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# Novice Academic Authorship in the Multilingual Digital Age

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NOVICE ACADEMIC AUTHORSHIP IN THE MULTILINGUAL DIGITAL AGE

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In this study, the author investigated how digital technologies mediate academic writing activities of four multilingual international students who had completed some college composition classes. Studying writing activities poses challenges; contemporary writing activities are diffuse, dispersed across multiple technologies and often inaccessible because of when and where the activities occur. The author developed a new methodology to gather real-time data during the on-going digital processes that writers use in online environments. This new methodology overcomes some barriers to observing writers at work in their "natural" multilingual digital environment using video screen capture technology and interviews. The study results provide new insights into the writing process of the multilingual, digital age. The author found that participants had developed a rhetorical transliteracy in which they used their computer screens as what the author calls transliterate testing grounds to acquire in-the-moment, good-enough linguistic and cultural knowledge to move into the relatively unfamiliar context of U.S. academic authorship. Writers' transliterate composing processes involved moving across linguistic, rhetorical, cultural, and national boundaries to access emergent resources from multiple web domains (Chinese and English) for dynamic, mediatory use in academic writing. That is, writers brought together multiple languages, tools, and applications on their computer screens in attempt to organize and control the language and cultural knowledge needed for writing tasks. The transliterate composing process became most visible when autocorrect features of word processors failed, when writers needed to translate an idea into academic

English, and when they faced rhetorical uncertainty about new or still-developing academic concepts or ideas. This in-development work should be understood as rhetorical in that it creates a shared language and common ground with an American audience. Further, observation of writers' transliterate work to test out new-to-them linguistic forms and cultural-specific examples draws attention to the reality that all networked computer screens used in academic writing are transliterate, transnational spaces. This has implications for understanding all academic authorship as multilingual and transliterate, unsettling lingering monolingual orientations toward academic writing in U.S. universities and reorienting First Year Composition to help all student writers develop rhetorical transliteracy to write and act in transnational contexts.

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INTRODUCTION TO THE STUDY

As a writing teacher, I have read thousands of student papers and spent countless hours in conferences with students asking about the choices they make behind the scenes as they write. During these meetings, my multilingual, international students would frequently talk about the digital tools they used to support their writing, such as translators, dictation applications, direct messaging tools, and social media sites. In one memorable exchange, a student from Saudi Arabia explained that the sentence structure problem we were discussing was not his fault but the fault of Siri, the artificial intelligence application on his Apple smart phone. During a subsequent conversation with this student, I learned that he frequently composed parts of his essay by speaking into Siri on his phone and then copying and pasting the results directly into the document where he wrote his essay. Learning about this unseen digitally-mediated part of his writing process surprised me and compelled me to wonder about other ways in which student writers might be using ubiquitous digital tools to support their academic work.

To find out more about the digital tools multilingual international student writers use for academic authorship and to more closely consider how those digital tools mediate their writing processes, I designed this study with the goal of directly observing writers at work in their digital writing environments. This required developing a methodology that could capture and contextualize the processes of writers in their own digital writing environments as they occurred. I invited four multilingual international students from China who were studying at a large research university in the Pacific Northwest to use video screen capture to record the work they performed on their computers for one draft of one academic essay. I also interviewed writers

before and after their recorded writing to better understand their relationship to and use of the digital tools and artifacts that I observed to be integral to their writing processes.

As Leonard (2014) pointed out in her essay on the rhetorical attunement of multilingual writers, "writers call on or create literate resources in the process of making do…in specific rhetorical situations" (p. 228). The experienced multilingual writers Leonard studied had developed the capacity to draw on a wide range of resources to "make do" during a lifetime of negotiating rhetorical situations across languages and cultures. My concern in this project is novice writers who are just beginning to move across languages and cultures. I wanted to know more about how novice writers who are relatively new to U.S. higher education culture with still-developing English proficiency might use digital tools to "make do" in the unfamiliar rhetorical situation of U.S. academic authorship. Leonard (2014), for example, used interviews and textual evidence to look at this rhetorical mobility. Writers in interviews and the texts they produced provide some evidence of their writing processes, but, as I discovered in observing writers at work, much of their labor to meet rhetorical requirements of academic authorship such as using Standard Written English and developing ideas and concepts with culturally-relevant examples happened behind the scenes. Further, much of this work happened on writers' computer screens. Evidence of their rhetorical mobility was located in their digital writing processes which were only revealed through direct observation of the writers at work.

The methodology I developed revealed as much as it did because of the importance for writers in this study of the digital space within the borders of their computer screens. Their computer screens should be understood as what I'm calling transliterate testing grounds for what can be described as transliterate composing processes. Transliterate composing refers to the ways in which writers literately crossed languages, rhetorics, national boundaries, and cultural artifacts

in pursuit of ever-changing resources available to address in-the-moment writing tasks. Writers used the computer screen to mediate or temporarily control and organize resources in which they were literate enough to help them acquire, at least for the moment, the language and cultural background needed to perform as U.S. academic authors. In other words, through transliterate composing writers performed rhetorical transliteracy for specific writing tasks.

Transliterate composing made it possible for writers to do the rhetorical work asked of them by the writing assignments. Rong, Jun, Ye, and Zhen (all pseudonyms for the participants in this study) purposefully used digital tools to move between written Chinese and English. Their use of both languages throughout their transliterate composing was mediated by a variety of translation applications. In addition, they drew on resources originating in both China and the United States in their work to better understand the content they were asked to write about and to find rhetorical examples that supported of their arguments for their American audience. The rhetorical mobility they demonstrated was transnational as it crossed Chinese and English web domains and was mediated by digital tools and artifacts with economic and ideological ties to China and the United States. Novice multilingual writers' demonstrated capacity for transliterate and transnational rhetorical mobility is a significant finding of this study and merits further exploration and consideration by researchers, writing teachers, and writing program administrators.

In the past five years, Writing Studies researchers have begun to attend to how students use writing technologies in both their academic and out-of-school lives. Writers have been observed and videoed at work on academic essays in public places (Pigg, 2014). Surveys of student writing practices have found that student writers use smartphones to write academic essays (Moore et al., 2016) and that students who completed their academic work in the

transnational space between the U.S. and Mexico border did so on smartphones "while driving, while waiting at stop lights, and even 'when I am at the bar'" (Monty, 2015, p. 137). Video screen recordings of college student Facebook sessions have shown writing unfolding in vertical processes in the short posts on Facebook while at the same time moving horizontally between other writing tasks such as e-mail and essay writing (Takayoshi, 2015). Fraiberg and Cui (2016) found that students from China studying in the United States used QQ, a Chinese instant messaging application, to coordinate social and academic activity.

What my study adds to these efforts is close observation of extended writing processes in the digital spaces that writers created for themselves as they worked on academic essays. I discovered that writers' ongoing cultivation of their computer screens as mediatory transliterate testing grounds was crucial to their rhetorical entry into U.S. academic authorship because those spaces enabled them to use digital tools and artifacts in multiple languages to address writing challenges related to both developing English proficiency as well as rhetorical and cultural knowledge. Close observation and analysis of the writers in this study suggest some elements of $21^{st}$ century academic writing processes: that they occur in *de facto* transnational spaces, that cultivating computer screens to accommodate transliterate composing is an ongoing part of academic writing processes, and that understanding both of these realities and developing a critical awareness of the ideologies and the affordance and constraints of digital tools and artifacts is essential for rhetorical mobility. I argue that these findings suggest a re-orientation of First Year Composition (FYC) to develop such rhetorical capabilities in all writers. Many U.S. universities, including the study site, assert that the work of higher education is to prepare students to be global citizens. Close observation of how students who moved into FYC from outside the United States and "made do" in new linguistic and rhetorical situations through

transliterate composing using a wide range and emergent set of digital tools offers insight into what all academic writers need to know and do to move into global communication contexts.

## Background and Context

Taking a closer look at the digitally-mediated writing processes of student writers is critical at this particular moment for several reasons. To begin with, the concept of academic authorship is in flux, and there is an opportunity to reconsider it based on the observed writing processes of student writers, who might be understood as novices (Grobman, 2009) on the periphery of the academic community in which they are part (Lave & Wenger, 1991). Students' position as academic authors has been contested for as long FYC has been around. Understanding the ways in which novice student writers have developed rhetorical mobility on their own may have the potential to challenge that contestation. Writing processes of academic writers have been digitally-mediated for as many decades as word processors have been widely used in U.S. university settings. However, rapid evolutions in digital technologies, including the development and deployment of artificial intelligence by companies like Google, add new dimensions to academic digital environments making them ripe for new exploration. The ways in which digital technologies are used by academic writers in the increasingly multilingual and transnational reality of U.S. universities merits review. The resulting multilingual, digital context of academic writing has compounded "shifting conceptions of what it means to write and what it means to be an author" (Robillard & Fortune, 2016, p. 8). Close observation and analysis of the writing processes of writers who are at the center of these conditions sheds light on what it means to be an academic author in the multilingual, digital age.

**Defining Novice Academic Authorship**

Academic authorship is a way for scholars to enter into disciplinary conversations through writing. Academic authorship may take a variety of generic forms, but it does have some common, recognizable elements related to its purpose. Being an academic author is about having enough knowledge to claim and develop ideas of one's own, sharing a specialized language with an audience who possess some expertise in the area, and feeling comfortable as a member of a disciplinary community. Generally, students gain experience in these elements in FYC. They also face challenges in each of these areas. Students whose prior linguistic and literacy experience is at a greater remove from the Standard Written English (SWE) and the western rhetorical styles of argumentation that are often valued in the academic essay may face additional challenges to rhetorically move into U.S. academic authorship. The documented struggles of student writers and debates about whether students can legitimately and productively *do* the work of academic authorship attest to the contested nature of student academic authorship.

Bartholmae (1985) argued that academic writing is an activity in which writers are "working self-consciously to claim an interpretive project of their own" (p. 158). Purposefully claiming a project requires confidence. Sommers and Saltz (2004), in their study of student writers at Harvard, found that students were able to best perform the work of academic authorship when given writing assignments that "move [them] from 'shooting out opinions' to giving them the 'confidence to speak back to the world'" (p. 136). This confidence resulted from students being asked to think deeply about what they already knew. Put another way, writers become academic authors as they gain confidence to purposefully engage "in a particular community of writers who dialogue across texts, argue, and build on each other's work" (Beaufort, 2007, p. 18). They must see the value in their ideas, which Lunsford, Fishman, and

Liew (2013) found is particularly difficult for student writers who are more likely to "privilege consumption" of other's work "over their own knowledge and intellectual property" (p. 478). Successful academic writers actively take hold of and own a project that takes a form recognizable to a particular academic community as an act of inquiry and knowledge-making that responds to others within that community. To be academic authors, writers must be capable of acting with some confidence and attaching value to their own work. To attain confidence, student writers must have some means of tapping into or acquiring enough knowledge about their topics.

In addition, writers must be capable of sharing in the language of academic discourse with their audience. In U.S. academic authorship, this primarily means writing in Standard Written English (SWE) and following discipline-specific conventions for documenting sources and formatting. The struggle of student writers to conform to expectations of the language and conventions of academic writing has a history that is as long as the history of FYC itself. In the late 19th century, the Harvard Board of Overseers formally reported on the failures of student writers, focusing primarily on "errors in spelling, grammar, usage, and even handwriting" (Berlin, 1984, p. 61). This resulted in the creation of required FYC courses at Harvard and later at most U.S. colleges (Berlin, 1987), a situation that persists today. In describing the creation of FYC, McLeod (2007) writes "first year composition was born under the shadow of remediation and a focus on correctness" (p. 7). Later, separate classes for so-called "basic writers" and students writing in English as a second language were created with the same goal of helping them better adopt and use SWE.

There is not full agreement in Writing Studies about what the linguistic features of academic English should be. The 1974 adoption and 2014 reaffirmation of Students' Right to

Their Own Language by the Conference on College Composition and

Communication (Committee on CCCC Language, 1974) to "affirm the students' right to their

own patterns and varieties of language -- the dialects of their nurture or whatever dialects in

which they find their own identity and style" (p. 2) points to the continued contestation about

what language is suitable for academic authorship. However, despite the many debates about the

value of different language varieties, SWE remains, in most cases, the language that academic

authors are expected to use.

Citing the words and ideas of others remains a cornerstone of academic writing even as

the types of sources and how they are accessed has changed dramatically. Academic writers need

to less strictly rely on print sources as all areas of information have become digitized. The rules

of citing the wide range of digital sources that might be used in academic writing are complex,

and all student writers struggle with knowing how to properly give credit for the words and ideas

they use. Student writers who enter U.S. academic authorship with experience writing in other

contexts often have even more difficulty. Learning how to use academic language and

conventions is key to academic authorship and a central challenge faced by the writers in this

study.

Fully sharing in the language of academic discourse also requires performing as an

academic author. Academic discourse is about both "*how* you say it" as well as "what you *are*

and *do* when you say it" (Gee, 2001, p. 525). Put another way, academic authorship is an activity

that creates both a text and an identity (Scott, 2015). Just as "teachers or writers demonstrate

their memberships in disciplines by using writing in ways validated by disciplines" (Estrem,

2015, p. 56), what students do when they write academic texts in FYC or other undergraduate

classes is to act as, or try to move into the position of, members of a discipline. Grobman (2009)

argued that a key component of FYC should be to help students "to view themselves as scholarly authors [and] see their voice as one among multiple others to create knowledge" (p. 179). However, not all FYC teachers and administrators agree that such a result is possible or even desirable. Students from diverse linguistic, literacy, and cultural backgrounds may face additional challenges in recognizing themselves as academic authors, even if they are able to rhetorically perform the work of authorship that they are assigned. Close observation of the writing processes of the students in this study revealed some of the ways in which they used digital tools and artifacts to add their voices to ongoing conversations. Better understanding these processes could be a first step in reconsidering student writers' relationship to the identity of academic author.

The relationship of student writers to academic authorship is also influenced by how plagiarism is constructed in relation to U.S. academic authorship. Despite a growing body of research in both L1 and L2 Writing Studies, a consensus on what constitutes plagiarism in student academic authorship remains contested (Pecorari, 2015). More than two decades ago, Howard (1995) problematized how plagiarism is constructed. She argued that rather than academic misconduct, using words and ideas that are too closely connected to source material is not necessarily plagiarism but could be understood as a stage in the process of learning how to write in a particular discipline or discourse community. Bouman (2006) further complicated plagiarism in his study by examining the alignments and misalignments of how student writers perceived and experienced plagiarism. Despite calls for revisiting plagiarism and its connection to authorship in the digital age (Howard, 2006; Kennedy & Howard, 2013) and research that investigates how writers from different language and cultural backgrounds, especially non-Western cultural backgrounds, incorporate source texts into their academic writing (Shi, 2004),

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policies and practices related plagiarism in FYC have remained relatively unchanged.

Current studies of plagiarism are limited in a number of ways. To begin with, they have been frequently based in examination of either a textual product or interview reports about writing practices. Neither gives a complete picture of what happens in the moment as writers work with texts in digital spaces. Close observation of how four novice multilingual international student writers worked with various source texts as they wrote complicates understanding textual borrowing and citation. This study adds a new dimension to understanding plagiarism while at the same time problematizing how it has been constructed as either an error in understanding or an error in morality on the part of the writer. The transliterate composing processes of the writers in this study draw attention to the limitations of current constructions of plagiarism. Intertextuality and plagiarism and their relationship to U.S. academic authorship warrants further investigation in the multilingual digital age.

Plagiarism is only one of the concerns arising in discussions about the relationship between student writers and academic authorship. Researchers have looked for evidence of academic authorship in the texts that students produce (Bartholomae, 1985, 1993; Lu & Horner, 2013); they have surveyed and interviewed students about their disposition toward their texts and text-making activities (Lunsford, Fishman, and Liew, 2013; Penrose & Geisler, 1994; Sommers & Saltz, 2004), and they have observed students ethnographically in classrooms and at work (Beaufort, 2007). This study adds to this work by closely observing students at work in their digital writing environment. Doing so sheds light on the digitally-mediated ways in which student writers attempt to move into U.S academic authorship.

This study focuses especially on the ways students as part of their transliterate composing processes adapted digital tools and artifacts to help them use academic English in their writing

and to develop culturally relevant understandings of the topics about which they wrote. The writing processes involved in this work should in turn inform notions of academic authorship and the place of novice multilingual international writers within U.S. academic discourse communities.

**The Multilingual Digital Writing Environment**

Conceptualizing the 21$^{st}$ century academic writing environment as transliterate, multilingual, and digital has several implications. Doing so supports the argument for understanding that U.S. academic authorship has the potential to take place in a multilingual, digital writing environment for all writers. Defining the academic writing environment as transliterate, multilingual, and digital also provides a way for teachers and scholars to consider how moving between languages, web domains originating in multiple nations, and an increasingly wide range of digital tools might be necessary for all writers to be rhetorically mobile. That is, situating academic authorship in a transliterate, multilingual space that writers use as a testing ground for new-to-them linguistic forms and cultural knowledge could potentially increase the transliteracy and rhetorical mobility of all academic writers.

The mobile, multilingual, transliterate nature of academic authorship may be especially visible in the writing activities of the growing numbers of international students whose physical movement to the United States is also a movement to new rhetorical contexts and often to a new language. The rhetorical situation of interest in this study is FYC, which has historically contained within it a tension between a monolingual SWE ideal and an inherently linguistically diverse constituency (Matsuda, 2006; Matsuda, 2015; Shuck, 2006). Linguistic diversity has become more visible in discussions of FYC in part due to the highly visible movement of international students in the past decade to the United States. Of the approximate 24,000 students

in the 2016/2017 academic year enrolled at University of X, the site of this study, about 14% were international students, the majority of whom came from China and speak and write in English as an additional language (University of X International Affairs, 2015). Such an increase in the physical presence of international students has drawn attention to how all writers negotiate language difference, drawing on "the internalized knowledge of words, phrases, and sentences and how they are put together to create meaning" (Matsuda, 2015, p. 68). Close observation of writers' transliterate writing processes has revealed how some of this linguistic and rhetorical negotiation happens through the use of digital tools and artifacts.

Many of the digital tools and artifacts that mediated the academic authorship of the writers in this study continue to rapidly evolve in ways that both shape and meet the needs of their users. In many case, the tools use artificial intelligence technology and "machine learning" to adapt to writers' needs with each use. As more writers with developing English proficiency enter U.S. academic authorship, the use of translation tools and the use of search engines to access information across languages and web domains will also likely increase. The tools then adapt and change. As this happens, writers, like those in this study, will be able to use these tools to move more readily into academic authorship. The cycle will then continue with tools and writers continuing to shape each other, increasing the possibility of rhetorical mobility for writers using digital tools.

Further, the digital writing technologies, both the devices that writers compose on and the applications within those devices, are increasingly interconnected, part of evolving digital networks that have the ability to connect different nations, such as the United States and China. Devices (laptops, tablets, smart phones), applications (word processors, translators, auto correct features), and publication platforms (social media, Wikipedia, blogs) can be understood as nodes

within a dense, networked system that crosses languages, cultures, and national and political spaces. The ability of devices to interact with each other is a key marketing point. So, too, is the ability of users to move across applications. Even as the writers observed in this study worked on their essays, they had access on the same computer screen at the same time to other rhetorical situations like e-mail, blogs, social media posts, and other digital platforms. For the writers in this study, different types of writing occurred in English and Chinese within the same writing session in the same digital writing environment. Each type of writing arises from a different rhetorical situation. However, the boundaries between rhetorical situations blur in the digital age.

The linguistically and culturally complex writing processes of the writers in this study suggest that the academic digital writing environment is always potentially multilingual and transnational. Negotiation of words, ideas, and knowledge by the writers in this study was supported by movement among academic scholarly articles in English and Chinese, Wikipedia entries in both languages, and a variety of translators and dictionaries, all made accessible by the multilingual digital nature of the writing environment. This allowed the writers in this study to enter into rhetorical situations that may have otherwise been out of reach. Nearly a decade ago, Yancey (2009) called for new models for understanding writing processes. Such models need revising again in recognition of the ways that the multilingual, transliterate writing environments support writers' rhetorical mobility in the transnational reality of academic authorship.

**Problem Statement, Statement of Purpose, and Research Questions**

The disconnect between what scholars and teachers theorize student writers do when they compose academic essays and the reality of their writing processes is the central issue of this study. The study of composing processes has a rich history in the field of Writing Studies, beginning when Emig (1971) investigated, described, and named the processes that twelfth

graders used when they wrote and when Zamel (1983) did the same with multilingual student writers. Both landmark studies gave valuable insight into writing processes but remained incomplete because the researchers could not observe writers in environments of writers own choosing. Nearly 50 years after Emig's (1971) initial study, what students do when they leave the classroom to go work on their essays is still largely a mystery to teachers. Further, conditions of writing have dramatically changed as technologies have evolved. People are writing more today than ever before (Brandt, 2014) and connecting with audiences across languages, cultures, and nations. More students bring multilingual experience to their academic writing as students with diverse experience as English language users enter U.S higher education (Jordan, 2012). Given these evolving realities, the work of student writing may seem even more mysterious to teachers who developed their own academic writing skills in a different technological milieu in what they may have experienced as a monolingual English context.

