*. Stamford, CO: Ablex Publishing Corporation.
- Howard, R. M., Rodrigue, T. K., Serviss, T. C (2010). Writing from Sources, Writing from Sentences. *Writing and Pedagogy*, 2(2). 177-192.
- Huffman, L. E. (1998). Spotlighting Specifics by Combining Focus Questions with K-W-L. *Journal of Adolescent & Adult Literacy*, 41(6). 470-472.
- Hyland, K. (2004). *Disciplinary Discourses*. Ann Arbor: University of Michigan Press.
- Jafari, A., Kaufman, C. (2006). *Handbook of Research on ePortfolios*. Hershey, PA: Idea Group Reference.
- Jamieson, S. (2013). Reading and Engaging Sources: What Student's Use of Sources Reveals About Advanced Reading Skills. *Across the Disciplines*, 10(4). n4.

- Jenks, S. (1986). Reviewed Work(s): *The Black Death: Natural and Human Disaster in Medieval Europe*. by Robert S. Gottfried. *The Journal of Economic History*, 46(3). 815-823
- Johnson-Shull, L., Rysdam, S. (2012). Taken at Our Word: Making a Fundamental Agreement When Responding to Student Writing. *Issues In Writing*, 19(1). 25-40.
- Kitzhaber, A. (1963). *Themes, Theories and Therapy: The teaching of writing in college*. New York: McGraw-Hill.
- Klaczynski, P. A., & Lavalley, K. L. (2005). Domain-specific identity, epistemic regulation, and intellectual ability as predictors of belief-biased reasoning: A dual-process perspective. *Journal of Experimental Child Psychology*, 92(1), 1-24.
- Kohn, A. (1999). *The Schools Our Children Deserve: Moving Beyond Traditional Classrooms and "Tougher Standards."* Boston: Houghton Mifflin.
- Koplowitz, H. (1984). A projection beyond Piaget's Formal-Operations stage: A general system stage and a unitary stage. In M. L. Commons, F. A. Richards, C. Armon (Eds.) *Beyond formal operations: Late adolescent and adult cognitive development*. New York: Praeger Special Studies. 272-296.
- Kress, G. (2010). *Multimodality: A social semiotic approach to contemporary communication*. New York: Routledge.
- Kuhn, T. (1970). *The structure of scientific revolutions*. 2nd ed. Chicago: University of Chicago Press.
- Kuhn, T. (2002). *The road since Structure: Philosophical essays, 1970-1993, with an autobiographical interview*. Chicago: University of Chicago Press.
- Lather, P. (1993). Fertile Obsession: Validity after Poststructuralism. *The Sociological Quarterly*, 34(4). 673-693.
- Lave, J., Wenger, E. (1991). *Situated Learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press. Google Books Edition.
- Lincoln, Y. S., Guba, E. G. (1985) *Naturalistic Inquiry*. London: Sage Publications.
- Lunsford, A. A., & Lunsford, K. J. (2008). " Mistakes are a fact of life": A national comparative study. *College Composition and Communication*, 59(4). 781-806.
- Lunsford, A. A., & Lunsford, K. J. (2008). "Mistakes are a fact of life": A national comparative study. *College Composition and Communication*, 59(4). 781-806.
- Meier, D., & Wood, G. H. (Eds.). (2004). *Many children left behind: How the No Child Left Behind Act is damaging our children and our schools*. Beacon Press.

- Menand, L. (2011). Live and Learn. *The New Yorker*. Retrieved at <http://www.newyorker.com/magazine/2011/06/06/live-and-learn-louis-menand>
- mikeroweWORKS Foundation. (2017). About Us. *Profoundly Disconnected*. Retrieved at <http://profoundlydisconnected.com/foundation/>
- Miller, C. R. (2004). Expertise and agency: Transformations of Ethos in human-computer interaction. In M. J. Hyde (Ed.) *The Ethos of rhetoric*. Columbia, SC: University of South Carolina Press.
- Miller, R. (1998). *As if learning mattered : Reforming higher education*. Ithaca: Cornell University Press.
- Mortenson, G. (2009). *Stones into Schools: Promoting Peace with Books, not Bombs, in Afghanistan and Pakistan*. New York: Viking Press.
- Muis, K. R., Bendixen, L. D., & Haerle, F. C. (2006). Domain-general and domain-specificity in personal epistemology research: Philosophical and empirical reflections in the development of a theoretical framework. *Educational Psychology Review*, 18(1). 3-54.
- Muuss, R. E. (1995). *Theories of Adolescence*. 6th edition. New York: Random House.
- Neider, X., Frye, M., Fernandez, M., and Torres, J. T. (2016). Washington State University Writing Portfolio: Eleventh Findings, June 2013 – May 2015. Office of Writing Assessment, Washington State University.
- Nowacek, R. (2011). Agents of integration: Understanding transfer as a rhetorical act. Carbondale, IL: Southern Illinois University Press.
- O'Brien, J. (2016). Which civilization in history was the happiest? *The Cracked Podcast*. Earwolf Productions.
- O'Neill, P., Moore, C., Huot, B. (2009). *A Guide to College Writing Assessment*. Logan, Utah: Utah State University Press.
- Ohmann, R. (1964). "In lieu of a new rhetoric." *College English*, 26(1). 17-22.
- Paul, J. L., Marfo, K. (2004). Preparation of Educational Researchers in Philosophical Methods of Inquiry. *Review of Educational Research*, 71(4). 525-547
- Paulson, F., Paulson, P., Meyer, C. (1991). What makes a portfolio a portfolio? *Educational Leadership*, 48(5). 60-63.
- Perry, W. (1998). *Forms of intellectual and ethical development in the college years : A scheme*. San Francisco: Jossey-Bass.