The purpose of this study, then, was twofold: to create a methodology to more closely observe writing-in-action in digital spaces and to better understand how digital technologies mediate rhetorical mobility of student writers from diverse language and literacy backgrounds as they move into academic authorship. The first task required overcoming the challenge of obtaining access to writers at work and capturing a fuller range of activities that constitute the complex processes of writing. The second task required a more comprehensive accounting of the digital tools, broadly defined as both digital devices and applications on those devices, that come into play as writers work on academic essays and how those tools are used in acts of composing. This study asked the following guiding research questions:

1. What digital tools mediate academic work by novice multilingual international student writers? What acts of composing are mediated by these digital tools?

2. What linguistic and cultural knowledge do novice multilingual international writers draw on in acts of composing and how do these relate to notions of academic authorship?

This study was designed to test the assumption that the work of multilingual international student writers is firmly embedded in both digital and multilingual realities. Matsuda (2012) argued that multilingual international writers "bring rich linguistic and cultural resources, among other assets" (p. 142) to their writing. My study, in its close observation of how four multilingual international student writers used digital tools in their transliterate writing processes, was designed to help describe those "rich linguistic and cultural resources" at play in 21st century academic authorship.

## Research Approach

This study followed recommendations by Takayoshi (2016) to extend "composition studies' research" strategies "on individual writers at the moment of composing" (p. 2) for a "less partial and more detailed understanding" (p. 6) of 21st century writing processes. The methods in this study update traditional composing process research strategies using 21st century technology and sensibilities. Activity Theory (Engeström, 2015) provided categories for transcription that helped describe and make sense of observed writing activities as social and rhetorical activities. A rhetorical transnational framework (Leonard, 2014) was consulted after initial analysis to better describe observed writing processes that crossed languages, national web domains, and digital cultural artifacts.

**Observing Writing Activity**

Beginning with Emig's (1971) study that shifted focus from the processes of professional writers to twelfth graders, writing studies scholars have used real-time observation, think aloud protocols, and process tracing interviews (Emig, 1971; Flower & Hayes, 1981; Pigg, 2014; Prior

& Shipka, 2003; Roozen, 2010) to reconstruct the visible physical processes as well as the mental processes or recursive events that lead to textual production. Early composing process researchers observed writers in lab-like settings as they wrote, asking them to "think aloud" to describe decisions and internal processes. Such studies relied on two underlying assumptions: that writing in an artificial setting is largely the same as writing situated in a "natural environment" and that "a writer's effort to externalize his process of composing something reflects, if not parallels, his actual inner process" (Emig, 1971, p. 40). Both assumptions are problematic and have since been thoroughly critiqued by the field. Composing process research was largely abandoned for the final two decades of the 20th century in part because the methods did not account for the growing understanding that writing is a social activity.

Writing Studies scholars are beginning to return to composing process research and take advantage of emerging methods and technologies to investigate writing processes. Composing process researchers have developed strategies to better observe writing in its "natural" environments: using texts and artifacts to prompt recall of processes during post-composing interviews (Roozen, 2010), asking participants to retrospectively draw their processes (Shipka & Prior, 2003), employing time use diaries (Pigg, 2014), and using video and audio recordings of the screens on which composing occurs (Takayoshi, 2015, 2016). This study follows in this tradition by combining screen-capture videos with follow-up interviews structured as reflections and explanations. In addition to using texts and artifacts in follow-up interviews to ask writers about their processes, I invited them to watch and reflect on moments of their recorded work to enrich the description and analysis of actions and processes on display in the videos. Interviews focused on eliciting writers' perspectives about "what happened, why, and what it means more broadly" (Rubin & Rubin, 2005, p. 6).

More specifically, to observe the actions of academic authorship as they happened, I asked participants to record all of the work they completed on one draft of one essay on their personal laptop. Participants used video screen capture software that allows for the entire computer screen to be recorded for hours at a time. In total, participants in the study submitted more than 20 hours of recorded writing. Because I am interested in how digital tools mediate writing, I identified "tool-intense" moments in the recordings where writers used multiple tools and artifacts to complete a writing task, such as when they recognized a language or grammar mistake, when they had a word or phrase in mind in a language other than English, when they were uncertain about their idea or concept, or when they were uncertain of the target genre or form of the essay. I invited writers to view these moments with me to prompt discussion during interviews in order to find out more about their intentions and experience in using digital tools that appeared to mediate their U.S. academic authorship and increase their rhetorical mobility.

**A Framework for Understanding Writing Activity**

In beginning this study, I wanted to draw attention to the digital tools and the ways in which those tools might mediate activity in the particular context of academic authorship. I wanted to understand the relationship between the digital materials of writing and the complex interaction of big picture rhetorical purposes and in-the-moment goals and problem-solving that are recognized parts of writing processes. I initially drew on Activity Theory as a heuristic for transcription and categorization of the factors at play in the mobile writing environments in which the study's writers worked. Activity Theory provides a way to focus on "activities" and "actions" of individuals and collectives create systems in which cultural, historical, and individual consciousness develop (Engeström, 1999) and to categorize the components that comprise activities such as composition processes. Considering academic authorship as an

activity system provided a way to initially describe and interpret the dynamic, mediational relationship between its subjects, tools, rules, community, division of labor, and object/motive/outcomes.

Activity Theory did prove useful for transcribing and initial categorizing of the writing activities captured in the hours of writers' recorded work. In adapting a method of transcribing work activities (Slattery & Geisler, 2007), I was able to name and identify tool-mediated acts of composing, but I found several limitations. The method in Slattery and Geisler's study is somewhat dated and does not fully account for the range of devices and applications available to writers. In addition, their method was developed in a "closed" situation in which writers only moved within the network of an office space. The writers in my study moved across national networked spaces. Further, Activity Theory is a theory of cognition. For the purposes of this study, I am interested in describing the previously unobserved digital writing environment and the actions writers take therein as they move into academic authorship. Given the transnational and translingual movement of the writers, a rhetorical transnational framework was needed for analysis of the concurrent movement and pressures of power and agency in the acts of writing itself and the emerging digital multilingual transnational rhetorical situation of U.S. academic authorship.

Authorship is a concept inherently tied to its context. In a special issue of *College English* focusing on western cultures of intellectual property, Kennedy and Howard (2013) wrote "we returned again and again to the question of *context,* pondering the ways in which the confluence of cultures, eras, mediums, and technologies drive shifting understandings" (p. 462) of the nature and value of intellectual work. Academic authorship, a corollary of intellectual property, is an historical, cultural practice which, over time, changes and is changed by the ways in which

people, as social beings, write. I observed the writers in this study working in a digital multilingual transnational environment situated within a U.S. university. I propose at the conclusion of this study that the capacity of the writers to move rhetorically between linguistic and national spaces points to the need for further development of a transnational approach to understanding the U.S. academic authorship of study writers. The Transnational Composition Standing Group at the College Conference on Composition and Communication (2017) has started to explore what this work might be on its blog (https://transnationalwriting.wordpress.com/). In an introduction to a special issue on transnational literacy in *Literacy in Composition Studies,* Leonard, Vieira, and Young (2015) defined transnational inquiry as "an analysis of movement" that, when turned toward literacy, considers how "writing…shapes and is shaped by transnational lived experiences and the infrastructures that govern transnational mobility" (p. vi).  Given the mobility across linguistic, national, and cultural borders on digitally networked devices I observed in this small study, coupled with the widespread access to such devices and networks in U.S. higher education contexts, I submit that all academic writing can and should be understood as potentially transnational.

If we are to more fully account for language differences and understand the unequal distribution of power within language varieties, and if we are to recognize that composing in the multilingual digital age means, at times, that writers use digital tools to move across languages, nation-affiliated web spaces, and a myriad of rhetorical situations connected by digital technology, then we need an approach to studying writing, creating writing pedagogy, and managing writing programs that accounts for and nurtures such mobility. Gilyard (2016) warned about the dangers of understanding linguistic diversity through a "sameness-of-difference"

model" (p. 286), suggesting instead a "cataloguing of competencies" of language users (p. 288). The work of this study adds to such a catalogue.

## Rationale and Significance

The rationale for this study emanates from a desire to better understand what students do as they write in an inherently multilingual, digital environment in order to acknowledge the value of their work and to support them as novice academic writers. Student writers in U.S. universities bring a diversity of cultural, linguistic, and literacy backgrounds and experiences to writing; differences in language use have historically placed students in a contested position relative to academic authorship. Ortmeier-Hooper (2008), for example, addresses how the activity of writing for multilingual students co-occurs with "negotiating the complex realities of their unique linguistic and cultural experiences" (p. 362). At the same time, evolving writing technologies and technologies to which writing technologies are networked influence the "performance" of all academic authors on all texts they write, not just those texts that are more obviously multimodal or digital.

Increased understanding of what students do as they write in multilingual, digital environments should shape policies and rules about technology use and how to equitably assess and value the work of diverse student writers. Results suggest that multilingual international students already are engaged in self-sponsored language learning and knowledge-making inquiry and, therefore, academic authorship. Uncovering what the participants in this study did with writing technologies during the act of writing informs recommendations for new ways to incorporate writing technologies more explicitly into writing instruction for all academic writers. In addition, this study returns the focus of writing studies research into digital writing practices to writing processes that mediate the "traditional" forms of academic writing such as the essay

genre. Doing so within an digital multilingual transnational framework leads to increased awareness of how both novice and expert academic writers' activities can be shaped by language and technologies and how, in turn, these writers are shaping tools and systems in which they occur. Adding a transnational lens brings the reality of the global communication context into play. The increase in international students in U.S. universities, the potential for academic writing to cross linguistic and cultural boundaries as technology makes that easier through increasingly sophisticated translation and social media applications, and the affordances and increased presence of the internet in a variety of global spaces requires that we re-orient writing studies to acknowledge transnational multilingual digital composing as the center instead of at the periphery.

## Project Overview

Chapter II lays the groundwork for the study with a review of literature that examines digital composing practices and authorship studies, especially its relation to agency in text-making decisions and ownership of texts. The purpose of the literature review is to further define academic authorship and consider recent studies that closely attend to 21st century writing processes and to examine the ways in which recent work in Writing Studies draws attention to the social and contextual nature of writing. Because I am primarily interested in novice academic authorship, I examine the history of FYC and its treatment of students as authors. I also read accounts of how FYC and Writing Studies have considered both linguistic diversity and evolving digital technologies as well as how both factor into understanding what student writers do when they are asked to address the rhetorical situation of the U.S. academic essay in their writing classes. This review shows that relatively little attention has been given to the space where multilingualism, digital technology, and academic authorship come together. This gap

demonstrates the need for the current study and its questions about how multilingual international students use digital tools in their academic authorship.

Chapter III outlines in more detail the processes through which participants were recruited, their writing activities recorded, and their perspective solicited through interviews. I provide more detail about the methodology I developed to observe writers at work in the digital writing environments that they create themselves. I explain how my method draws on previous work in composing process research while taking advantage of new easy-to-use and inexpensive technologies. Then, I outline how I identified the four multilingual international student writers who eventually became part of my study out of the potentially 2,500 students enrolled in a lower division writing course during the term of the study. After introducing participants, I provide insight into the kinds of data made available through the developed methodology. Then I explain my decision to focus on what I term "meso" activities of writing in order to explore the findings described in Chapter IV. I also address ethical considerations, trustworthiness of the study design, and the limitations of the study.

Chapter IV provides an in-depth look at the computer screens that function as dynamic, mediatory transliterate testing grounds for participants transliterate composing processes to illustrate the ways those created environments facilitate writing activities in which participants moved between languages, accessed information and artifacts from multiple web domains (Chinese and English), and created artifacts for use in academic writing. The chapter explores three major findings about the writers in this study: 1) writers use of their computer screens as a mediatory testing ground is a continual component of 21st century transliterate composing processes; 2) writers' transliterate composing processes facilitate the movement of writing activities across linguistic, rhetorical, cultural, and national boundaries and allow access to

emergent resources from multiple web domains (Chinese and English) for dynamic, mediatory use in academic writing; and 3) writers bring together multiple languages, tools, and applications in their digital testing grounds to acquire in-the-moment, good-enough literacies to work through writing problems. In other words, writers practice and develop rhetorical transliteracy in the testing ground of the computer screen to organize and exert some control over language and cultural knowledge in the moment to address the relatively unfamiliar context of U.S. academic authorship. Characteristics of writers' digital writing environments are illustrated using narrative description, still shots of video from writers' primary screens, and writers' descriptions of the how they set up their digital environments. This is followed by detailed description of the "troublesome moments" in which writers use multiple languages, tools, and applications to address the condition. These conditions include: the writer recognizes a mistake (on their own or through application); the writer has a word or phrase in mind in needing translation into English; and the writer faces rhetorical uncertainty about how to approach the idea, topic, concept she is in the process of writing about.

Chapter V offers interpretation and analysis of data using a framework derived from considering the work of composing as transliterate, rhetorical, and transnational and participants' explanations of their motivations and challenges in working on the one draft of one assignment they recorded for the study. The writers I observed engaged in transliterate composing processes that demonstrated rhetorical mobility through their curiosity; their understanding of the limits of their linguistic and rhetorical knowledge; their persistence to look for answers to troublesome questions across digital tools; and their developing critical awareness of the limits of the tools and artifacts. I submit that further study of digitally-mediated rhetorical mobility, or this transliteracy, is an important next step in more fully articulating a transnationally-oriented FYC.

After closely observing transnational writers at work, then, I ultimately reframed my initial questions: What tools and artifacts appear in a transnational writing space? How do these digital tools mediate rhetorical mobility in transnational and transliterate writing? What might this mean for understanding academic authorship and how it is taught in First Year Composition (FYC) at U.S. universities? Continued study of these questions using the methodology developed for this study can lay the groundwork for a more fully-developed Transnational FYC that 1) acknowledges the transnational reality of 21st century academic authorship for all writers and 2) cultivates the capacity to critique and move within the power of transnational digital spaces. If we are to prepare students to be global citizens, then we must ground our work with students in the "complex, networked understanding of power" (Dingo, 2012) that flow through the transnational digital environment in which they write.

CHAPTER II

LITERATURE REVIEW

This study sought to describe in detail the writing activities of novice multilingual international student writers as they composed academic essays in a multilingual, digital environment. This work adds to understanding writing processes and re-conceptualizing academic authorship in the multilingual, digital age. The critical review of literature presented here describes the changing ways in which the field of writing studies has defined authorship and student writers' relationship to it. A deepening understanding of the social nature of writing and how emerging writing technologies have affected writing processes and products has dramatically reshaped the field's research methodologies and objects of study. As writing came to be understood as a historically and culturally situated activity, fine-grained examination of writing activities to develop theories of process were replaced by theory-based studies to understand the context of writing as a literacy activity. Increasing linguistic diversity among U.S. university student populations and proliferation of emerging writing technologies now situate academic writing in dynamic, multilingual, digital environments. At the same time, academic writing performing inquiry and knowledge-creating work, especially by novice writers, continues to be influenced by a conservative, decontextualized conceptualization of authorship that has been both theoretically critiqued by scholars in a range of disciplines and challenged by the writing technologies that mediate contemporary writing practices. This conflict described in the literature reviewed here suggests a need to revisit and redefine academic authorship and supports a focus on the work of multilingual international student writers as a productive place to do so.

One promising area of inquiry within writing studies suggest a way forward. Contemporary writing activity research that resurrects and redefines the tradition of composing

process research looks closely at what writers do, revealing dense, complex, networked writing practices. Recent studies describe how student writers both adapt to and make adaptations of the physical and digital environments in which they write (Moore et al., 2016; Monty, 2014; Pigg, 2014; Shipka, 2014), use vertical writing processes across horizontal writing applications simultaneously (Takayoshi, 2015), and coordinate their personal and academic lives through writing (Fraiberg & Cui, 2016; Pigg et al., 2014). But there is still much to be learned about how writers put together linear, alphabetic texts, like those privileged in academic authorship. Further, little of this recent work directly attends to the academic writing activities of multilingual international students.

In this literature review, I focus on research examining what novice academic writers do and experience in the university with special attention to studies examining the work of multilingual writers and/or multilingual international students. Defining authorship and examining how students, as novice academic writers, have been situated within that definition is an important first step. So, too, is examining the ways in which writing activity has been studied by early and contemporary composing process researchers. This can lead to generation of the new models of composing that Yancey (2009) insisted are needed to account for and promote twenty-first century literacy practices.

## Authorship Studies

The circumstances that afford and constrain authorship change over time and across contexts, raising these questions: who has ownership and control over an authored text, and what counts as writing? Contemporary ideas of authorship in U.S. academic contexts continue to be influenced by the Western, Romantic construct of the Author as a "bearer of special legal rights and cultural privileges" (Woodmansee & Jaszi, 1994, p. 13). The persistent influence of

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nineteenth century authorship has contributed to decades of debate about what contemporary authorship is, how it functions in public and academic spheres, and why it continues to matter (Robillard & Fortune, 2016). A purpose of this current study was to better understand academic authorship as a sociocultural phenomenon in which novice multilingual international writers take part. This work begins in recognizing that "authorship is not a natural category but a naturalized one" and asking: "who and who is not positioned to claim the status of 'author': whose voice is and isn't heard; and what circumstances enable or prevent the claim" (Robillard & Fortune, 2016, p. x). In this section, I review literature that traces the historical western construction of authorship and theoretical, legal, and technological challenges arising in response. I look at how developing copyright law has contributed to strengthening the author's individual ownership and control over texts. Then I consider how changing definitions of what it means to write, arising in part from evolving digital technologies and literacy practices in digital writing environments that span multiple languages and cultures, challenge the connection between authorship and ownership. In challenging this connection, contemporary writing practices also call into question what it means to be an author and who can claim authorship.

**Copyright, Ownership, and Control Over Authored Texts**

Ownership of ideas is central to the Western conceptualization of authorship; copyright is the legal regulation of ownership governing who has claim to the objects created through authorship. The history of this conceptualization of Western authorship presented here briefly highlights the historical and ongoing connection between authorship and capital and, ultimately, authorship and power. Decisions about who owns a text are decisions about who benefits from the legal, financial, and cultural capital connected to a text (Woodmansee & Jaszi, 1994). The advent of the printing press in the year 1440, in changing the way in which texts are made and

distributed, necessitated regulating "rights" to texts (Woodmansee, 1994). Contemporary

copyright laws granting rights and ownership, or textual authorship, trace back to the 1709

Statute of Anne in England, which transferred copyright from publishing houses who did the

material work of producing texts to individuals responsible for the ideas expressed in texts

(Woodmansee & Jaszi, 1994). Woodmansee (1994) examined how in the century that followed,

authors came to be recognized for their individual genius. Prior to this shift, the publishers

involved in textual production had been afforded the honor. Rhodes (2002) referred to the

Romantic poet William Wordsworth (1815) as the "very avatar of authorship" (p. 9). In doing so,

Rhodes joined Woodmansee in crediting the poet's description of authorial genius in his 1815

*Essay, supplementary to the preface* as a key moment when "text-as-capital and author-as-owner

emerged from…new conditions that demonized plagiarism and valorized 'individuality,'

especially as an economic construct" (Rhodes, 2002, p. 4).

U.S. copyright law has had a profound effect on contemporary authorship. The U.S.

Constitution addresses ownership of writing: "The Congress shall have power: To promote the

progress of science and useful arts, by securing for limited times to authors and inventors the

exclusive right to their respective writings and discoveries" (art. I, § 8). Today, U.S. copyright

includes all "literary work," defined broadly to include any work in its final form from computer

programs and "compilations" (Copyright Act of 1976, 2016, § 101) to student essays (DeVoss,

2010). Protection of work, whether or not it is formally published, extends for 70 years beyond

the death of the author, which is the result of continual expansion to protect financial interests of

large media companies (Lessig, 2004). Once a text enters the public domain, it can be distributed

and remixed into new material by anyone for free (Lessig, 2004). Lessig (2008) argued that

copyright law unproductively imposes limits on public domain materials, severely limiting

potential authorship activities, especially "remix" in which ordinary people "add to the culture they read by creating and re-creating the culture around them" (p. 28). Copyright law formed in the pre-digital age strengthens the connection between authorship, ownership, and distribution of physical and digital texts even as technological innovation provides opportunities for greater access to material and tools for authorship and distribution of texts across languages and cultural boundaries.

Bordieu's (2011) notion of the three forms of exchangeable capital is useful here in explaining the significance of the connection between copyright, ownership, and authorship. Capital refers to actual and symbolic "goods" available for exchange, including economic (monetary), cultural (assets such as education and language variety possessed by the dominant class), or social (family, networks). These forms of capital work together to reproduce the existing social structure. Those who are most powerful have the most types of capital and the most say in how each type of capital is regulated. Most obviously, texts or authored works are material goods that can be exchanged for money or economic gain. The ability to act as an author also carries with it cultural capital, especially when authorship is understood as an example of individual "genius." Copyright makes explicit an author's ownership of both kinds of capital. The strong tie between copyright, ownership, and authorship works toward reproducing social relations in the west that exclude or devalue certain kinds of authorship because those already in positions of wealth and power have historically been the people who have been able to influence and interpret the rules that govern how copyright and authorship function. The "dominated classes" are not those who have made decisions about copyright protection. Rather, powerful media companies have wielded their weight to protect control and ownership of their property, which has given them both financial gain and control over the production of popular culture.

**Changing Definitions of Writing**

The tension between conservative copyright law and changing technologies contribute to what Robillard and Fortune (2016) identified as "contested authorship" or conflicting ideas about "what it means to write and what it means to be an author" (p. 8). Evolving theories of writing and changes in student demographics also unsettle efforts to define what counts as writing and who can claim ownership of that writing in the university context. Theories of writing as a social, dialogic, intertextual, multimodal activity suffuse writing studies in the post 1980s, post process era. How these theories influence research and pedagogy are shaped by increasingly visible linguistic diversity and evolving writing technologies.

**What it means to write.** Russell (1997) traced four decades of writing theory, from formalist in which writing is "something contained and its container" (p. 506) to dialogic theories influenced by Bakhtin (1986) in which writing is "a dynamic, functional, intersubjective process of reciprocal negotiation among writers and readers" (Russell, 1997, p. 506). What it means to write moves from an act of transcribing ideas onto a set, print form to an ongoing negotiation in which writing is always a social and rhetorical activity (Roozen, 2015) with each instance "filled with echoes and reverberations of other utterances" (Bakhtin, 1986, p. 91). The language in writing refers back to its prior uses and contains all of the voices from those prior uses (Bakhtin, 1986); the text itself refers back to other texts (Porter, 1986). As Prior (1998) put it, "the situated moment-to-moment work of writers making meaning" (p. 27). The shift from understanding writing as an individual, form-oriented enterprise altered the course of process pedagogy and composing process research, as explored more fully below.

Literacy studies, especially the idea of multiliteracies (New London Group, 1996), also has widely influenced discussions about what it means to write and teach writing in academic

contexts (Cope & Kalantzis, 2009). Writing, when understood in terms of multiliteracies, is about "designing social futures" (New London Group, 1996) not just putting words on a page or screen. In this view, writing responds to "the context of our culturally and linguistically diverse and increasingly globalized societies" and "the burgeoning variety of text forms associated with information and multimedia technologies" (New London Group, 1996, p. 61). Like Lessig (2008), the New London Group linked authorship to social and cultural participation where "effective citizenship and productive work now require that we interact effectively using multiple languages, multiple Englishes, and communication patterns that more frequently cross cultural, community, and national boundaries" (p. 64). The New London Group wrote that what it means to write is transformed to encompass "negotiating a multiplicity of discourses" and "the plurality of texts that circulate" in digital spaces (p. 61). Writing technologies extend the possibilities of authorship while also adding constraints. Thus, teaching writing as a stable set of skills becomes impossible.

The changing social, linguistic, and technological conditions to which the concept of multiliteracies responds have accelerated in the two decades since, as have theoretical discussions of the nature of writing. Selber (2004) identified the functional, critical, and rhetorical digital literacies academic writers need to productively and rhetorically respond to writing situations; he found a disconnect between school-based authorship that regards "knowledge as inherently stable" and "actual situations of practice" that are "marked by instability, uncertainty, and contingency" (p. 158). Critical literacy, his proposed solution, denaturalizes "conventional preoccupations and narratives" and critically considers "design cultures, use contexts, institutional forces and popular representations within the shape and direction of computer-based artifacts and activities" (Selber, 2004, p. 95). This aligns with other

entreaties for the field to investigate ideologies in the computer interface (Selfe, 1994), to "pay attention to technology" (Selfe, 1999, p. 415), and to "bring to new media texts a humane and thoughtful attention to materiality, production, and consumption" (Wysocki, 2004, p. 7).

As a result, further refiguring of authorship is needed to respond to changing technology and recognize that writing is "dominated by the [screen-based] logic of the image" (Kress, 2005, p. 18) instead of the linearity of print-based texts. The reader "designs the meaning" of a text from "materials made available on the screen" (Kress, 2005, p. 18). Writing, then, must be understood as multimodal, using the "linguistic mode" as well as the "visual and spatial" (Ball & Charlton, 2015, p. 43). Traditional conceptions of authorship depend on a stable text whose meaning resides primary in authorial intent. Studies of writing in an increasingly digital age destabilize the solidity of texts and disperse meaning among writer, reader, and the materials used to produce the text.

***Technology-influenced models of writing.*** The destabilization of text and author, especially in digital texts, has inevitably led to alternate views of how writing should be taught in the classroom. Digital writing scholars have continued to propose and implement new models of writing in academic classrooms. Johnson-Eilola and Selber (2007) proposed converging outside-of-school remix with the academic essay in assemblages or "texts built primarily and explicitly from existing texts in order to solve a writing or communication problem in a new context" (p. 381). Use of assemblages or other alternatives to academic essays pushes against what they see as a continued focus on "a unique, creative text, the 'original' words produced by the student" where "the ghost of the authorial, creative genius remains standing between the lines, propping up what is an increasingly unrealistic artifact in our postmodern age" (Johnson-Eilola & Selver, 2007, p. 378-379). Maranto & Barton (2010) theorized a research and pedagogical agenda in

which both student writers and professional rhetoricians study and write on social media sites such as Facebook. Purdy (2014) traced the concept of "design," like that proposed by the New London Group, in writing studies in his argument for a design-influenced theory of writing that draws attention to the material conditions of composing. Each of these approaches mingles the elements of writing, making it increasingly difficult to pinpoint a single person as the origin of meaning.

Such an approach, however, has contributed to a tacit split between "digital" and "non-digital" writing. That is, multimodal writing becomes close to synonymous with digital writing and increasingly separate from writing that is logo-centric, such as the traditional academic essay. The split emerges because, understandably, "new media tools" for writing, such as video, call for new processes of writing and critique of applying a linear, print-based process. An example is the approach promoted by the Center for Digital Storytelling at the Conference on College Composition and Communication in 2009 to study composing videos and other multimodal work (Fulwiler & Middleton, 2012). Writing as an act of digital storytelling, in this sense, is inherently different from writing as an act of typing words on a screen. DePalma and Alexander (2015) reinforced this conceptual separation between "multimodal composing" and print composing in their consideration of how to assess student academic texts that mix video, audio, and visual elements. DePalma and Alexander (2015) asked "how does multimodal composition reinforce and/or challenge students' rhetorical knowledge and composing processes?" (p. 184) in order to situate a multimodal model of writing as separate from print-based work.

Separating multimodal composing from other forms of writing presents its own problems. Shipka (2014) critiqued the separation of alphabetic writing from other modes of writing in her

argument for "tracing the entire range of modes or semiotics that are present and consequential" (p. 65) in writing as a situated literacy activity. Shipka (2014) noted that "*multimodal, intertextual, multimedia*" have been used interchangeably to refer to "production and consumption of computer-based, digitized, screen-mediated texts" (pp. 7-8), a situation that "works to facilitate a text-dependent or textually overdetermined conception of multimodality" (p. 12). "Technology" has become synonymous with "computer"; "multimodal" has come to be primarily associated with video and other digital texts. Shipka (2014) called for a more expansive view of multimodality to include a broader range of writing and experiences of writing or attending to the "multimodal aspects of *all* communicative practice" (p. 13). Another problem with separating multimodal from what is perceived as composing traditional essays erases the multimodality at work behind the scenes. Uniting composing of different forms using different methods underneath a capacious definition of the writing process is needed.

   ***Recognizing linguistic diversity.*** A writing process that includes multiple modes and methods of composing also should recognize the various languages available to writers composing academic texts in U.S. universities. Even as technologies unsettle definitions of academic writing, the increased visibility of multilingual writers at U.S. universities prompted by growing numbers of international students has made the long-present linguistic difference and varieties in writing classrooms more visible. FYC classrooms have always included linguistically diverse students, including international students, US-resident multilingual students, and students who speak "non-standard" varieties of English (Matsuda, 2006). "The myth of linguistic homogeneity" or the "tacit and widespread acceptance of the dominant images of composition students as native speakers of a privileged variety of English" (Matsuda, 2006, p. 638) has repressed recognition that the "Standard Written English" (SWE) of academic writing is not

neutral. In fact, the very "idea of a standard language is constructed and re-constructed on an ongoing basis by those who have a vested interest in the concept" (Lippi-Green, 2012, p. 56). The idea of a standard language incorrectly conflates spoken and written language and bases its "rules" on the practices of an elite, educated few that results in the "the ordering of social groups in terms of who has authority to determine how language is best used" (Lippi-Green, 2012, p. 58). Though perceived as neutral, SWE is anything but.

The visibility of linguistic diversity has prompted efforts to recognize that the "rules" governing academic writing should be revisited, and what it means to write in academic spaces in English should more closely reflect the diversity of academic writers. An agreed-upon position statement outlining conditions in which students should be given "rights" to their home languages (CCCC Language Committee on Language, 1974) was reaffirmed in 2014. The statement focuses on dialect variation and does not imagine the four multilingual international writers in this study whose "home" language is Chinese. They might not consider the English they speak as a dialect or a "home" language for them since they primarily speak this English in the academic context of the university.

How to recognize the right to use "home" languages instead of or addition to SWE in the composition classroom is related to the "translingual approach" which sees "difference in language not as a barrier to overcome or as a problem to manage, but as a resource for producing meaning in writing, speaking, reading, and listening" (Horner, Lu, Royster, & Trimbur, 2011, p. 303). A pedagogy for writing within this approach might look like what Canagarajah (2006) suggested in "meshing" World Englishes and localized variety of Englishes with Standard Written English. Canagarajah's theoretical framework is based on empirical observation of multilingual speakers communicating in English as an additional language. Fraiberg (2010) drew

on multiple theories, including Activity Theory, to describe writing as multilingual, multimodal "knotworking" or a "continual process of tying and untying of languages, texts, tropes, narrative, images, sounds, and ideologies distributed across far-flung networks" (p. 117). Writing is not bounded by space, such as classrooms and companies. The activity of writing in this proposed model is understood as "juxtaposition, filtering, selection, and recombining" (Fraiberg, 2010, p. 118), ideas similar to remix (Lessig, 2008) and assemblage (Johnson-Eilola & Selber, 2007).

Another approach to acknowledging the increasing visible linguistic diversity on U.S. college campuses is the call to "redesign" writing "by expanding the scope of the act of composing: from efficient, conventionally acceptable texts into relationships and strategies that are essential to intercultural and linguistic negotiations" (Jordan, 2012, p. 87). In this view, what it means to write is linked to intercultural communicative competence, a concept Jordan (2012) developed from a European Union effort to "manage linguistic complexity" (p. 121). The work of writing in this view is more about developing relationships through language than it is about authorship as authorship has been conceptualized historically.

Each of the discussions mentioned here work against a western, formalist print-based conceptualization of authorship by suggesting new ways to consider what it means to write and new types of writing for academic spaces. The work of considering what it means to write is ongoing (Wardle, 2014). Yancey's (2009) call for "new models of writing" (p. 1) has not yet been fully answered. Observations of how writers use different languages in actual moments of composing, as in the present study, are needed to more fully flesh out how theoretical approaches to language difference and negotiation play out in the practice of academic writing.

**What it means to be an author.** Even as what it means to write has undergone transformation, so, too, has what it means to be an author. Theoretical challenges to the author-

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as-creative-genius began in the 1960s as part of the movement dismantling the stable categories of Modernism. Barthes (1967) argued that "a text's unity lies not in its origin but in its destination...the birth of the reader must be at the cost of the death of the Author" (p. 148). The text as a singular container of an author's ideas is destabilized; instead, it is the reader, in the moment of reading, who creates the text. Foucault (1969) also challenged the singular nature of authorship in proposing the "author function," in which "author" is invoked as a discursive construction. Jaszi (1994) credited Foucault's challenge to authorship for making it possible to understand how writing and reading practices have historically been "organized around the idea of the 'author'" (p. 30). Although theoretical critique of the author has been slow to impact the legal sphere (Woodmansee, 1994), "hacker ethic," "remix culture," and the "DIY movement" have gained momentum, lessening the influence of the Romantic author as the experience of the audience and other stakeholders is considered in copyright-related court rulings (Jaszi, 2015).

The idea of the solitary author-as-genius has been further problematized by scholars studying who or what does the work of writing in digital spaces. For example, the author might now be understood as a non-human actor (DeVoss, 2013), such as a bot writing a Wikipedia article (Kennedy, 2009) or compiling meta data into formal, copyright-protectable reports in social media spaces (Reyman, 2013). Lunsford (2015) explained that writing technologies and networks have "blurred the boundaries between writer and audience," creating moments of authorship where "consumers of information can, quite suddenly become producers" (p. 21) as they retweet a quote with a comment or purposefully curate and order other writers' words on blogs. However, none of these re-imaginings of what it means to be an author explicitly addresses the possibility of using multiple languages in these acts. Furthermore, each of the texts that result from these new authorial practices are available in networked writing environments

for use at any time for a conscious assemblage and direct and indirect use in academic writing like that observed in this study. This suggests the need for a more comprehensive accounting for authors and their artifacts as actors in other authors' activity systems via digital writing environments.

## Students as Contested Novice Academic Authors

The questions raised by challenges to copyright and definitions of writing have unsettled the construction of authorship in theory, but changes in practice have not always kept pace, especially in consideration of academic authorship and of students as academic authors. Academic authorship, though related to authorship, is distinct in ways that raise questions about the ability of student or novice academic writers to act as full participants within its system. Some of these distinctions may present additional challenges to writers from other cultures, such as the multilingual students from China in this study. Academic authorship is closely tied to disciplines and is recognizable to members in distinct disciplines by genre conventions, including the "moves" that writers make to establish and occupy a niche within existing research (Swales, 1990) as well as specific and tightly controlled citation practices. Academic authorship is an act of inquiry and knowledge-making that responds to others within the disciplinary community by taking "ownership" and building on a tacitly agreed upon project (Bartholomae, 1985). Although influenced by copyright, capital (Bordieu, 2011) does not function in quite the same way in academic authorship. Academic capital is not as closely tied to economic capital or financial gain in the way that "popular" texts might be. Instead, academic authors are more likely to gain cultural capital and full admittance into the academic community.

For faculty, academic authorship is necessary for employment and tenure; for students, academic authorship is connected to grades and graduation. For both, academic authorship

carries prestige. What "successful" writers do as they engage in academic authorship is actively take hold of and own projects in recognizable forms of inquiry and knowledge-making. In taking ownership of a project, writers seek to gain a position of authority from which they can enter into knowledge-making conversations and move those conversations into new places. To successfully enter into academic conversation, writers must use the particular discourse of the particular academic community in which they write. These conditions of academic authorship, its continued association with textual ownership, and its relatively specialized and rigid formal rules create barriers for all novice academic writers.

The author as a modern creation (Jaszi, 1994), with a strong correlation to ownership and value of ideas, words, and texts (Lessig, 2008), continues to influence both how the academic community positions student writers relative to authorship and what student writers experience as they begin to write in the academy. Although this idea of individualistic authorship has been critiqued by theorists (Barthes, 1967; Foucault, 1969), legal and cultural scholars (Lessig, 2004; Woodmansee & Jaszi, 1994), and writing studies scholars (Brandt, 1990; DeVoss, 2013; Howard, 1995; Prior, 1998; Robillard & Fortune, 2016), it continues to inform discussions of student writers and influence policies guiding student work and student dispositions toward their own textual products. At the same time, there is continued interest in writing studies in arguing for recognition of the work that student writers do as novice authors, as opposed to school practice, and in creating conditions in which student can "claim authorship *as students*, as writers who are asked to work with and comment on the writing of others" (Harris, 2016, p. 193). Academic authorship takes into consideration how acknowledged members of the academic community position student writers as well as how student writers perceive their position and act within the system of academic authorship.

**Student Writing and Textual Ownership**

A central component of academic authorship is the ability to "own" a text or an idea. Students' relationship to their own academic texts continues to evolve and be complicated both by discussions of plagiarism and discussions of students' ability to add to ongoing academic conversations.

Students writing in U.S. universities are learners and participants in the academy at once which puts them in a difficult position (Howard, 2007). This paradox is evident in discussions of citation practices and plagiarism (Harris, 2016; Howard, 1995; Vie, 2013), ownership of student texts (Ritter, 2005; Robillard, 2006), value and authority granted student-authored texts (Grobman, 2009; Lunsford, Fishman, & Liew, 2013), and student writer ability to participate in academic discourse (Bartholomae, 1985; Beaufort, 2007; Lu & Horner, 2013; Penrose & Geisler, 1994; Sommers & Saltz, 2004). Students are in a contested position relative to authorship in the academy (Robillard & Fortune, 2016). As with more general discussions of authorship, evolutions in writing technologies reverberate throughout these discussions.

Academic writing is recognizable by its conventions, including explicit citation practices that closely link ideas and words with their owners. This method of "giving credit" for ideas and the words of others referenced in an academic text is indicative of the lingering acceptance in writing classrooms of the importance of the "autonomous" self and "the concept of authorship (as ownership of a singly-held property rights)" (Lunsford & Ede, 1994, p. 425). Howard (1995) demonstrated how traditional, unrevised ideas about authorship inform institutional and classroom plagiarism policies despite theoretical understandings of authorship that demonstrate that "proprietorship, autonomy, originality, and, a corollary morality, to 'true' authorship" (p. 798) are not possible in a postmodern understanding of reality.

Discussions of the connection between ownership, plagiarism, and academic authorship have increased along with increased access to the internet. Howard (2006) identified a "near-universal belief that the Internet is *causing* an increase in plagiarism" (p. 4). This belief has propagated primarily because of increased access to texts and portions of texts available online for copying and purchasing (Ritter, 2005). Howard (2006) called for considering "not just access to text but also textual relationships" (p. 4). A writer's increased access to texts online shapes concerns about plagiarism, and so does the reader's access to those same texts, necessitating, in Howard's (2006) view, a rethinking about intertextuality, or how texts connect to others texts.

Internet-age concerns about "authenticity" of student-authored texts have given rise to plagiarism detection software, another technology that shapes how student writers are positioned within academic authorship. Turnitin, one of the most popular programs, works by creating a database of millions of student essays against which future student essays can be compared. When students submit an essay, they consent to transferring their copyright to the company. This practice perpetuates "the dominant ideological narrative" (Vie, 2013, p. 7) of the singular author whose words and ideas should be closely controlled by copyright. Student academic authorship is recognized in the transfer of copyright even as it is challenged by the assumption that student-authored texts are prone to inauthenticity and therefore need checking.

Student's ownership of their writing also is minimized when it is cited differently (with first instead of last names) in publication than "real authors" and when it is primarily used as "testimonial" of good teaching (Robillard, 2006). In this situation, "a student writes; an author is read" (Robillard, 2006, p. 51). This positioning of student writing in opposition to "real writing" (Grobman, 2009) affects how students view their own work. Students "privilege consumption"

of others' texts "over their own knowledge and intellectual property" (Lunsford, Fishman, &

Liew, 2013, p. 478).

**Re-Authorizing Student Academic Authorship**

Even as student authorship is contested, it is also valued. Writing Studies scholars

continue to call for acknowledging and valuing the labor of student writers and legitimizing its

place within the academy. However, there has not yet been a full consideration of how changing

multilingual and digital realities of academic authorship might support seeing students as

academic authors.

Howard (1995) argued that "student writing must be accorded the same respect as

professional writing; it must be treated as subject rather than object formation" (p. 796).

Bartholomae's (1985) analysis of student difficulty with academic discourse began in his

consideration of students as academic authors. In studying "how the lack of authority shapes"

student writing (p. 507), Penrose and Geisler (1994) recommended ways to help students

"understand the development of knowledge as a communal and continual process" (p. 517), a

validating move that creates a space for students to enter academic authorship. Beaufort (2007)

studied a student writer during four years of college to reshape FYC to help students be flexible

authors across contexts.

Grobman (2009) argued that students should be considered novice writers so they can

enter authorship the same way as all scholarly writers: when they "see their voice as one among

multiple others" that "together create knowledge" (p. 179). In the Stanford Writing Study,

Lunsford, Fishman, and Liew (2013) found that students better value their own writing when

they identify with the community and recognize other authors inhabiting the same context in

which they write. Sommers and Saltz (2004) discovered that students who see their writing as

having a larger purpose beyond fulfilling an assignment develop more than writers who do not have this belief. Also, students who can see themselves as academic authors are more likely to be recognized as academic authors by others. Together, these articles make an argument for valuing the academic work of students in the same way that expert academic work is valued.

However, none of this scholarship that associates student academic work with the higher-valued work of academic authorship explicitly considers the academic work of multilingual students. If, as Prior (1998) argued, a writer is an "individual-using-mediational-means" in complex, historical, situated scenes of literacy (p. 158), then a consideration of student academic authorship should recognize the multilingual digital reality of today's higher education context. The call in Jordan (2012) for a redesigned composition that focuses on intercultural communicative competence was founded on recognition that all students bring different language varieties, including English varieties, to the U.S. composition classroom. This framework "authorizes" student writers from diverse cultural backgrounds and acknowledges the advantages of writers who already have experience negotiating across languages and cultures. Fraiberg (2010) drew on activity theory among others to propose that all texts and text-making is a multilingual multimodal endeavor. Writers, then, might be "knotworkers" positioned within multiple activity systems at once with the potential to "tie" actors and artifacts together (Engeström, Engeström, & Vähäaho, 1991; Fraiberg & Cui, 2016). If academic authorship is an activity system, then all subjects, regardless of novice or expert experience or linguistic or cultural background shape and are shaped by the activity of writing. This emerging theory is built through observation of non-academic writing activities at an international business based in Israel (Fraiberg, 2010), a healthcare organization in Europe (Engeström, Engeström, & Vähäaho, 1991), and at a U.S. university in the Midwest (Fraiberg & Cui, 2016). Observation and analysis

of the activity of academic writing is warranted to examine the promise of connecting activity theory, digital and multilingual practice, and academic writing to forward a project of articulating the value of student or novice work at the university.