- Pintrich, P., Marx, R. W., Boyle, R. A. (1993). Beyond Cold Conceptual Change: The Role of Motivational Beliefs and Classroom Contextual Factors in the Process of Conceptual Change. *Review of Educational Research*, 63(2). 167-199.
- Pollan, M. (2006). *The Omnivore's Dilemma: A Natural History of Four Meals*. London: Penguin Books.
- Posner, G. J., Strike, K. A., Hewson, P. W., & Gertzog, W. A. (1982). Accommodation of a Scientific Conception: Toward a Theory of Conceptual Change. *Science Education*, (2), 211-27.
- Riley, K., Davis, M., Jackson, A. C., Maciukenas, J. (2009). "Ethics in the Details": Communicating engineering ethics via micro-insertion. *IEEE Transactions on Professional Communication*, 52(1). 95-108.
- Romano, S., Daane Lawrence, M. (2013). Using and Communicating Results. In Moore Gardner, M., Kline, K. A., Bresciani, M. J. (Eds.) *Assessing Student Learning in the Community and Two-Year College: Successful Strategies and Tools Developed by Practitioners in Student and Academic Affairs*. Sterling, VA: Stylus Publishing. 91-110
- Rose, M. (1983). Remedial writing courses: A critique and a proposal. *College English*, 45(2). 109-128.
- Rose, M. (1988). Narrowing the Mind and Page: Remedial Writers and Cognitive Reductionism. *College Composition and Communication*, 39(3). 267-302.
- Seymour, E. (2000). *Talking About Leaving: Why undergraduates leave the sciences*. Boulder, CO: Westview Press.
- Simkins, D. W., Steinkuehler, C. (2008). "Critical Ethical Reasoning and Role-Play." *Games and Culture*, 3. 333-355
- Smith, A. A. (2015). Community college to bachelor's. *Inside Higher Ed*.
- Socrates. Wikipedia. 25 Aug. 2015. Retrieved at <http://en.wikipedia.org/wiki/Socrates> (25 Aug. 2015).
- Steinkuehler, C., Duncan, S. (2008). "Scientific Habits of Mind in Virtual Worlds." *Journal of Scientific Educational Technology*, 17. 530-543
- Steinkuehler, C., King, E. (2009). "Digital literacies for the disengaged: creating after school contexts to support boys' game-based literacy skills." *On the Horizon*, 17(1). 47-59.
- Strickland, D. (2011). *The managerial unconscious in the history of composition studies*. Carbondale: Southern Illinois University Press.
- Swales, J. (1990). *Genre analysis: English in academic and research settings*. Cambridge University Press.
- Thompson, A. (2004). Gentlemanly orthodoxy: Critical race feminism, whiteness theory, and the APA manual. *Educational Theory*, 54(1), 27-57.

- Thompson, B. (1997). Rejoinder: Editorial Policies regarding Statistical Significance Tests: Further Comments. *Educational Researcher*, 26(5). 29-32.
- Toulmin, S. E. (1958). *The Uses of Argument*. London: Cambridge University Press.
- VanderMey, R., Meyer, V., Van Rys, J., Sebranek, P. (2011). *CompWrite*. Boston: Wadsworth.
- Vosniadou and Xanthakis 2007
- Vosniadou, S. & Brewer, W. F. (1987). Theories of Knowledge Restructuring in Development. *Review of Educational Research*, 57(1). 51-67
- Vosniadou, S., & Brewer, W. F. (1992). Mental models of the earth: A study of conceptual change in childhood. *Cognitive psychology*, 24(4), 535-585.
- Vosniadou, S., Vamvakoussi, X., Skopeliti, I. (2008). The framework theory approach to the problem of conceptual change. In S. Vosniadou (Ed.). *The international handbook for conceptual change*. Routledge: New York. 3-34
- Vygotskiĭ, L., & Cole, Michael. (1978). *Mind in society : The development of higher psychological processes*. Cambridge: Harvard University Press.
- Wagner, G. (1976.) *The End of Education*. New York: Barnes.
- Wardle, E. (2009). “Mutt Genres” and the Goal of FYC: Can We Help Students Write the Genres of the University? *College Composition and Communication*, 60(4). 765-789.
- Williams, J. M. (1981). The phenomenology of error. *College Composition and Communication*, 32(2). 152-168
- Williams, J. M. (2010). Evaluating what students know: Using the RosE Portfolio System for institutional and program outcomes assessment. *IEEE Transactions on Professional Communication*, 53(1). 46-57
- Wong, A. (2015). Life after No Child Left Behind. *The Atlantic*.
- Yancy, K., Weiser, I. (Eds.) (1997). *Situating portfolios: Four perspectives*. Logan, UT: Utah State University Press.