## Composing Process Research

Elements of traditional composing process research when combined with contemporary writing activity scholarship shows promise for examining the value and potential of the academic work of novice writers, and, more specific to this study, writers who are also multilingual international students. Contemporary composing process and contemporary writing activity research attends closely to the actions of writers, particularly novice academic writers, as they write. An increasingly complex and technologically advanced mixture of methods continues to develop in order to empirically capture the complex, ongoing work of active composition. In using video screen capture to record extended work sessions on academic writing, this study continues and adds to this tradition to seek a deeper understanding of academic writing as a historically and culturally situated activity in complex and dynamic multilingual, digital environments.

### "First Generation" Composing Process Research

Writing Studies has always, by definition, been interested in what writers or "ordinary people" do as they write (Harris, 2016, p. 204). What continues to be debated is the definition of what writing is and what methods are best employed to understand what writing is. First generation process researchers reacted against a privileging of writing as a noun, or the text that the activity of writing creates. In her landmark study, Emig (1971) argued that student writers should be studied in the manner that professional authors are studied and that writing as an activity is a flexible, recursive process. To justify her study of the composing process of twelfth

graders, Emig (1971) evaluated 504 empirical studies of writing by adolescents, finding only two studies that define writing as a process. Further, the writing process in textbooks of the time is "a tidy, accretive affair that proceeds by elaborating a fully pre-conceived and formulated plan" (Emig, 1971, p. 22). Writing, in this definition, is a transcription of thoughts to page.

To situate writing as an unfolding, recursive process, first generation process researchers developed methods for closely observing writing as an outward activity and an internal decision-making process. This required a controlled setting where the researcher could watch and record writers' thinking aloud about their processes as they wrote. in which writers describe their decisions in real time. Pre-writing surveys and follow up interviews with students also help elaborate the process.

Following Emig (1971), researchers began to look at the process of different kinds of writers. Perl (1979) studied "unskilled" community college writers and established a coding process that was replicated by Raimes (1985) in order to study eight "unskilled" multilingual student writers completing an ESL composition course assignment. Zamel (1983) interviewed six student writers from a variety of L1 backgrounds (Chinese, Spanish, Portuguese, Hebrew, and Persian) and analyzed their textual products to find that, like other writers studied, they used a "constant interplay of thinking, writing, and rewriting" (p. 172); in addition, participants "did not view composing in a second language in and of itself problematical" (p. 179). Raimes' (1985) participants, on the other hand, wrote significantly more and spent more time re-reading their texts to generate new ideas and less time in editing than writers studied in Perl (1979). Raimes (1985) found that "students whose [language] proficiency is judged as insufficient for academic course work generate language and ideas in much the same way as more proficient

students" (p. 25). The stated aim of these studies was pedagogical; they did not explore context or rhetorical factors. Additionally, the writing that participants performed was only for the study.

First generation writing process research is closely aligned with a cognitive psychology research tradition in which the metaphor of the brain as a computer serves as a model for explaining memory and processing (Faigley, 1986). In their influential *cognitive theory of writing*, Flower and Hayes (1981) built on this model with data gathered using moment-by-moment think-aloud protocols and protocol analysis. Writing is "a distinctive thinking process" (Flower & Hayes, 1981, p. 366) guided by the writer's own goal-setting, which is itself a process. Writing, in other words, is a problem that individuals solve by using an internal, but observable, cognitive process that uses long term memory, a "monitor," and goals that writers "regenerate or recreate…in light of what they learn" (Flower & Hayes, 1981, p. 381). This view assumes what Aktinson (2003) wrote about as a model of writing in which cognitive processes are separated from social situations. Failing to explicitly recognize that writing arises in social situations removes the possibility of understanding how it is shaped by social interaction.

**Writing contexts and computers.** In a *CCC* essay about what her studies of the writing process yielded, Perl (1979) anticipated contemporary writing process research that draws attention to writing as a physical, embodied experience (Ehret & Hollett, 2014). Perl (1979) identified two elements of the composing process: *retrospective structuring*, where writers "feel" or "sense" ideas prior to verbalizing ideas, and *projective structuring*, where writers consider their work from their reader's perspective. In drawing attention to the importance of feelings in writing and creativity, Perl (1979) conceptualized writing as an individual, creative process, conforming to the western ideal of authorship.

As computers, and, more specifically, word processors have become more prevalent, the impact of the writing medium on the writing process has begun to be studied. Haas (1988) studied the amount and type of planning that 10 expert writers and 10 FYC writers use in three writing conditions: writing with pen and paper, on a word processor, and with both. The word processor she studied (named Andrew and developed by IBM) bears little resemblance to today's digital composing programs. However, the study suggested that technology "may have a powerful role in shaping writers' cognitive processes" (Haas, 1988, p. 39). For example, the study found that writers using early word processors engaged in less planning during the writing process than writers using pen and paper. The idea that technology shapes cognition, as well as other aspects of life, has and continues to influence writing studies research.

**Critiquing Cognitive Theory and Process Research**

Research examining moment-by-moment writing activities faded as individual-based theories of composition came under critique in the 1980s. The October 1983 issue of *CCC* contains several critiques of composing process research, questioning the ability of writers to describe their mental states in think-aloud protocols (Cooper & Holzman, 1983) and the validity of decontextualized study settings (Voss, 1983). Lotier (2016) identified *1986* as the year in which studies about invention in writing shifted into a "post process" methodology, "reject[ing] internalist models of cognition for more social and ecological ones" (p. 363). As more social models of cognition began to gain ground, Faigley (1986) argued that the three dominant schools of thought within the process movement—expressivist, cognitive, and social—each contain significant shortcomings and should be replaced with an understanding of writing as "historically dynamic" instead of "a psychic state, cognitive routine, or social relationship" (p. 537). This

presages the widespread adoption of post process and "post cognitivist" in the social turn in the field (Atkinson, 2003).

The rejection of individual-focused expressivist and cognitive understandings of writing was part of a broader critique of structuralism, or "human behavior as substantially determined by closed, abstract, formalized systems" (Atkinson, 2003, p. 4), in the humanities and social sciences. The focus of writing studies moved from "cognitive issues to larger social issues" (Matsuda, 2003, p. 73). Matsuda (2003) argued that the post process paradigm is a discursive construction that "solidif[ies] disparate critiques of so-called expressive and cognitive theories and pedagogies" and sets up expressivism and cognitive views as "necessary caricature[s]" that allow a new, unified disciplinary agenda (p. 74). Constructing post process in opposition to process meant abandoning the research agenda and methodologies developed by process researchers. Numerous scholars (e.g., Fleckenstein, 2012; Shipka, 2014; Takayoshi, 2015) have noted the drop off in empirical studies of writing activity as the post process movement moved writing studies scholarship into a more theoretical realm. However, more recently, scholars have been paying renewed attention to what writers do as they engage in the activities of writing.

**Contemporary, "Next Generation" Writing Activity Research**

As in authorship studies, debates about what counts as *writing* shape contemporary writing activity research. The studies reviewed in this section represent scholarship in the last five years that closely attends to the activities of novice academic writers. Differing definitions of what writing is has lead to differing temporal, spatial, and digital boundaries around the activity of writing under investigation. The studies reviewed here represent two distinct ways of defining writing: as a cognitive activity and as a literacy activity. Further, writing as a literacy activity is either studied as a school-based activity or an out-of-school activity, although all

studies reviewed here present implications for pedagogy. Contemporary cognitive studies, like their first-generation counterparts, are situated in controlled settings with timed writings. Literacy-based studies primarily seek to study writing as it happens in the real-world lives of study participants. This requires a range of methodologies that frequently take advantage of the affordances of the technologies used by participants. In addition, most studies acknowledge and analyze the role of specific technologies used in writing activity. Activities of writing by students from diverse linguistic and cultural backgrounds are represented in this current research, and some results do suggest the need to consider the multilingual reality of 21st century academic writing environments as well.

As a group, these studies contribute to understanding what it means to write, and by extension, what it means to be an author. Their findings create an opening to understanding academic authorship as an activity system as they explicitly and tacitly invoke writing technologies as tools, divisions of labor in the work of writing, and enriched descriptions of digital and physical communities in which the activity of writing takes place. These are all components Engeström (2015) identified as mediators of object-directed activity. Understanding how student writers already shape academic authorship as they engage in moment-to-moment, behind-the-scenes writing activity positions them as subjects-as-transformers and legitimate contributors to knowledge-making within the academic community.

**Cognitive-oriented studies.** Researchers interested in writing as a cognitive (Baaijen, Galbraith, & de Glopper (2012); de Milliano, Gelderne, & Sleegers, 2012) and metacognitive (Negretti, 2012) activity studied the writing of individuals in controlled settings. De Milliano, Gelderen, and Sleegers (2012) studied the cognitive writing process of eighth graders in an experimental environment where students write and think-aloud while being videoed in response

to a prompt. Writing, in this study, was defined as "the mental operations employed during writing . . . divided into the sub-processes of planning, formulating, and reviewing" (De Milliano, Gelderen, & Sleegers, 2012, p. 305) and "self-regulatory activities" that further describe each sub-process. Baaijen, Galbraith, and de Glopper (2012) studied logs recording writers' keystrokes as they composed a "well-structured and complete article" (p. 255) on a computer in a 30-minute controlled writing session. Researchers mapped the pauses and bursts of typing to cognitive processes identified by John Hayes, who developed the influential cognitive theory of writing along with Linda Flower (see Flower & Hayes, 1981).

Nishino and Atkinson (2016) argued that writing, in particular second language writing, should be studied within a sociocognitive framework in which the "mind, body, and ecosocial world function integratively and inseparably in producing social (or sociocognitive) action, including writing" (p. 38). Unlike other cognitive-oriented studies, Nishino and Atkinson (2016) studied writing in a "naturalistic" setting. That is, the study took place where writers who are participating in the study choose to write instead of a staged setting created by researchers to observe writing activities. The researchers video and audio recorded 13 collaborative writing sessions between two graduate students co-authoring an academic article; the researchers used multimodal interaction analysis to consider how "moment-by-moment coordinated talk, gestures, and additional semiotic resources" (p. 42) indicate alignment between the writers and elements of their non-human environment. The stated purpose of the research is to bring a "balancing and complexifying view of cognition in SLW" (p. 52).

**Literacy-oriented studies that focus on writing environments.** There is clear demarcation between empirical research of writing as a cognitive activity and writing as an everyday literacy activity distributed across time and space, including multiple physical and

digital environments. This group of studies can further be divided into those that primarily look at school-sponsored writing and those that take a wider look at the different kinds of writing that create literate lives (Pigg et al., 2014). Writing is further distinguished in literacy-based studies by genre and the work the writing does. For example, Moore et al. (2016) surveyed student writers about where and how they engage in more than 30 specified types of writing; Pigg et al. (2014) examined texting as a type of writing that performs transactional or coordinating work. Writing might be for school (Ehret & Hollett, 2014), social networking (Buck, 2012), or a mix (Monty, 2015). The activity of writing includes "habits" or "process choices" that are "not fully self-conscious or premeditated and could often be described as operations or everyday ways of doing things" (Pigg, 2014, p. 257). In the following sections, I examine how these studies consider writing sites and environments.

  ***School-based literacy activity.*** Ehret and Hollett (2014) drew on affect, literacy, and embodiment theory in their study of 12-year-olds composing digital stories on iPods in a classroom environment to understand writing "as a felt experience of moving bodies" (p. 431). The activity of writing was mediated by the technology (the iPod) and the lived physical experience of being in a classroom and composing across "multiple timescales" or "time as a lived experience in which the body *feels* the past in the present moment" (p. 434). The past experience, in this case, included previous experience using mobile technology in non-classroom environments. The researchers videoed participants as they wrote digital stories on their iPods, noting how writers interact with the technology and the environment. The iPod, a technology designed for mobility, allowed students to move around physically and digitally to gather material for their digital stories. This affordance allowed researchers to study writing as an activity in which writers' bodies can be "engaged affectively and temporally" in creating "real

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virtualities" or the "layering…of the digital and physical upon one another" (p. 431).

Researchers also asked participants about their past experiences with mobile technology to consider how in-class writing activities connect more broadly to "literacy practices." Writing, as a verb, becomes "producing, exploring, sharing, moving, and navigating" (p. 437) the operating system on the iPod; writing, as a noun, becomes a layered text made up of physical and digital material.

In another school-based study, Li and Kim (2016) drew on a sociocultural framework to consider how international graduate student writers in an English for Academic Purposes course collaborate on a research proposal and annotated bibliography on a wiki, an online writing technology. As with the iPod, the affordances of the wiki allowed the researchers to unobtrusively observe writing activities that previously may have remained invisible. The wiki recorded a history of changes to the two academic genres in which the participants wrote; it also featured a way for writers to use written comments and discussion on the wiki to guide their collaborative academic writing. Li and Kim (2016) used this coordinating writing to taxonomize the ways in which participants used language functions (e.g. acknowledging, agreeing, suggesting) "as a mediating tool to interact with group partners while performing writing tasks and negotiating social relationships" (p. 37) and to move their academic writing forward. Writing, here, is an academic, collaborative task categorizable by genre, e.g. research proposal and annotated bibliography. Less directly, writing is also what Pigg et al. (2014) referred to as an instrument that brings "together individuals through the ongoing act of making arrangements" (p. 102).

***Writing, literate activity, and life management.*** Pigg, et al. (2014) built on work of the Revisualizing Composition Study Group that was formed to better understand what kinds of

writing college students do and valued in their everyday lives. Using a multi-institutional survey, time use diaries, and follow up interviews in selected cases, Pigg, et al. (2014) found that college students highly valued texting as writing, especially for transactions and coordination. By situating their work in New Literacy Studies, and, in particular, the idea of literacy ecologies, Pigg, et al. (2014) argued that even writing that appears as "mundane" as texting is "part of a much more complex social practice that supports and sustains roles" (p. 108) that are important to participants. Therefore, writing, in all of its forms should be studied. Writing is never just writing; "writing—as an act, a verb—shapes contemporary social and personal lives" (p. 93). As in other contemporary composing studies, Pigg et al. (2014) used writing technologies in data collection, such as text message reminders asking participants to report, also via text message, their writing activities.

Buck (2012) also used an ecology framework to study how writers represent identities on multiple social network sites, finding, like Pigg, et al. (2014), that writers used writing technologies to coordinate and manage a range of activities. Principal writing technologies studied include Facebook and Twitter. The archiving affordances of those sites, e.g. time stamping and storing of short bursts of writing activity over time, were used to observe participants in addition to "touring" writers' profiles and conducting follow up interviews about the choices writers made and consequences they experienced. Buck (2012) found that the "literate activities" on each site, including writing short sections of text and posting photos, helped the writer "manage various aspects of his identity" and other activities, both online and in the "real world" (p. 21). These writing activities add up to what Buck (2012) termed a "literate life" that happens "in multiple environments and across physical and digital spaces" (p. 22).

***Digital applications and digital writing environments.*** Other studies examined how writers make choices that shape their digital writing environments and incorporate multiple and evolving digital applications that in turn mediate the activity of writing in surprising ways. Using a multi-institutional survey of 1,366 college students, Moore et al. (2016) drew attention to some of the environments in which students wrote and the more than 30 different genres including academic papers, lecture notes, lists, texts, and blogs that they wrote in. The project, like Pigg et al. (2014), extended the work of the Revisualizing Composition Group and explicitly built on the Stanford (Lunsford, Fishman, & Liew, 2013) and Harvard (Sommers & Saltz, 2004) studies of student writer experience. The survey asked students what kinds of writing they do, why they write, and what technologies they use to write. Moore et al. (2016) found that college student writers "see much more flexibility in genre/technology pairings than writing faculty might anticipate" (p. 6). Notably, students report using cellphones to write many genres, including academic essays.

Takayoshi (2015) offered an example of what this fine-grained research might look like in an analysis of Facebook composing. Using the affordances of Facebook and "screencasting," or video screen capture with audio recordings of think-aloud protocols, Takayoshi (2015) studied eight Facebook writers' composing practices during a 30-minute segment of the time they typically spend on the site. As in Pigg, et al. (2014) and Buck (2012), Takayoshi (2016) found that "the brief and seemingly trivial written compositions" on social media sites like Facebook represent "a complex, fleeting, and richly rhetorical process of decision-making" (p. 9). Writing unfolded as a series of vertical decisions and processes in short form writing on Facebook, a "micro" version of the recursive processes explicated by earlier researchers examining essay writing.

Like Ehret & Hollett (2014) who drew attention to the layered nature of contemporary writing, Takayoshi (2015) described how Facebook writers also "horizontally" negotiate many writing tasks at once on Facebook and on other digital spaces such as e-mail and word processors. The concurrent negotiation of the vertical, back and forth process of writing with writing horizontally across tasks for multiple purposes and audiences merits closer attention as an object of study. Takayoshi (2015) noted that "studies which focus on the technologies themselves are doomed to be shoved into the dustbin of time" (p. 5), calling instead for more work looking at what writers do whenever and wherever they may write.

"Wherever" students write includes physical and digital writing environments and incorporates both networked applications, such as those studied by Takayoshi (2015), Buck (2012), and Li and Kim (2016), and devices, such as the iPods studied by Ehret & Hollett (2014) and the range of technologies about which Moore et al. (2016) survey college student writers. Following this tradition, Monty (2015) focused on "lived mobile and social media writing practices" (p. 126) of college students who attend school in the United States but frequently cross the border into Mexico for personal and business reasons. The study examined dispersed writing environments made available by mobile devices such as smartphones. Student writers are surveyed on "their preferred mobile devices and while in the in-between" spaces (Monty, 2015, p. 129) as they move across borders from school to community as well as U.S. community to communities in Mexico. After a follow-up survey with five students, Monty (2015) found that participants "perform identifications as students regardless of their physical locations" (p. 135); most (75%) use mobile devices for schoolwork "while waiting in line on the international bridge, while driving, while waiting at stop lights, and even 'when I am at the bar'" (p. 137).

Pigg (2014) also was concerned with how writers shape writing environments in physical and digital spaces in a changing literacy landscape where "coffee shops can become office spaces, seats on the bus can becomes sites of academic learning, and classrooms can become domains of personal communication" (pp. 252-253). Pigg (2014) capitalized on the public affordances of coffee shops to closely observe and video record two writers' work sessions. In combining observations with interviews, Pigg (2014) discovered, as did Monty (2015), that writers create convenient, accessible places of writing and learning outside of academic spaces. Here, "access" refers to both the ability to possess and use writing technologies as well as the ability to find safe, productive spaces in which to write. Access also means having stable wifi to build the digital spaces needed to do the work of writing. For example, one writer in the study maintained an open but minimized web browser tab to the course management site so she could periodically check for assignment updates. Pigg (2014) explicitly placed the study in the composing process tradition and called for "more research that analyzes how student writers simultaneously and actively navigate—and become influenced by—physical and virtual environments" (p. 254).

**An Emerging Research Agenda**

Writing, then, is what students do on their devices; they "compose outlines, take notes (by typing and via talk-to-text software), edit documents, respond to online group work, send emails, text peers, and write essays…and translate instructor comments (from English) and their own writing (into English)" (Monty, 2015, p. 134). The mobile writing environment is created and constrained by devices (most frequently smartphones and iPads), mobile network providers, and physical, geographic spaces. Students writers "do not compartmentalize schoolwork as needing to take place in an officially or traditionally designated academic space" (p. 130);

instead they "challenge, modify, and create composition place and space through their mobile, social, and lived practices" (p. 137).

Collectively, the contemporary writing activity studies reviewed here suggest an emerging research agenda that 1) focuses on how the activity of writing is dispersed across physical and digital spaces, each with its own affordances and constraints that mediate textual production; 2) seeks to understand writers' motives and values of their own writing; 3) recognizes that "the micro" and "the mundane" moments of writing are important for overall understanding of what writers do and experience; and 4) works toward developing a new model of composing as Yancey (2009) called for that encapsulates a wide range of writing technologies and practices.

Each of the studies reviewed here considers the location of writing as important. Nishino and Atkinson (2016) argued that writing is always embedded in a social context; Buck (2012) and Monty (2015) argued that writing happens across borders, mobile devices, and social networking spaces; Takayoshi (2015) provided an in-depth picture of Facebook as one composing environment; Pigg (2014) drew attention to coffee shops as one physical, public, and social location of writing. Writing is "distributed in space and time" (Pigg et al., 2014, p. 108) and an embodied practice (Ehret & Hollett, 2014) where student writers go about "capturing, revising, and publishing multiple images" (p. 438) while moving about with their writing technologies and devices. Writing can mean a number of different activities that happen simultaneously with other, apparently unrelated writing activity (Pigg, 2014; Takayoshi, 2015). In each of these studies, the researchers drew on the affordances of the writing technologies used in the activity of writing to assist in data collection.

Next generation writing activity research is just beginning the work of describing and understanding the complex digital and physical writing environments novice academic writers co-create with writing technologies, physical environments, and the kinds of writing these writers need to do to transact and coordinate their lives inside and outside of school. But there is much yet to be learned about writing environments and the "micro" processes and mundane, everyday writing activities that co-occur with authoring more formal academic texts. Takayoshi (2015) closely looked at a specific composing situation, but the focus was on Facebook. Pigg (2014) observed academic writing, but the focus was more diffuse and primarily concerned with the environment and not the fine-grained actions involved in completing an academic text. Both Li and Kim (2016) and Nishino and Atkinson (2015) looked at academic work, but the focus of both studies was on the collaborative process; additionally, Li and Kim (2016) only focused on the affordances of one technology involved, the wiki, without describing the digital and physical environment formed during the writing process.

What this research agenda does not yet fully recognize is just how dispersed digital spaces can be when the writers occupying them bring experience in writing in multiple languages, such as Chinese and English, in digital spaces originated from multiple cultural contexts, such as the United States and China. Contemporary writing activity research has expanded its focus to include many forms of writing. The agenda acknowledges the importance of incremental acts of composing, but does not yet offer a catalogue of what the "micro" acts of composing might be in digital spaces and how these acts of composing might reshape how we understand what the field has named the composing process. More focused attention is warranted on the acts of writers who have access to multiple languages and digital tools and environments as they work on academic essays in order to more fully develop rich, dynamic models of writing.

**Writing Activity Research, Authorship, and Activity Theory**

Activity Theory offers a way to help describe what student writers do and experience while writing academic texts. As a theory of both contextual explanation and transformation (Engeström, 2015), it offers a way to describe and understand how academic authorship, as a system, both influences the activities of novice academic writers while at the same time can be transformed by their actions. Recognizing moments of transformation can in turn enrich our understanding of how academic authorship unfolds in the twenty-first century. In this section, I review studies that incorporate Activity Theory. The studies reviewed suggest there is value in using an activity system framework for describing and valuing the academic work of multilingual international students like those in my study.

**Activity Theory and the Activity System**

The activity system model as developed by Engeström (1999, 2015) offers a foundation upon which to create new models of composing. Activity Theory is a cultural-historical theory developed out of the work of Vygotsky (1978) who explored "the relationship between the use of tools and the development of speech" (p. 19) and argued that "to study something historically means to study it in the process of change" (p. 65). Vygotsky represented change in the idea of *mediation* or "the appropriation and eventual self-generation of auxiliary means (predominantly but not exclusively, spoken and written language) that enables users to voluntarily organize and control (i.e. mediate) mental activity and bring it to the fore in carrying out practical activity in the material world" (Lantolf & Thorne, 2006, p. 62).

Second generation activity theorists led by Leont'ev, a Soviet psychologist similar to Vygotsky, expanded the theory to account for the division of labor in activity and further define its motives and objects. For Leont'ev, an activity is always directed toward an object and

explains why something takes place. Actions are carried out to achieve goals, and operations represent the conditions under which actions take place (Lantolf & Thorne, 2006). Engeström (2015), who placed his activity system model within third generation Activity Theory research, incorporated community and rules and added multi-directional arrows to indicate that movement in one component influences other components. He also explained that analysis of one activity system inevitably requires analysis of multiple activity systems the interconnect during activity.

This model originates in Engeström's (2015) *Learning by Expanding*. Each activity system can be explained and analyzed by categorizing elements of the activity into tools, subjects, motives, community, rules, and division of labor and then examining the relationship of categories to each other and how together they mediate the goal-oriented activity under investigation. As analysis expands outward, it also contracts inward, attending to issues of "subjectivity, experiencing, personal sense, emotion, embodiment, identity, and moral commitment "(Engeström, 2015, p. xv-xvi). These same issues are being taking up by contemporary writing activity researchers to explain academic writing as a situated, embodied literacy activity connected to classroom and institutional goals while carried out in hyper local environments on individual digital devices. Figure 2 shows a provisional description of academic authorship as an activity system based on emerging understandings of writing activity from recent studies following the examples in Engeström (1999) and using the descriptions of the categories extracted from Engeström (2015) by Kain and Wardle (2005, p. 120):

- *Tools* are "physical objects and systems of symbols (like languages, mathematics) the people use to accomplish the activity)"

- *Subjects* are the "person or people engaged in activity who are the focus of a study on activity. The points of view used to focus on the activity"

- *Motives* are the "purposes, reasons for the activity"

- *Objects* are the "problem space" and outcomes are the "desired goals of activity"

- *Rules* are "laws, codes, conventions, customs, and agreements that people adhere to while engaging in the activity"

- *Community* is "people and groups whose knowledge, interests, stakes, and goals shape the activity"

- *Division of Labor* refers to "how the work in the activity is divided among participants in the activity"

Engeström (1999) explained that modeling human activity in this way "explicate[s] the components and internal relations" (p. 30) of the system, in turn providing nuanced understanding of the system and how humans act within and change it. The dynamic nature of activity systems accords with emerging data and practices. Writing can be conceptualized as a "macro" activity spurred by cultural motivations while at the same time recognizing individual reasons and "micro" actions. In addition, Engestrom (2015) described how, in third generation Activity Theory, analysis always extends beyond a single system, expanding to "multiple interconnected activity system[s] with their partially shared and often fragmented objects" (p. xv). Moments where components of multiple activity systems come together are moments of "knotworking" or the "rapidly pulsating, distributed and partially improvised orchestration of collaborative performance between otherwise loosely connected actors and activity systems" (Engestöm, Engeström, & Vähäaho, 1999, p. 346). Fraiberg (2010) and Fraiberg and Cui (2016) drew on the concept of knotworking to define writers as knotworkers.

**Activity Theory in Writing Studies**

Writing Studies scholars who employ Activity Theory as a framework share a recognition of the inextricability of individual, society, context, and writing activity. Activity Theory supports the simultaneous study of texts, social relationships, and contexts as mediators within activity systems. Russell (1997) synthesized Engeström's (1999) activity system model with genre theory to develop a theory of writing that explains "how doing school, doing work, and doing the other (political, familial, recreational, etc.) things our lives are made of come together through the mediation of writing" (p. 505). Activity theory shifts the object of analysis from just texts to also include "interactions among higher education and other social practices" (Russell, 1997, p. 525). Rather than examining an actual situation, Russell created a hypothetical situation of how students might move through an imaginary major of cell biology. From this, he illustrated how Activity Theory could be useful in a project to "trace the relation between school and society" (Russell, 1997, p. 525) and the writing and learning that happens as students move through disciplinary study of any sort. Wardle (2003) continued in this tradition in using the activity system model to analyze FYC as an activity system interacting with other disciplines, also conceptualized as activity systems. FYC writing teacher motives for teaching particular genres are contrasted with curricular outcomes in the FYC activity system as well as goals in other disciplines. An Activity Theory lens provides rich historical and ongoing descriptions of the contradictions and potential transformations to improve the systems under study.

Kain and Wardle (2005) explored the pedagogical potential of Activity Theory, as instantiated by Engeström's (1999) model, for helping business communication students understand the writing they will be doing once they enter the workforce. They argued that Activity Theory "provides a lens for capturing the complexities of contexts, closely examining

the relationships among factors that contribute activity, and elaborating the role of genres in contexts" (Kim & Wardle, 2005, p. 119). Workplaces are defined as activity systems. Students examine writing in specific workplaces and submit a report of their findings to meet class requirements. In analysis of the reports and a post-course survey, Kain and Wardle (2005) found that Activity Theory did lead to students to make "sophisticated judgments about the use of genre within the activities they researched" (p. 126).

Prior (1998) and Prior and Shipka (2003) drew on sociocultural theory, including Activity Theory, to postulate academic writing as "mediated authorship" and "chronotopic lamination" with "simultaneous layering of multiple frames and stances" (Prior & Shipka, 2003, p. 187) dispersed across time and space. Prior (1998) used ethnographic observations, interviews, and artifact analysis to study how graduate students come to be enculturated in disciplinary communities; authorship is understood as multiple, ongoing activities mediated by other people and artifacts. Prior and Shipka (2003) examined how four writers draw, discuss, and describe their feelings toward their writing environments and writing processes to show writers' "environment-selecting and –structuring practices" (p. 219) and to argue that Activity Theory and writing studies "could both benefit from a greater awareness of chronotopically laminated chains of acts, artifacts, and actors that are woven together and unwoven in polyvalent moments of being" (p. 231).

Shipka (2014) continued the project to further develop a socioculturally-based mediated action framework that "provides us with ways of attending to the social and individual aspects of the composing processes without losing sight of the wide variety of genres, sign systems, and technologies that composers routinely employ while creating texts" (p. 40). Shipka (2014) built on the data set created in Prior and Shipka (2003) to push against "the discipline's fading interest

in composing process studies with its tendency to 'freeze' writing, to treat it as a noun rather than a verb, to privilege analyses of static texts" (p. 13). Writing studies should resist thinking about texts as monomodal, disembodied experiences. Texts, as final products, must be considered "*in relation* to the complex and highly distributed processes involved in the production, distribution, and valuation of those products" (Shipka, 2014, p. 51).

Fujioka (2014) more explicitly used Engeström's (1999) activity system model to revisit an ethnographic study of a graduate-level education course in the United States taken by both domestic and international students. A stated purpose in the study was to test the explanatory potential of the activity system to shed light on how learning happens across systems. Interpreting "activity system" to mean the tools, rules, divisions of labor, motives, and communities shaping individual participation in the graduate level course under investigation, Fujioka (2014) mapped the conflict and coordination in activity systems of the course's professor and a Japanese student. In her review of Activity Theory-based studies of L2 learning environments, Fujioka (2014) noted researchers use Activity Theory to "situate L2 writing in the sociocultural context where it takes place" (p. 42) but not yet to take advantage of "the dynamic view of activity system as interactive and collective endeavor" (p. 43). In her use of Activity Theory, she found that the writing practices of both participants are transformed in the interaction of activity systems.

In yet another direction, Fraiberg and Cui (2016) used a sociocultural approach to explore how Chinese students studying in U.S. universities use "interactive networked writing" (INW) or "deep social and real-time writing exchanges mediated by network technologies" (Fraiberg & Cui, 2016, p. 84). Of primary interest is how students used INW to form communities and networks in U.S. universities and how the practices associated with INW and community

forming intersect with students' academic work. QQ, a popular Chinese instant messaging application, was the study site and a "president" of a QQ group at a large mid-Western university campus was the interviewed informant. Of particular interest to the present study was how participants coordinated help on homework and used Chinese "internet language," or the "rich set of terms popularized on the internet that index new forms of social identities as part of a shifting social landscape within modern day China" (p. 88), to mediate homework coordination and other activities. This begins to "offer a glimpse into student lifeworlds that often remain hidden from educators" (p. 98); however, it is only a partial mapping.

**Affordances of the Activity System Model**

Collectively, the studies reviewed here reveal affordances of Activity Theory and Engeström's (1999) activity system as a framework for understanding what it means to write and be an author in U.S. academic contexts. Researchers engaged the activity system model to explain contradictions between actors and components among multiple systems (Fujioka, 2014; Wardle, 2004); to understand the complexity of contexts in which activities, like writing, take place (Prior & Shipka, 2003; Shipka, 2011); and to conceptualize how activity systems, and the subjects within them, are already always connected and moving among multiple systems (Fraiberg & Cui, 2016). Only Fraiberg & Cui (2016) and Fujioka (2014) explicitly studied the work of multilingual international students, and only Fujioka (2014) attends to explicitly academic writing of a single multilingual international student. None of these studies used direct observation of the work of writing in action to analyze what is happening in the moments of connection between systems. Access to and use of multiple languages in multiple cultural spaces afforded by digital technology is not fully addressed in any of the reviewed literature. However, the literature does confirm the potential of the inherently dynamic activity system to describe the

continuous movement between languages and digital tools that is possible in writing activity in multilingual digital composing.

In these studies, well-delineated groups, such as disciplinary systems, are defined as activity systems and serve as the focus of analysis, and writing technologies play an important role. In Russell (1997) and Wardle (2003), disciplines were considered activity systems; in Kain and Wardle (2005) businesses were conceptualized as "real world" instantiations of disciplines and therefore activity systems. Prior (1998), Prior and Shipka (2003), and Shipka (2014) drew on sociocultural theory more broadly to develop theories of disciplinarity and writing that explain situated literacy in terms of mediated action and authorship. Fujioka (2014) explicitly adapted Engeström's (1999) model to individuals taking a specific graduate course to explain multi-directional learning. Fraiberg and Cui (2016) studied international Chinese students as a group of individual "knotworkers" using networked writing to form continually shifting and deeply collaborative relationships. Disciplinary conventions are recognized and serve to focus analysis (Fujioka, 2014; Li & Kim, 2016; Nishino & Atkinson, 2015; Prior, 1998). In doing so, Fraiberg and Cui (2016) raised a question closely related to the present study: does collaborative activity mediated by writing technologies "extend into writing classrooms, and, if so, how might this challenge traditional conceptions of the autonomous author governing much of writing instruction?" (p. 99). The research reviewed considers acts of academic writing but not as the activity that organizes the system. In this study, focus is on the activity of academic writing and academic authorship as the organizing system that forms around the goal-oriented activity of completing academic essays.

**Academic Authorship: An Activity System**

As Robillard and Fortune (2016) contended, authorship is contested when there is dissensus on what it means to write and what it means to be an author. Authorship in academic spaces is such a site of disagreement as the continued influence of copyright and traditional, western ideas of authorship limit imagination of how and where the work of academic writing gets done, even as transnational movements and emerging writing technologies have significantly changed the ways in which texts are defined, written, distributed, and consumed. Contemporary writing activity research challenges traditional authorship, primarily by presenting a rich array of possibilities of what counts as writing, including short form writing and writing negotiated not just between people, but among genres, technologies, and the physical and digital environments. Contemporary writing activity studies also reveal some ways in which the activity of writing crosses institutional and geographic borders, devices (from smartphone to laptop), applications (from Facebook to e-mail to word processor), and networks. Writing is dispersed temporally and spatially. What these negotiations mean for academic writing and novice academic writers remains unsettled and unexplained. A first step is to more closely observe such negotiations as they occur in the activity of academic writing. To analyze and understand such activities, a dynamic framework is needed, then, that provides a way to consider academic writing as a macro activity with cultural motivation as well as a micro and mundane activity where tools, rules, divisions of labor, and communities mediate the objective of writing. Framing academic authorship as an activity system and using its explanatory power to describe more closely what multilingual international student writers do may uncover ruptures and revolutions within the system of academic authorship that could lead to deeper understanding of what it means to write and be an academic author.

This framework opens up the possibility of considering novice academic writers as "knotworkers" actively creating their own "knots" or sites of writing that are richly collaborative, interactive, dispersed, pulsating, and dynamic. Using the framework draws attention to broad categories that work within these "knots" to shape the activity. But, as Engeström (2015) explained, the activity is always shaped by its constituents, and, in fact, Activity Theory has always been conceived of as a transformative approach to research. He wrote that Vygotsky was concerned with both internalization or how artifacts mediate thinking as well as "how children *created* artifacts of their own to facilitate their performance" (Engeström, 2015, p. 26). In paying attention to both the macro and micro sites and activities of writing that are dispersed spatially and temporally but that can occur in vertical and horizontal alignment, there is potential for more fully describing both the ways in which the various writing technologies, rules, communities, and motives collectively mediate academic authorship as well as determining what might be inserted into the system to transform it and to recognize existing transformation by writers as subjects who have long been considered at the periphery of academic writing.

CHAPTER III

METHODOLOGY

This study contributes to understanding 21st century writing process by examining how novice multilingual writers use digital technologies in their "natural" digital environments and how those technologies mediate writing activities. This examination required a way to observe writers at work in their natural digital environments and to develop a method of analysis to understand the actions they take and the decisions they make. Researching writing processes has always presented challenges. Writing happens in public and private places at all times during the day, making direct observation of writing activities difficult. Asking writers to recall what they do as they write only provides a partial glimpse into writing processes. Writers may be unaware of or unable to accurately remember what they do as they write. The growing range of technologies available to writers for academic writing further reduces the effectiveness of asking writers to recall their decisions.

Writers might not have the language to describe the full range of activities taking place as they write or recognize the technologies they rely on to complete them. Technologies become less visible as writers habituate to them. At the same time, the changing conditions of writing demand examination by researchers. To meet the demand, a second purpose of this study was to test a methodology that merges proven approaches to researching composing processes with the affordances of emerging technologies to capture writer activities in real time. More specifically, this study employed a novel method of observation to explore what four multilingual international novice academic writers who come from China to study at a U.S. university did and experienced as they engaged in the activity of academic writing in a multilingual, digital environment that they had a hand in shaping.

To observe the actions of academic authorship as they happen, I asked the writers in this study to record work on one draft of one essay with Screencast-o-matic, an inexpensive, easy-to-use video screen capture program that is able to record long stretches of writing activity as it unfolds across digital computer screens. I also requested writers to provide screenshots of writing activities on their smartphones, and I conducted in-depth interviews where videos and screenshots were used to stimulate recall of writing work to trace, contextualize, and interpret actions and decisions of writing. Activity Theory was used as the initial heuristic to describe writers' recorded activities. Describing academic authorship as an activity system brought into focus the tools and the objects/motives/outcomes and their mediational relationship to each other, and to other activity systems to which academic authorship is connected. The categories of Activity Theory help define the phenomenon under investigation and provide a framework for description and analysis of collected data. At the same time, using Activity Theory in this way tests its explanatory power for future analysis of writing as a multilingual digital activity. A consideration of findings through a rhetorical transnational lens (Leonard, 2014) suggests ways to use an enriched understanding of multilingual, digital writing processes to re-orient how academic authorship is taught in FYC.

This study was guided by the following research questions:

1. What digital tools mediate academic work by novice multilingual international student writers? What acts of composing are mediated by these digital tools?

2. How do digital tools facilitate multilingual international student writers' use of linguistic and cultural knowledge in composing academic work? What might student writers' use of digital tools mean for notions of academic authorship?

This chapter provides a description of and rationale for a methodology designed to gain access to

previously hidden writing activities in order to answer these questions. Writers were selected to participate in the study who had access to their own digital devices for writing and had a level of confidence in their ability to use digital devices for writing. Writers' individual digital writing environments were closely examined; the videos of their activities were reduced to meaningful sequences of acts of composing with digital tools, analyzed using Activity Theory, and then considered within a transnational framework. Ethical considerations, trustworthiness, and potential limitations guided the study throughout.

## Rationale for Research Design

In qualitative research, data collection often requires multiple, interconnected methods (Marshall & Rossman, 2011); hybrid genres and methodologies are recognized as frequently necessary in writing studies (Kirsch, 2012). The present research examining student writer processes and students use of tools and languages to address the rhetorical situation of academic authorship is one such project that required multiple research methods. Digital observations were combined with process tracing interviews to collect and interpret data within the framework of Activity Theory to enrich description and interpretation of the acts of composing of multilingual international students in their "natural" multilingual, digital environment.

Writing as an experienced, mediated activity, as it occurs within its natural context, is more richly understood by both observation of how writers use language and other digital tools as they create texts as well as description of the writer's motives for the activity and their perceptions of what is happening during the activity. Composing process research, which has historically attempted to capture "key details of composing by using methods that rely on recall and/or observation of key moments, sometimes controlled by the researcher" (Hart-Davidson, 2007, p. 155), provides some methods to describe the actions taken and tools used by writers and

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some of the ways those tools mediate the texts produced. Methods include controlled observation

in lab-like settings where writers think aloud about their decisions while writing (Emig, 1971;

Flower & Hayes, 1981); video recordings of the spaces in and the digital screens on which

writers compose (Geisler & Slattery, 2007; Takayoshi, 2015, 2016); time use diaries (Hart-

Davidson, 2007); experience sampling methods (Addison, 2007; Pigg, 2014); and process-

tracing interviews (Roozen, 2010) and drawings (Prior & Shipka, 2003). Composing process

researchers frequently combine methods (Hart-Davidson, 2007) in an attempt to capture the rich

and complex activities of writing.

While these methods have added much to our understanding of writing processes, they do

not provide full access to 21$^{st}$ century writing activities. The "distributed, collaborative, and

mediated nature of composing processes" (Hart-Davidson, 2007, p. 153) makes capturing

everything that happens between the time a writing situation presents itself (such as being

assigned an academic assignment) and when the situation concludes (such as submitting an

academic assignment for a grade) nearly impossible. Composing process research looks for "key

details of composing by using methods that rely on recall and/or observation of key moments,

sometimes controlled by the researcher" (Hart-Davidson, 2007, p. 155), with the goal of

capturing as much of the process as possible. What writers do and how writing actions mediate

and are mediated by the digital devices and applications that appear in the digital writing

environment might not be activities that writers would think to recount in retrospective

interviews. For instance, technologies are theorized to "work best when they are invisible"

(Takayoshi, 2016, p. 7) so that "writers working fluently do not usually notice the role that

technology plays in their moment-by-moment practices unless the technologies cause

breakdowns" (Hart-Davidson, 2007, p. 159). Retrospective surveys and interviews alone only

capture a limited range of writing actions.

Video screen capture has been used in a few studies, but that use has been limited and has not yet reached its full potential in writing activity research. This study uses Screencast-o-matic, an inexpensive, easy-to-use video screen capture application. Writers can record their work at any time or place in which it occurs, even if that work is in the middle of the night, in coffee shops, or in their bedroom. They also have control over what they record. Using this out-of-the-box software designed for use by non-experts requires little technical expertise. Also, the software is minimally intrusive. Once writers begin recording, they can work for hours without having to do any further action to take part in the study. Screenshots of writing activities on their smartphones supplement the videos, and interviews before and after the activity of writing invite study participants to recall, explain, and reflect on their writing process and relationship to and use of digital writing technologies. Interviews provide insight into the rich array of actions observed through the videos.

Writing, when understood as part of the activity system of academic authorship, is both individual and social, constituent of concrete moments that emerge over time. Much of the 21st century writing process occurs in digital spaces. Video screen capture provides the most complete access to date of writing activities occurring in the digital writing environment over time. Activity Theory, in turn, provides a way of conceptualizing academic authorship as a system in which individuals, communities, rules, labors, and tools relate to each other across time and contexts in ways that mediate the objects, motives, and outcomes of activities that form and define work in the university context. Activity Theory comes out of the sociocultural theoretical tradition asserting that "human activities take place in cultural contexts, are mediated by language and other symbol systems, and can be best understood when investigated in their

historical development" (John-Steiner & Mahn, 2012, p. 191). Sociocultural phenomena, like academic authorship, evolve over time; qualitative research's inductive approach and flexibility to adapt research design as data emerges can help "discover the meaning" (Englander, 2012, p. 16) as it unfolds. The purpose of conceptualizing human behavior within the activity system model developed by Engeström (1999) is to "explicate the components and internal relations" (p. 30) of the system in order to better understand the system and how humans act within and change it. Together, video screen capture, screenshots of smartphone activities, and interviews provide access to digitally-mediated writing activities over time. Activity Theory provides the framework to begin description of what multilingual international student writers' activities mean for understanding academic authorship as it has evolved in the 21st century. Applying a transnational lens (Leonard, 2014) to writers' activities and considering their work as rhetorical transliteracy draws attention to the ways in which writers use computer screens as a testing ground to organize and control new-to-them linguistic and cultural knowledge. This in turn suggestions the need to re-orient FYC as a transliterate, transnational enterprise.

## Overview of Research Design

This study brings into focus the digital writing environment and the digital tools that mediate the academic writing of the four multilingual international student writers who participated. Digital observation using video screen capture technology is the primary method of data collection supplemented by screenshots provided by participants of writing activities on smartphones and interviews before and after video recordings to provide additional information about the writing activities unfolding on digital writing screens. Important elements of the research design include: participant identification and recruitment, orientation of participants to the study procedures and adaptation of methods to align with each participants individual digital

writing environment and writing schedule for the term, introduction to participants, explanation of data collection procedures, description of raw data elicited by procedures, and an account of analytical method developed to reduce data into manageable segments. An activity system framework offers a way to conceptualize, analyze, and interpret how writers as subjects shape and are shaped by the connected, mediating tools, rules, community, divisions of labor, and motives of academic authorship. This framework provides a way to examine and account for "ruptures" and possible places for transformation as multiple activity systems come into play at once during the activity of academic writing (Engeström, 2015).

**Selecting Study Participants**

Participants were sought who could provide the right kind of information (Marshall & Rossman, 2011; Patton, 1990) because their experiences and actions "construct" them as novice academic writers who "operationalize" writing within a digital, multilingual academic authorship activity system. Novice academic writers are defined as student writers who have some but not extensive experience writing within a university. Academic writing, for the purposes of this study, is defined as an essay, lab report, or other document that engages writers in an academic project with a recognizable form or genre. The purpose of academic writing should be understood as an act of inquiry or knowledge-making responding to questions at issue within an academic community. Academic community is defined by the discipline of the class for which the project is written. Because this study is interested in what novice academic writers do and experience in a multilingual, digital environment, *information rich cases* are understood as those in which students are composing academic writing assignments using digital devices and applications and in which multiple languages come into play.

**Study context.** The study site is a large public research university in the Pacific

Northwest with an enrollment of approximately 24,000 students, about 20,000 of them

undergraduates. About 14% of incoming first year students in 2016/2017 was comprised of

international students, the majority of which come from China and speak and write in English as

an additional language. These international students join student writers from diverse linguistic

and literacy backgrounds; about 51% of students are residents of the institution's home state

(University of X International Affairs, 2015). All students at University of X are required to

complete two-terms of FYC. International students who are admitted to the university with

TOEFL scores at 87 or below are also required to complete a three-term sequence of Academic

Writing for International Students (AEIS) courses.

In their writing classes, students at University of X write primarily "traditional" essays

that are logo-centric and print-based; that is, students compose primarily in words using MLA or

APA formatting. Further, the genre in which students write in this context is unusual. Students

are taught to develop enthymemes which then are understood to guide the "shape" of their essays

(Gage, 2005). Neither the FYC or AEIS program requires or provides training related to

technology and writing, although a small number of writing teachers are beginning to be

involved in the university's emerging Digital Humanities effort. The FYC program manual at the

time in which study participants were enrolled in FYC suggests that these are the technology

policies:

- "Since this is not a lecture course, personal computers are not necessary for note-taking
  and should not be used during class time;"

- "Personal computers may be used for note-taking only if notes are emailed to me at [ux.edu address] at the end of each class period" (University of X Composition Program, n.d.).

These policies discourage students from using personal technology in the classroom. In AEIS classes, the general policy is that students are told not to use translators as they write. Other policies regarding technology use are at the discretion of individual teachers. Students enrolled at the university can download Microsoft Word at no additional costs; they typically access their writing course information through the digital course management system. Very few sections of introductory writing courses are conducted in a computer classroom.

**Identifying potential participants.** Given the relative inattention to writing technologies in the policies, training, and curriculum in required introductory writing classes at the study site, student writer use of digital tools in writing can be understood as primarily self-sponsored. All student writers at the study site use digital technology in completing their writing assignments. However, those with higher confidence in using technology and who used their own computers instead of devices in computer labs on campus were sought for the study to provide a potentially wider range of answers to the first research question about the types of digital tools used in writing. Additionally, multilingual international students were sought for their potential to provide information about the second research question, which seeks to examine the mediating relationship of digital tools with linguistic and cultural knowledge in academic writing.

To identify potential participants, a Qualtrics survey (See Appendix A) was distributed to about 2,500 students enrolled in required undergraduate writing classes through e-mail during Winter Term 2017. The primary purpose of the simple descriptive "one-shot survey" (Mertens, 2010, p. 177) was to identify participants who were somewhat confident using digital technology

for writing, who had access to their own device for writing, who were multilingual, and who were enrolled in a course requiring academic writing. Students answered questions about their experience with digital technologies while writing academic essays; their confidence levels with technology for a variety of purposes; the type of technologies they use in academic writing, including non-digital technologies like pen and paper, their importance, and how they are used; adaptations made to technologies; the environment in which they write; and policies related to technology in their classes. Basic demographic information was also asked, including year in school and language background. Participants were also asked to report the length of a typical writing session. Responses provided a snapshot of the digital writing environment and informed development of the questions asked in the initial interview.

**Refining the sample.** Fifteen students were invited to an initial, hour-long introductory interview, and nine responded. During this session, participants were asked to bring laptops, smartphones, and other portable devices they use in writing. The interview served two primary purposes: to ensure that the writers met the requirements of the study in order to provide information to answer the study's questions and to orient participants to Screencast-o-matic and other technology they would be using to complete the study. During the meeting, writers were asked about their general relationship to writing and writing technologies to "understand the world from the subject's point of view and to unfold the meaning of their lived world" (Kvale, 2006, p. 418) and to give a "tour" of digital devices (DePew, 2011) used to work on academic essays. Writers were also given an overview of the technologies they would be asked to use to record writing activities of one draft of one essay. Questions were adapted based on each individual participant's survey responses (see Appendix B) and designed to define with participants what constitutes "writing activity" for them and to begin gathering information about

digital tools used by the participants in academic writing. Asking ahead of time where, when, on what devices, and in which applications academic writing might take place for each participant determined whether the identified method of using a combination of video screen capture through Screencast-o-matic and screenshots of mobile devices would adequately record significant portions of the participant's writing activity. For example, at the time of the study, there was no reliable way to make video recordings of activity on the screens of iPhones. A writer whose primary writing screen is an iPhone would not be able to provide adequate information for the study.

Initial interviews also included "talk time" to build trust with participating writers so they would feel comfortable recording their screens during the writing process. Orientation to the methodology also invited participating writers to make suggestions for how to best and most completely capture their writing activities as a way to "foster interactive, collaborative, reciprocal, mutually beneficial, nonhierarchical relations with research participants" (Kirsch, 2012, p. xxi).

Informed consent, including permission to record interviews, was obtained at the beginning of the meeting. Interviews were recorded and transcribed as accurately as possible in order to add to data collected through digital observations and follow-up interviews. A central question of the study was to find out more about the kinds of digital tools that come into play as writers work on academic writing. In answering interview questions, writers began to reveal some of the digital tools they had used for writing prior to participating in the study. They also provided information about their relationship to academic writing and technology. This background information later was used to enrich interpretations of writing activities recorded using video screen capture.

**The final four.** Of the nine potential participants invited to the introductory meeting, two did not use multiple languages when writing, and three did not complete the study. Four writers completed the full study and will be identified throughout the study by pseudonyms: Rong, Ye, Jun, and Zhen. Although participants were sought from a large pool of potential participants, all four participants who finished the study had previously taken one of my FYC courses. Because the study required students to share recordings of writing, which is usually a solitary and "hidden" experience, familiarity with the researcher may have increased the likelihood that my former students would be more likely to volunteer to record their writing activities. In addition, my courses are for international students and are filled primarily with students from China. I teach a high proportion of students who meet all criteria. As described in Table 1, all participating writers in the study were international students from China writing in English as their second language.

Table 1

*Summary of Participant Characteristics*

|  | Sex | School year | First Language | Major | Assignment Recorded | Devices Used in Writing | Select Applications Mentioned |
|---|---|---|---|---|---|---|---|
| Rong | F | 2 | Chinese | Education | Argument Essay on film and racial tropes | personal laptop (PC); iPhone | Pendo, Grammarly, Iciba |
| Ye | M | 3 | Chinese | Computer Science | Research Proposal on computer databases | personal laptop (Mac), desktop (Mac), iPhone | YouDao, Grammarly, Quora, Zhihua, QQ, Baidu |
| Jun | F | 2 | Chinese | Accounting | Semiotic Analysis of *Lord of the Flies* | personal laptop (PC); iPhone | Baidu, YouDao, Zhihua |
| Zhen | M | 3 | Chinese | Economics | Argument Essay on campus proposal | desktop (PC); iPhone | YouDao, Baidu |

Rong, Jun, and Zhen were enrolled in the second of the two-course FYC sequence at the study site. Ye was enrolled in two courses that required academic writing: an art appreciation course and an upper-division computer science course. Zhen and Jun were in their second year at the university, and Rong and Ye were in their third year. Rong, Jun, and Zhen all recorded writing for the second of the two required writing courses. Individual instructors have some freedom in what kind of writing they assign. Rong recorded her work on an argument essay about racial tropes in film; Jun recorded a semiotic analysis of the film *Lord of the Flies*; and Zhen recorded work on a proposal for how undergraduates could be included in the creation of a new science research center on campus. Ye, who was writing for an upper-division computer class, recorded work on a proposal to conduct a study on two kinds of computer databases.

The writers in this study used both PC and Mac computers. All used iPhones, which, at the time of the study, did not support any known method of video screen recording. Rong, Ye, and Jun brought their laptops, and Ye reported also using a desktop computer to write. Zhen did not bring his laptop to the meeting, explaining that he uses his desktop computer for writing and his laptop computer for gaming only. As they talked about their experience and relationship to writing and technology, writers mentioned several specific applications, including translation applications based in China. Ye, Jun, and Zhen used YouDao, and Rong used ICIBA for translation. All mentioned the Chinese-based search engine Baidu. Other applications that were mentioned included social media sites for asking and answering questions such as Quora (Ye), Zhihua (Ye, Jun), and Grammarly (Ye, and Rong). Grammarly is an application with both free and fee-based functions that provides grammar suggestions. The initial meeting was also used to better understand each participant's relationship to writing. In the following subsections, each participant is introduced in more depth to explain their relationship to writing and the

technologies they mentioned. This provides necessary context to better understand writers' observed writing processes.

*Rong*. Rong spent a year studying law at a university in China before moving to University X to study education in 2015. Rong recorded work on a six-page essay connected to *Between the World And Me* by Ta-Nehisi Coates, the campus common read, for the second class in the required two-course FYC sequence. The six-page, 2,000-word essay assigned students to make a connection to and argument about Coates' book. Because she studied race and film in an education studies class she took the same term as her writing class, Rong focused on common tropes of racism in films: "since we talk about the common trope in educational class, I think this is the best way to show how the films effect the public." Rong explained that she always tries to connect the work in all of her classes to her work in education, because that is her major and interest.

> Rong described why she prefers to do most of her writing on a laptop:
>
> Since the document is empty and I enjoy the feeling to fill the whole screen. … So maybe sometime I get some inspiration just for I don't know suddenly… you can think more as your writing goes on, so even though sometimes I cannot think of three or four reasons but I just have one or two I don't worry about that because as I'm writing I can think of more. … I may enjoy writing.

*Ye*. Ye began study in computer science at University X after three years of study at what he described as a "very famous" university in China. At the time of the study, he was enrolled in a senior-level computer science course on big data issues, and he recorded work on a five-page project proposal. The assignment required him to define an area of study within big data, explain the problem to be discussed, and include several references related to the project. His project

compares relational and graph databases because "in my previous classes, I have never learned other kinds of database except relational database" and in his current class "my professor had mention that graph database can somehow address big data issues, and that's why I choose these two as my research targets." Ye said that he does most of his writing on his desktop at home and only uses his laptop when he is unable to get his writing done at home. He was concerned about being distracted by social media and other applications on his laptop. For him, the first hour of writing can set the tone for an entire work session. He said:

> If in the first one hours, you're just like, 'oh, I have lots of time, it's still like after a
> week, I have lots of time to get that down, and it's not in hurry, I click some websites and
> find, oh, there is an interesting reading.' If you do that thing in the first one hour, it will
> ruin you, the following hours for you.

*Jun*. Jun had studied accounting for two years at University X at the time of the study. She recorded work on a 2,000-word essay in which students were to "choose a specific piece of visual media (for example, a film, TV show, or music video) on which to conduct a semiotic analysis." accounting. Outside sources are not required and are limited to three. Jun wrote about morality in the 1963 version of *Lord of the Flies* because

> I just check online and check the theme of *Lord of the Flies* and I saw some people talk
> about morality. I just type in a question about morality and *Lord of the Flies* and some
> people say morality is something society set it up on us so I think it's pretty good.

Jun explained she chose to write about the film because she had seen and written about it for a high school English class in China. Jun compared writing to squeezing the last bit of toothpaste out of the tube. She said the Internet is an important place for her to "grab the information from

them and then I can come up with my idea." She continued, "I can read their thoughts and then explain with my own words" and "so I can get some thought for myself."

*Zhen*. Zhen was in his third year of study in economics at University X at the time of the study. Like Rong and Jun, Zhen was enrolled in the second term writing class. The essay he recorded for the study asked students to synthesize three articles posted on the university web site about an initiative to build a "new science campus," identify an issue facing undergraduates related to the project, to make a case for the issue to be examined, and then to end with a thesis about the identified issue. Zhen said, "I don't think this essay is easy because I have no ideas." His writing group in class chose to focus on food on the new campus. Zhen said that he does most of his writing on a computer, but that he does not like to spend too much time working on his computer and that he tries to limit his writing session. He said,

> I have a friend who is taking the 122 writing class this term. I saw that he was writing essays from 7 pm to the 2 a.m. That's so much time. I think it's a waste of time. If I spend so long, I can't stay in front of the computer to write.

Zhen said that he prefers to write in solitude without texting his friends because "I think that their thoughts will affect my idea…and I want my ideas individual."

**Digital Observation of Writing Activity**

To gain better access to natural digital writing environments and to gain insight into how digital tools mediate writing activities, this study combines video recordings of participants primary writing screens, screenshots of secondary writing screens, and stimulated recall interviews about observed moments where the affordances of digital tools come into play. Participants were given instructions (See Appendix C) to launch and use Screencast-o-matic, a web-based, fee-for-service video screen recorder, or Quicktime, an application that comes

standard on Apple devices when they sat down to their computer to work on an essay that they

had agreed to record for the study. Participants were asked to use video capture software to

record all activities that occurred on their laptop or computer screens during each writing session

they engaged in for an academic writing assignment they identified. Participants were advised to

monitor their computer for slowing and reduced functionality. Both of the applications can

record indefinitely, but as the videos become longer, they take up more space on the computer. If

participants noticed their computer was slowing down, they were advised to end the recording,

upload it to their university OneDrive account or a flash drive, and begin recording again.

**Process tracing or recall interviews.** To better understand writing activities recorded, I

interviewed participants for 60-90 minutes within three to 10 days of their submission of

recorded videos. During the interview, participants were asked to speak more about their

experience using video screen capture and its perceived effect on their writing process; the

physical setting of composing and other details not captured on the screen; and other artifacts

(books, notes, drafts) and people (teachers, friends, tutors) who were part of the writing process.

Then, using the method of process tracing in which memories of the composing process are

stimulated by artifacts from writing (Roozen, 2010), participants watched selected moments

from their own recordings and were asked to describe what they noticed themselves doing.

Sections of video selected for viewing included moments when participants visited used tools,

such as search engines and dictionary/translators, based in both the United States and China and

displaying information in both Chinese and English, opened documents from other classes

(including previous assignments they had written), paused while writing, engaged in significant

revision of a section of their text, and used applications such as QQ and email to communicate

with others while they wrote. Participants were also asked about patterns of composing that they

noticed during the initial viewing and to provide explanation and rough translation of what they typed and read in Chinese during some moments of composing.

Each interview helped shape the next interview as topic areas repeated among participants. Three main topic areas emerged during the interviews: idea development using online searches, word choice using a combination of translation applications and online searches, and the participant's own previous writing. The relatively informal nature of the interviews allowed for development of conversation about participants' essay topics.

**Description of Data**

Collectively, participants recorded 20 hours and 51 minutes of recordings. Orientation and follow-up interviews provided an additional two to five hours of discussion with each participant about the writing activities recorded. Screenshots from smartphones supplement the data set. The multiple activities that comprise the work of writing visibly come together in the recordings. The videos, supplemented by the interviews and screenshots, reveal more than previously possible about how writers make choices about words and ideas and what tools they use to help solve the ongoing problems occurring during writing. As they used multiple digital tools, the writers in this study acted on word choices and ideas as they constructed their texts. In addition, background information was revealed through the videos. The applications used for recording in this study also include sound, allowing background noise, such as conversations and music, to be heard during work sessions. Videos can be watched repeatedly in real time, slowed down, or sped up. Screenshots of individual moments can be extracted from the videos for further analysis.

Together, the data collected using this method reveals new insight about macro-, meso-, and micro-level writing activities. On a macro level, the data show on what devices participants

write, which applications they use, how long they spend on the devices to complete a draft, and where and when writers perform the work of putting an academic essay together. At the other end of the spectrum, the videos offer the possibility of analysis of the most-minute processes. For example, an analysis based on writers' individual keystrokes would be possible. The videos also showed the writers in this study engaging in sequences of planning, exploring, testing, and searching across multiple applications on the recorded screen that culminate in the work of producing an academic essay. This meso-level of writing activities is more closely interpreted and analyzed to answer the guiding questions of this study about the digital tools used by writers and the ways in which those tools mediate writing and allow writers to draw on linguistic and cultural knowledge.

**The bigger picture.** The macro activities of the writers in this study include the type and topic of the writing recorded by each participant; the length of recorded writing session, location, time, and date of recording; the portion of the screen recorded; and applications used.

Participants wrote in Starbucks, the library, and classrooms at all times of day. Rong submitted six hours and 54 minutes of work on an article summary and an argument essay about U.S. racism and racial tropes in U.S. films; Ye submitted four hours and 30 minutes of work on a research proposal about computer databases; Jun submitted seven hours and 45 minutes of work on an argument essay based on a semiotic analysis of *Lord of the Flies*; and Zhen submitted one hour and 41 minutes of work on an argument essay about the role of undergraduates in a new campus science initiative. Ye and Jun recorded their full screen from corner to corner. Zhen and Rong did not maximize the recording application, so that they recorded all but the top menu bar where time and date is typically located and the bottom of the screen which shows which applications are available and open. For this reason, I could not determine the exact times all

recordings were made. Videos made by Ye and Jun show time and date.

Most recordings happened in the same day in single work sessions with some breaks. Ye's sessions for his proposal assignment occurred over multiple days; he reported that one session happened while he was in class. Jun reported pausing the recording while she took breaks, even though she was instructed to keep the recorder on. Rong reported that she took only short breaks while recording; Zhen reported that he did not take breaks and planned his writing session for two hours. In videos recorded without the full screen, there is no way to tell beyond participant's report about breaks or the duration between recordings. The software allows pausing in recording without stopping a session and publishing.

Participants were informed that they could pause or quit recording at any time during the session. Rong reported that she paused her recording when friends stopped by her spot in the library. Ye reported that he did not stop recording except to save and upload videos. Jun recorded a work session that spanned the course of an entire night. She reported that some of the long pauses with no activity on the screen were moments when she fell asleep. She also reported doing some work that she did not record because she forgot to turn the recorder back on after stopping to save and upload video segments. Zhen reported that he recorded straight through his relatively brief work session, pausing only to save and upload videos. Table 2 below summarizes these activities and provides closer look at the specific applications used by each writer.

Table 2

*Chart Summarizing Macro-Level Writing Activities*

| | Assignment(s) recorded | Number + length of recordings | Essay Topic | Locations Recorded | Time of Day Recorded | Full or Partial Screen | Applications Used |
|---|---|---|---|---|---|---|---|
| Rong | Article summary (AS), argument essay (AE) | AS: 2 recordings=24 min<br><br>AE: 4 recordings= 4 hrs 30 min | U.S. racism, racial tropes in U.S. films | library, apartment | early evening to midnight | partial | Word, Google, Google Translate, ICIBA (translator), Ozdic (collocator), Canvas, email, Wikipedia |
| Ye | Research Proposal (RP) | RP: 3 recordings=4 hrs 30 min | computer databases | apartment, computer class | various, after 8 p.m., during class | full | Word, Google, library database, YouDao, email, QQ (Chinese social media), Wikipedia |
| Jun | Argument Essay (AE) | AE: 6 recordings=7 hrs, 45 min | semiotic analysis of *Lord of the Flies* | Starbucks, apartment, library | from 8 p.m. to 8 a.m. (over the course of one night) | full | Word, Google, Baidu, Canvas, Goodreads, eNotes, Wikipedia |
| Zhen | Argument essay (AE) | AE: 7 recordings=1 hr 41 min | science campus | apartment | 5 – 7 p.m. – before dinner | partial | Word, Google, Baidu, YouDao, Canvas |

**A more detailed look at digital tools.** The videos provided a more complete picture of

the digital applications and tools and the languages in which they are used than what individuals

recalled in orientation interviews. In watching the videos, I identified 14 tools used in writing

activities including search engines, databases, dictionaries, translators, communication software

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as well as certain affordances of the Graphical User Interface (GUI). Four of the tools are Chinese-based: Baidu, a search engine of large Chinese web services company; Youdao, a Chinese-based application that study participants used as a both a desktop and mobile dictionary and translation application; ICIBA, an online translator; and QQ, a Chinese instant messaging application that one study participant used to facilitate a group chat. The remaining tools are developed by U.S. companies. Of the 14, Rong, Ye, and Jun used a wider variety of applications than Zhen. All participants used Word, Chrome as their browser, Google, and the GUI affordances of computer screens of windows, clipboards, and cursors. Rong used Google Translate, ICIBA translator, Ozdic to collocate, Canvas, email, and both Chinese and English versions of Wikipedia. Ye used Google, the library database, YouDao translator, email, QQ, and both Chinese and English Wikipedia. Jun used Baidu browser, Canvas, Goodreads, eNotes, and both Chinese and English Wikipedia. Zhen used Baidu, YouDao, and Canvas.

Writers used both Chinese and English in eight of these tools: Google Search, Google Translate, YouDao, ICIBA, Chrome, school email, and QQ. Both languages appeared in another two applications: Word and Baidu. In the case of Word, this is primarily because participants used settings of the word processor that display the rulers and functions of the tool in Chinese. In the case of Baidu, English words appeared in some of the searches, most visibly in searches by Rong for information about U.S. movies. Tools used by participants that are available on the GUI such as presence of windows that can be manipulated, the cursor, and the clipboard that allows copying and pasting across artifacts, also were used across both languages. Only the library database at the study site, Canvas, and Ozdic, an online web page that shows words in English that are frequently grouped together, appeared on the writers' screens with one language. The primary writing screen for each participant was almost always multilingual.

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In addition to recognizable applications, such as Word, Google, and YouDao translator, the videos also showed the ways in which various tools within applications and the GUI came into play during writing activities. For example, writers manipulated the size and number of windows with different documents and applications open on their screen. They used the clipboard, or copy and paste feature, in ways that affected their word choice and word use. They actively used the cursor to assist in reading and reviewing material. In addition, all participants in this study accessed the Internet using Chrome as their browser during their recorded work sessions. Browsers, like Chrome, offer different plug-ins, such as for translations. All of the participants in this study used the English to Chinese extension on Chrome during their recordings.

The writers in this study used similar apps across their devices. Writers had access to the same applications for note taking, web browsing, and translating loaded onto both their smartphones and the laptops and computers that became their primary writing screen when at work on the assignments recorded in this study. The writers in this study primarily used smartphones in early, brainstorming activities, usually in places other than those in which they choose to do the bulk of the work on the writing assignments recorded for this study. Rong, Ye, and Zhen all used translations applications on their laptops and computer for the work of this study. Jun reported that she used her the translation and dictionary applications on her smartphone while doing work on her computer. Rong, Ye, and Zhen all reported that they try to avoid their phones while writing because of the potential distraction.

**Sequences of significance.** To move from observing macro-activities and lists of digital tools to describe more closely 21<sup>st</sup> century writing processes mediated by digital tools and applications required developing a transcription method in which acts of composing come into

relief. The transcripts transformed videos into written documents for coding and analysis. In addition, the act of transcribing the videos was an act of interpretation that works toward better understanding writing activities. I adapted the Activity Theory-based transcription method in Geisler and Slattery (2007) in order to identify sequences of tools, artifacts, and micro-operations working in concert toward identifiable sub-goals within the overall activity under review. "Tools" are understood as "physical objects and systems of symbols (like language, mathematics) that people use to accomplish the activity" (Kain & Wardle, 2005, p. 120). *Artifacts* are objects on the screen that may be used as tools in writing in that they help writers accomplish the activity. Some tools used in writing in digital environments created or made available artifacts for use in writing activities, such as when writers search translators, dictionaries, search engines, or files on their computers. The results were artifacts because they did not directly do work as did tools. The document that writers were working on is also considered an artifact. Tools also created other artifacts used in acts of composing. *Operations* were incremental activity on the screen, such as typing, opening a tool or application, minimizing a window, and copying and pasting text from one artifact to another.

I watched videos several times through and at multiple speeds to refine my written descriptions of the tools, artifacts, and operations and their use in on-screen action. Transcripts contain time codes of videos to facilitate multiple viewings of key sections. Through this process, I began to refine a list of recognizable acts of composing, most often bounded by the writers moving from one application on the screen to another. I used information provided during interviews with participants to check and further refine descriptions of acts of composing. On the transcript (See Appendix F), acts of composing were grouped into sections with still screenshots from the videos. Tools, artifacts, languages used, and apparent purpose were

highlighted in each sequence. Through this process, *acts of composing* came to be written out as sequences of combinations of tools, artifacts, and operations that cumulatively work together to accomplish the goal-oriented activity of writing.

Acts of composing made visible through interview-enriched recordings of participants screens include: manipulating text in Word documents in which essays are composed (including typing, editing, formatting, fixing spelling errors, moving words, phrases, and blocks of texts around); using translators, search engines, and other tools in choosing words and phrases; creating and bringing artifacts into the digital writing environment (assignment guidelines, feedback from instructors, previously written essays, material from other classrooms and cultures); reading artifacts on the screen (scrolling through quickly, moving through with cursor, selecting sections of text); and shaping digital writing environments (resizing, reshaping, bringing artifacts together on the screen, bringing in tools from outside the screen, moving through browser tabs).

**Interpretation and Analysis**

The nature of the digital writing environments in which the participants in this study write gives them access to a wide variety of digital tools in both English and Chinese. The tools allow writers to create and access artifacts from their own personal archives as well as from both China- and U.S.-based web spaces that they then use to support writing activities. To identify repetitions and patterns of digital tool use across participants, I first looked at the frequency of each tool in individual recordings as well as across cases and made note of the acts of composing at play with each tool. To identify tool-mediated acts of composing relevant to the study's research questions, I then made note of linguistic and cultural knowledge used in the acts of composing and the result or problem addressed by each tool/act. I refined this list of relevant acts

of composing with digital tools to the following: manipulating text (typing, revising, formatting), correcting a mistake (wrong word and/or grammatical formation), searching for a better/correct English word or sentence construction, searching for English equivalent of Chinese word or concept, searching for/developing knowledge about new topics or concept about which the writer has not yet fully formed an idea, searching for "evidence" to explicitly integrate (cite) in essay, and searching for genre or assignment information.

I then centered interpretation and analysis on the acts of composing in which writers drew on multiple tools and artifacts in problem-solving oriented sequences of acts of composing. In other words, I looked at places in the recordings where writers used more than one application, tool, or artifact to complete the act of composing. Then, I returned to interviews and reviewed what participants had said about their tool use and challenges in writing and how each writer interpreted similar or the same acts of composing during tracing interviews. Through this process, a pattern emerged of problems or troublesome moments requiring writers to use multiple resources afforded by their digital writing environments. These moments included negotiating words and phrases in both Chinese and English, seeking information about cultural context related to the writing assignment, and trying to understand new academic concepts and ideas.

More specifically, situations in which multiple tools and artifacts are in play on the screen included when a writer recognized a mistake (on their own or through application); when a writer was seeking to translate a word into English for an academic audience; when a writer was uncertain about the idea, topic, concept she was in the process of writing about; when a writer did not feel like they had anything to say about topic; and when a writer did not have the type of written assignment before or was uncertain about requirements. Each problem had a

corresponding act of composing, respectively: searching for a better/correct English word, searching for an English equivalent of a Chinese word or concept, searching for/developing knowledge about new topics or concept about which the writer has not yet fully formed an idea, searching for "evidence" to explicitly integrate (cite) in essay, and searching for genre or assignment information. Specific tools varied by writer and specific instance of the problem, but included use of at least two of the following: Word dictionary and spellcheck, Google Search, Google Translate, YouDao Translate, Baidu Search, Wikipedia (both Chinese and English versions), and various social media platforms (QQ, Quora, Zhihu, Goodreads). See Table 3 below for a summary of the writing problems, the related acts of composing, and a selection of tools writers used in engaging in the identified acts.

Table 3

*Summary of Troublesome Writing Moments*

| Writing "Problem" | Acts of Composing | Some of Tools Used In Act |
|---|---|---|
| writer recognizes a mistake (on own or through application) | searching for better/correct English word | Word, Word dictionary, Google, Ozdic (collocator website), Google Translate |
| writer has a word or phrase in mind in a language other than English | searching for English equivalent of Chinese word or concept | YouDao, ICIBA, Google Translate, Wikipedia (Chinese, English) |
| writer is uncertain about the idea, topic, concept she is in the process of writing about | searching for/developing knowledge about new topics or concept about which the writer has not yet fully formed an idea | Google, Baidu, Wikipedia (Chinese, English), Goodreads, eNotes, writer's own archives |
| writer doesn't feel like they have anything to say about topic | searching for "evidence" to explicitly integrate (cite) in essay | Google, Baidu, library database |
| writer hasn't written assignment before; writer is uncertain about requirements | searching for genre or assignment information | Wikipedia, Google, Baidu, Quora, Zhihu, Canvas, QQ, email |

Each writer in this study had created a digital writing environment in which they could draw on a range of tools, linguistic, and cultural resources all within the same space in which

they are also typing and formatting their academic work. This made the methodology of this study especially revealing of the writing activities of these particular writers. Chapter IV provides an in-depth look at study participants' primary writing screens to illustrate their ongoing curation of the tools and artifacts in a dynamic digital writing environment. Continual shaping of the digital writing environment is a crucial component of writers' process. The findings illustrate that curation of digital writing environments allowed writers to use Chinese and English, access information and artifacts from both Chinese and English web domains, and create new artifacts that supported their rhetorical movement into academic writing. The chapter also presents in detail illustrative moments in which participants used combinations of multiple language, tools, and applications on the primary screen of their digital writing environment to address problems or troublesome moments in writing.

**Significance of Findings**

To consider how the tool-mediated, digital, multilingual writing activities of participants might problematize notions of academic authorship, I used a series of Analytic Questions (See Appendix E) to examine troublesome moments and the languages, tools, and applications used in the acts of composing addressing such moments. I also considered the findings using a transnational lens. A discussion from this analysis follows in Chapter V and explains the implications of both the study's methodology and participants' revealed writing activities for understanding academic authorship in the multilingual, digital age. Tentative conclusions suggest next steps for researchers, teachers, and writing program administrators.

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**Ethical Considerations**

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Research that involves human participants is ethically responsible for protecting and informing them of potential risks of study involvement (Marshall & Rossman, 2011; Mertens,

2010). Participants' rights and interests were considered throughout data collection, analysis, and reporting and dissemination of data. Prior to commencing this study, I obtained approval from the institutional review boards at the site of this study and my doctoral granting institution. I used a consent process wherein participants acknowledged that they were informed of and understood potential risks of involvement and the measures taken to protect them from those risks. The primary risk is loss of confidentiality during data collection, analysis, and reporting of study results. Loss of confidentiality poses varying kinds of risks. For example, participants were observed engaging in behavior that could be considered plagiarism. In fact, any details about what a participant did during writing could have impacted how the text was received by their instructor. For this reason, care was taken to ensure that instructors did not know that their students participated in the study. All data gathered was and is stored securely. No data was shared in any way beyond the researcher prior to participants finishing the classes for which they recorded assignments. Any data shared beyond the researcher has been stripped of identifying features.

I also wanted to ensure that my participants understood my role as a researcher, as a subject within the activity system of academic authorship, and as a possible colleague of the instructor for whom they are writing the assignment that will be studied. I discussed this with each participant throughout the process. I was also mindful that unanticipated ethical issues could have arisen, especially as this study employs relatively new multimodal observation methods. I continued to reflect on ethical concerns during all phases of the study (Guillemin & Gillam, 2004) and will continue to do so. Participants were made aware that they could contact me with any concerns or questions about the study during or after its course. Participants could opt out at any time with no deleterious effects.

## Trustworthiness

Trustworthiness of qualitative research is demonstrated by explicit and careful documentation of study design (Smagorinsky, 2008) to show the study's credibility, dependability, confirmability, and transferability (Anfara, Brown, & Mangione, 2002; Mertens, 2010). To demonstrate my credibility as a researcher, I described and reflected on my position as a subject within the activity system of academic authorship at the site of this study and as a writer and a teacher of writing students in my dissertation journal throughout the course of the study, including during transcription (Tilley, 2003). In interviewing participants after they had recorded their writing, the study had a built-in member check. Additional emails were sent to participants to give them the opportunity to confirm, deny, and/or clarify descriptions of their actions in the study. I also had frequent discussions with other writing teachers at the study site and researchers at conferences where I shared transcripts, initial findings, and my methodology to request feedback and to check my assumptions. I recorded and reflected on such conversations in my dissertation journal. The affordances and constraints of study design have been reported throughout this study to address dependability. All study materials that have been stripped of identifying features to preserve participant confidentiality are available for review and use by other researchers to confirm the "logic" of the study (Mertens, 2010).

Being concise in reporting research methods is important; so, too, is knowing what elements will help other readers recognize, understand, and accept the study's contributions. Working toward this balance is at the heart of transferability. Mertens (2010) noted that the "burden is on the reader to determine the degree of similarity between the study site and the receiving context" (p. 259). Richness of description and adequate context and background of the study allow the reader to make such a judgment. Geertz (1973) explained that "that we call our

data are really our own constructions of other people's constructions of what they and their compatriots are up to" (p. 4). I hope that in reporting data collection and analysis methods in detail has provided the reader with enough information to judge for themselves the trustworthiness of this study and its tentative findings, conclusions, and recommendations.

**Limitations of the Study**

Each decision made during the study puts limits on what can be understood about the study's questions. I have continually sought to recognize and address limits prior to and throughout the study to minimize their impact and accentuate the affordances of qualitative research. For example, this study is limited by its context. International student writer demographics vary across U.S. universities. There are no standard writing curricula in FYC programs (Fulkerson, 2005; Yancey, 2015). The FYC courses at the site of this study use a curriculum based on a book used virtually nowhere else. The researcher, as a member of this academic community and a teacher in the FYC program, had existing relationships with participants and pre-existing ideas about what they do and experience as writers. Initial and ongoing reflection in the form of the dissertation has been the primary method to make visible and address these biases and others that emerge during the course of the study.

A qualitative design also limits the form data takes and the ways in which it addresses the research question. For example, a quantitative approach might provide methods for measuring the number of writing technologies available or a specific effect they might have on a text by looking at a large number of cases. This study focuses instead on the fine-grained experience of a few individuals for an in-depth look at actions and experience. The results presented in this study are limited to the actions and experience to the four writers who completed the study. Smith (2004), in advocating for the value of in-depth investigation of few cases, wrote that individual

cases can reveal "how at the deepest level we share a great deal with a person whose personal circumstances in many ways seem entirely separate and different from our own" (p. 43). The affordances of qualitative research outweighs the limitations.

Another limitation of this research is that I, the researcher, am not fluent in Chinese. All of the participants in this study at times accessed resources in Chinese. I could not read Chinese resources in their original language. I used Google translate and the autotranslation capabilities of Chrome. I also asked students to explain and translate some of the resources they used during our interviews. This did limit my understanding of how writers used the resources. However, I was still able to see how writers moved across resources to test out new linguistic forms and cultural knowledge. Observing movement across resources was sufficient for the purposes of this study. The data collected in this study could be translated and further examined as part of future study.

Data collection methods also pose limitations. Asking writers to use video screen capture to record work on one draft of one essay assignment does capture a significant amount of the work that goes in to a specific writing situation, but the recordings do not capture all of the work that writers engaged in to complete their essays. Defining sessions to be recorded as those where writers are actively working in a document does not account for all of the ways and places that the process of writing (planning, inventing, drafting, revision, discussion) take place. Technology limitations prevented recording of multiple devices in this study. Participants had control of when a work session on writing began, which was after significant work on the project had taken place on the digital screen, in class, and in the everyday life of the writer as they considered and likely talked about their topic or the assignment with peers. But the observations do provide rich, fine-grained detail of one activity within the writing process and provide a starting place to

reconsider how we teach and value the writing of multilingual international students and ask new questions about the work of academic writing more generally.

Similarly, interviews limit the kind and amount of data collected. Building trust is important in an interviewing situation; the researcher must be able to build trust and be able to maneuver the interview in a productive direction without being manipulative (Kvale, 2006). My experience as a former journalist helped to address limits arising during interviewing. I know how to remain flexible and cognizant of helping interviewees feel comfortable revealing their experience and how to make them aware of the consequences of doing so. My experience with international students and my prior relationship to study participants helped me negotiate meaning when during moments of difference in language and cultural backgrounds between interlocutors.

CHAPTER IV

REPORTING OF FINDINGS

A primary purpose of this study was to provide description of the digital technologies available in the multilingual digital age that novice academic writers might use in working on academic essays at U.S. universities and to understand some of the ways in which those tools mediate writing processes. Chapter IV provides an in-depth look at how writers created a dynamic, mediatory testing ground for linguistic forms and cultural knowledge on their computer screens. These individual digital writing environments of each of the four multilingual international students observed in this study reveals some of the ways those created environments facilitate transliterate writing processes and allow writers to move rhetorically into U.S. academic authorship to varying degrees of success.

The first finding that I will describe is that as part of their 21$^{st}$ century writing process, the writers in this study engage in ongoing shaping of their computer screens to facilitate their use as transliterate testing grounds for developing linguistic forms and cultural knowledge. Writers acted with agency to change their writing environments such as by downloading translation applications and managing and storing artifacts such as their past writing. Computer screens, which I also refer to as both transliterate testing grounds and digital writing environments throughout this study, also changed as writers used tools such as Google Translate that operate and change themselves through artificial intelligence and algorithmic-based applications that adapt through writers' use. The second related finding of the study is that the testing ground of the digital writing environment facilitated writers' enacting and development of rhetorical transliteracy to increase their rhetorical mobility. This transliterate testing ground allowed each writer to move across linguistic, rhetorical, cultural, and national boundaries and

access emergent resources in multiple web domains (Chinese and English), and retrieve their own previous rhetorical artifacts for use in academic writing. The artifacts retrieved from the web and the stored files are in both Chinese and English and were created in contrasting rhetorical traditions and situations. The third finding relates to how writers bring these resources to bear on their academic writing. Writers bring together multiple languages, tools, and applications in their digital transliterate testing grounds to acquire in-the-moment, good-enough literacies to work through writing problems. In other words, writers enact rhetorical transliteracy in the testing ground of the computer screen as they organize and exert some control over language and cultural knowledge in the moment to address problems or troublesome moments in writing. These moments or conditions that require participants to access multiple tools include when the writer recognizes a mistake (on their own or through application); has a word or phrase in mind she needs to translate into academic English; and/or is rhetorically uncertain about how to address the idea, topic, or concept she is in the process of writing about.

Digital technologies allow writers to cultivate the kinds of digital transliterate testing grounds that support their rhetorical transliteracy and mobility. Cultivating and curating the testing grounds in which digital technologies can be used should be understood as an ongoing and vital part of 21$^{st}$ century transliterate writing processes. Video screen capture works especially well to reveal the writing activities of the writers in this study because this function records full computer screens. The writers in this study do use multiple digital devices in their transliterate composing process for translation and web search activities. However, they set up their computer screens in such a way as to allow them to engage in the same translation and web search activities on their computers at the same time they are also composing their essays in their

word processing applications. Video screen capture does not record all of their writing processes, but it does record a significant portion, including the ways in which writers use multiple digital tools and artifacts to support their academic writing on their computer screens.

The findings presented here are the result of multiple viewings and transcription of video recordings of participants' primary writing screens during work sessions of one draft of one essay assignment. Video transcription was in itself an analytic activity. Rather than imposing a pre-determined list of available acts of composing onto what was happening in the recordings, I followed the guidelines in Slattery and Geisler (2007) to look for "constellations of operations, tools, and artifacts that usually show up across multiple frames" (p. 196) to identify acts of composing. A few definitions are in order here before I proceed in describing the findings. *Tools* are understood as "physical objects and systems of symbols (like language, mathematics) that people use to accomplish the activity" (Kain & Wardle, 2005, p. 120). Digital tools, for the purposes of this study, are objects through which writers perform acts on digital screens to add and manipulate text and documents, perform searches for words in dictionaries/translators, and retrieve objects stored in files on their computer or in internet spaces, among other actions

Digital *artifacts* are different than tools. They are objects on the screen that may be used as tools in writing in that artifacts help writers accomplish the activity; however, artifacts do not do things by themselves. Digital tools may be used to create or access digital artifacts that then become tools of writing. For example, Google Search and Google Translate are considered tools because writers manipulate them by typing text into the search or translate box respectively, which then causes the tool to perform the work of retrieving results. The results, a list of webpages or a list of possible words in this example, then can become artifacts. Writers might select and go to the webpage of a search result, or they might use the search results page itself as

an artifact to support their writing. In this study, applications that can be acted on and through, such as dictionaries, word processors, search engines, chat/messaging, and email, among others, are tools. Translation and search results, blog posts, articles, essays, and other "static" information on the screen are examples of artifacts. *Acts of composing* are combinations of tools, artifacts, and operations or micro-acts, such as typing a word or opening a document. Acts of composing are understood to occur in sequences to address incremental goals and problems in writing. Writers engage in sequences of acts of composing that cumulatively work together toward accomplishing the goal-oriented activity of academic authorship.

## Description of Findings

The writers in this study, who had taken at least four college-level writing classes prior to the term of the study, had varying degrees of confidence as writers, but all were interested in improving their academic English in order to better compete with their American peers and be successful in their courses of study at University of X. Writers also identified finding and developing ideas and doing so as efficiently and in as little time as possible as challenges in academic writing. Additionally, each writer in this study was asked to enter into a relatively unfamiliar rhetorical situation in the academic writing assignments for their respective classes. Through narrative description, still shots of video from writers' primary writing screens, and writers' descriptions of how they set up their digital environments and explanations of identified tool-intense acts of composing, the remainder of this chapter provides a close-up look at some of writers' formerly hidden processes that they enacted as they worked toward these goals. This in turn sets the stage for a revised understanding of academic authorship and new directions for FYC, the training ground for academic authorship, in the multilingual, digital age.

**Cultivation of Transliterate Testing Grounds is Part of Transliterate Writing Processes**

The space on computer screens is malleable and can be cultivated by writers to facilitate access to the resources that support transliterate movement into unfamiliar rhetorical situations. The writers in this study cultivated their space bounded by their computer screens in some common ways prior to beginning work on academic essays, which suggests that forming and manipulating the digital writing environment is a standard component of 21st century transliterate writing processes. In particular, the writers in this study set up computer screens that facilitated their access to linguistic and informational resources including translators/dictionaries and U.S. and Chinese search engines. Such a range of resources on computers, the primary digital environment observed in this study, facilitated digital mediation of writing processes. Writers were observed to continually bring new artifacts into their digital writing environments and to use digital tools in different ways during the course of writing one draft of one essay. The cultivation of the digital writing environment as a testing ground continued during work on essays and likely continued afterward. The descriptions presented here of writers' digital writing environments illustrate some of the ways in which writers formed and manipulated their computers as part of a multilingual digitally-mediated writing process to enter into the unfamiliar rhetorical situation of U.S. academic authorship.

Each writer in this study used a computer for the majority of the writing processes they recorded for this study. Each used Word as their word processor, each connected to the Internet during recorded writing activities, and each used a web browser to access additional digital tools and information on the web while writing. Although the sample in this study is small, most computing spaces used in U.S. academic authorship have similar basic features. From this basic template, writers' digital writing environments diverge. Writers have made different choices

about what applications need to be open as they begin typing text into their essays. They have

made choices about the default page their browser opens with each new tab and what language

many of their applications default to. They have also downloaded applications such as translators

and dictionaries prior to this study in response to previous challenges they have experienced in

writing. The continued cultivation of a digital writing environment was an integral part of the

writing process of the writers in this study that facilitated how they have been able to navigate

the unfamiliar rhetorical situations they have found themselves in as multilingual international

students studying in the United States.

**Windows and screen set up.** In this section, I describe the digital writing environment or

computer screens of each of the writers in this study beginning in the opening moments of the

videos of their work. Prior to beginning recording and in the opening moments of their work,

writers made decisions about what applications to open and where to put the windows with each

application on their screen.  The applications that writers opened and the way in which they sized

and positioned the windows with those applications on their screens provided writers quick and

easy access to the tools and artifacts, in both English and Chinese, needed during writing

activities. Writers continued to open new applications and manipulate the windows with

applications while they wrote. The ways in which writers set up their screen allowed them access

to a range of digital tools and artifacts to support their writing. Choices made about setting up the

computer screens as transliterate testing grounds increased the available choices for writers to

address rhetorical challenges that arose while they worked on their essays.

*Rong.* Rong began her recording of her work on her essay about common racial tropes in

film with a Word document already created with her name, instructor's name, and date as shown

in Figure 1. The window with the document fills her entire screen. Rong said in her interview that she likes to format as she goes.
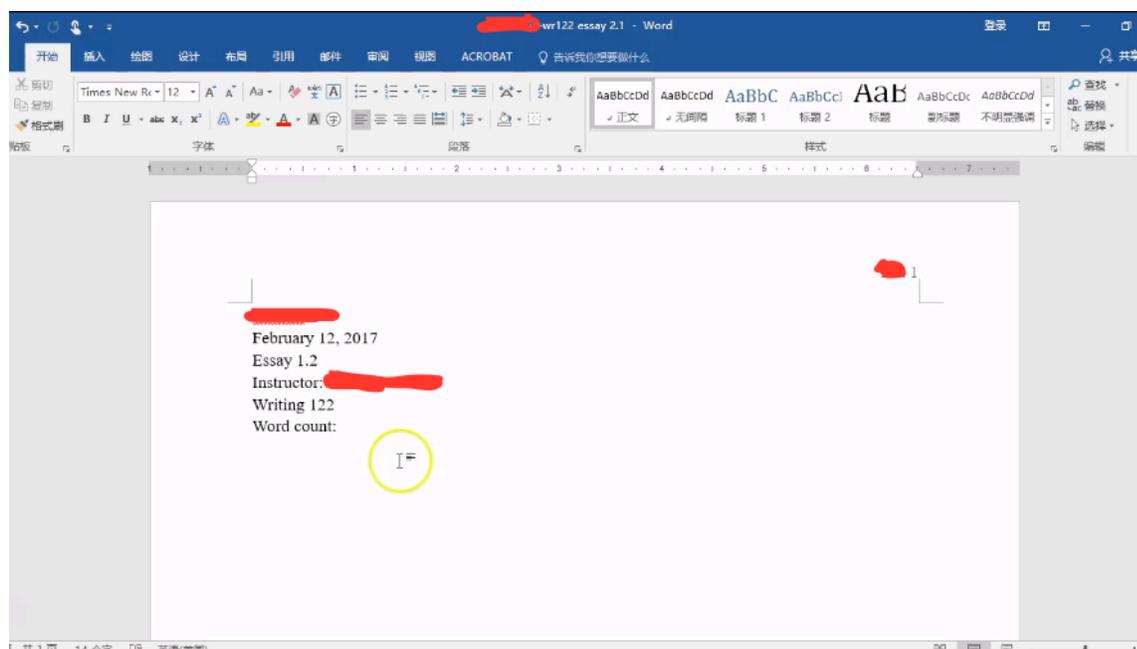


*Figure 1.* Opening moments of Rong's essay.

A window with her browser was also already open on her computer, "hidden" behind the Word document. When she brought it up, I could see that she had already opened seven tabs: a page on her university's web site; Ozdic, an online English collocation dictionary; Grammarly, an online English grammar application; Canvas; her email; and Google Translate. There were two additional Word documents minimized on the screen, one called "Word Form Chart" and the other "Response." Rong could not recall why she had all of the tabs open beyond saying that she had been working on her homework. Writers in this study commonly had space on their computer screens open for other kinds of work in addition to essay writing. Because Rong used ideas from on essay she wrote for her education studies class as part of the writing process under investigation, she frequently brought up artifacts on her screen from that class in her digital writing environment as well.

During her recordings, Rong usually had just one window open on her screen at a time as shown in Figure 2 below.
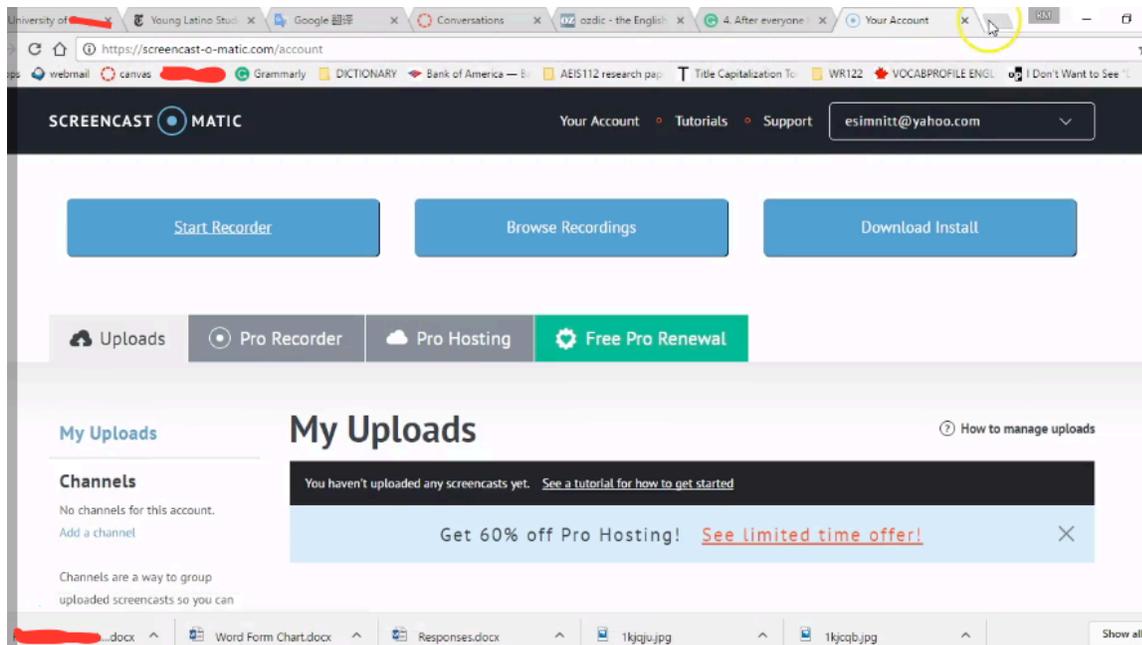


*Figure 2.* Screenshot of Rong's browser tabs.

She did not typically resize windows; instead, the window in which she was working typically filled up the entire screen of her laptop. In recording her writing essay, she moved between a Word document, her Chrome browser with multiple tabs open, and the folders saved on her laptop to access and reference previous work from her writing class and her education studies class.

**Ye.** Ye's recording of his work on his research proposal for his computer science class opened with him going to an already-open QQ chat session. Then, he almost immediately opened a Word document and moved through several windows already open on his screen, including a browser with nine tabs already open as shown in Figure 3.
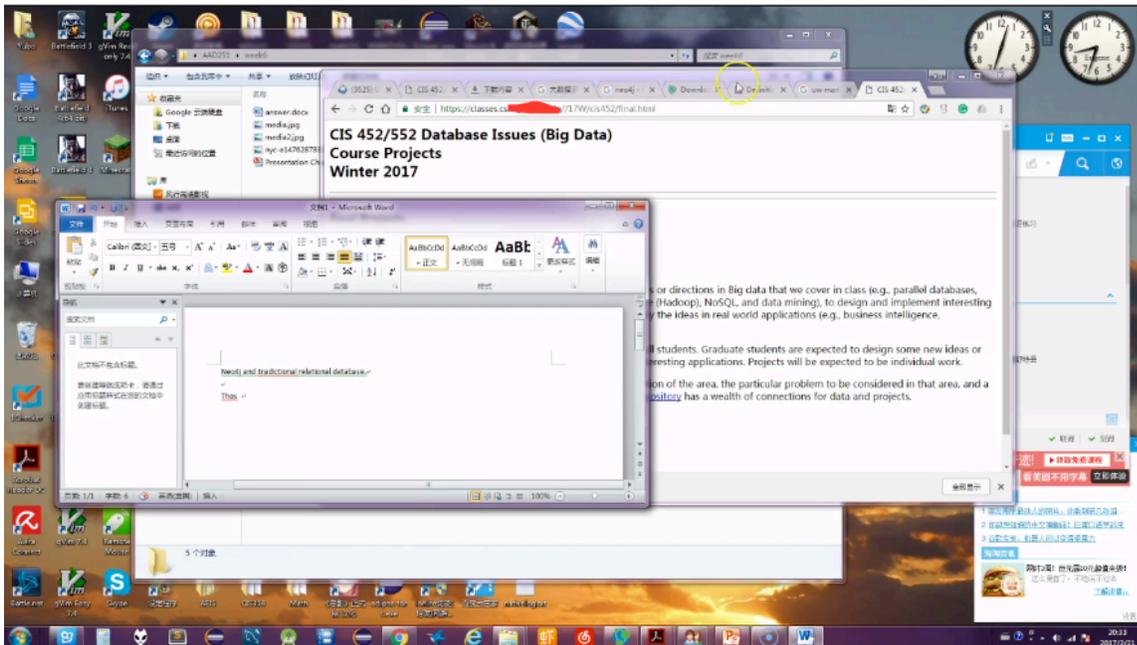
*Figure 3*. Nine tabs on Ye's browser at start of writing.

Ye explained in an interview that QQ is one of his go-to places when he is having trouble

focusing. However, as I observed, he accessed it as part of his process of writing his research

proposal. He explained that in the week prior to working on the proposal, he had joined a group

interested in software development that he found on Zhihu. He opened the application at the

beginning of his work session in order to ask them about his project. During his

recording, Ye asked the group about the database he examined in his project and for advice about

writing a proposal. Intermixed with discussion about his proposal were off-topic chat sequences

about the merits of different U.S. universities and jokes about linear algebra.

Ye's screen had both Chinese and English on it at once. Like Rong, he set up his Word

document to have the tool bar and other menu options in Chinese. His browser tabs showed a

mix of both Chinese and English. His translator/dictionary was always open in the right-hand

corner of his screen during the recordings. Ye also had already opened an informational PDF

about one of the databases he was writing about. During this study, Ye did his work on a desktop

computer which has a screen larger than his laptop. This may explain why he had so many

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different windows open, spread out across the screen, and layered on top of each other. As more windows are added to a smaller screen, the windows themselves became smaller. More than any of the other writers in the study, Ye moved among the various applications, windows, and browser tabs he opened before and during his writing process. He rarely closed browser tabs, and the number of tabs open on his screen continued to increase throughout his recording. In an interview, he spoke about his fear that he would not be able to retrieve the information again once he had found it. Throughout the recording, the number of open tabs continues to grow throughout his recording.

*Jun.* From the start of her recording, Jun set up her computer screen to support the ways in which she accessed information from the Internet and files on her computer as she worked on her semiotic analysis of the film *Lord of the Flies*. She made it simple to move between her Word documents and other applications by the way that she sized the window of her Word document to cover the right half of her laptop screen as shown in Figure 4.
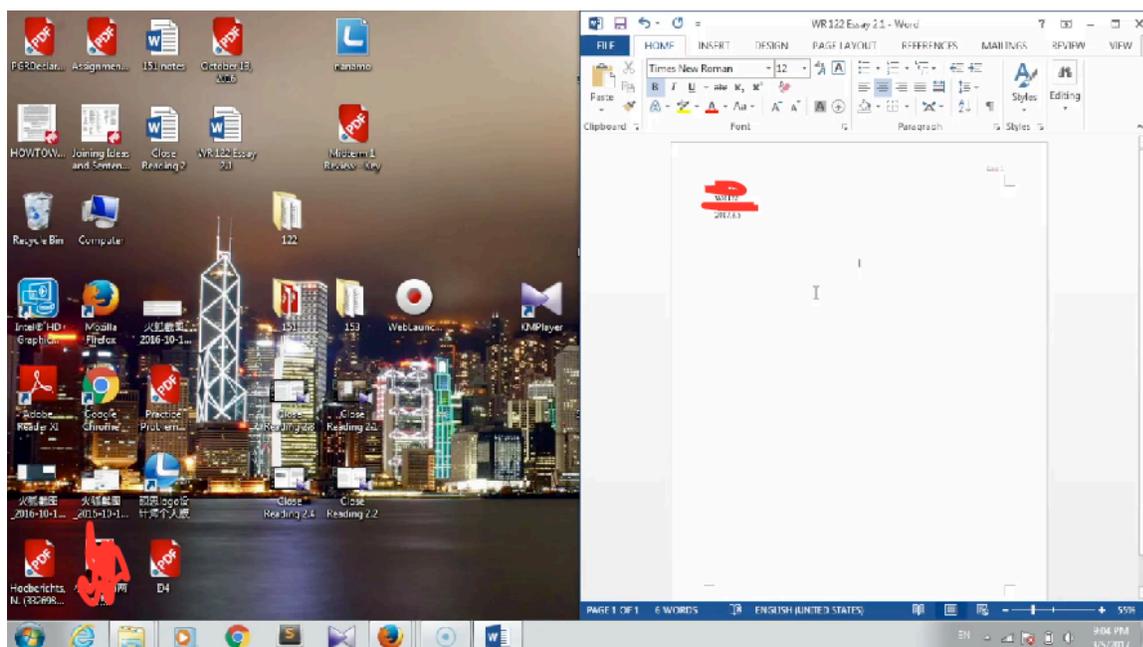


*Figure 4*. Jun's essay on right half of screen.

Jun used the left half the screen to open windows that were alternately filled with one of two browsers with multiple open tabs, assignment guidelines, and her own previous writing, both for the class for which she wrote the *Lord of the Flies* writing as well as previous writing classes.

Like Rong, Jun had at some point, before beginning to record her work session, looked up information on her topic. This was evident by what was already up in her browser when she first opened it. When she first brought her browser to the front of the screen, there were tabs open with the Wikipedia entry on *Lord of the Flies,* a Goodreads discussion on *Lord of the Flies*, a SparkNotes page on *Lord of the Flies,* a YouTube page of the film, and the Canvas site for her writing course. She then opened a Word file with guidelines for the assignment, followed by another browser, this one with three tabs open: one with OneDrive (the application used to share material with me for the study), one with Screencast-o-matic (the application used to record material for the study), and one tab with information about the film in Chinese. Shortly thereafter, Jun opened another tab on this browser, typed "lord of flies human nature" into Google and opened an eNotes page on the book as shown in Figure 5.
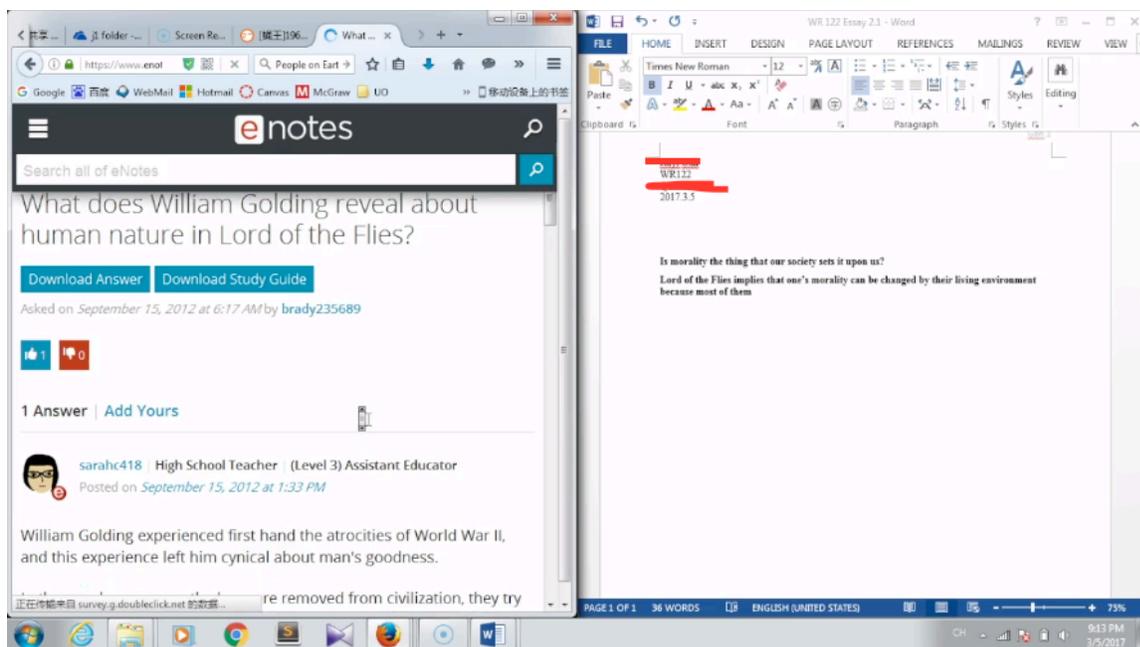


*Figure 5*. eNotes shown on left side of Jun's screen.

For most of the rest of the recording, Jun moved between the two browsers and various Word documents filed on her computer. She frequently typed or copied and pasted text from the left-hand window into her essay on the right-hand side. Jun organized her primary writing screen to facilitate her reliance on others' words and ideas in shaping her own. She set up the Word document containing her essay in a window filling the right hand side of her screen. She used the left side of her screen to bring up the artifacts she used to help her think through ideas, formulate her ideas in English, and check her understanding of her assignment. The space on the left side of her screen is occupied by a shifting array of webpages, like the Chinese article she found by searching Baidu, a series of essays she wrote in high school about *Lord of the Flies*, educational Prezi presentations about the book, assignment guidelines, and a forum on Goodreads with answers to the same question that guides her project.

*Zhen.* Zhen's recording began in a window filled with his browser as shown in Figure 6 below. There were three tabs open: one with feedback from his instructor on the preparatory assignment, one with Youdao, and one with the assignment guidelines for the essay he is working on.
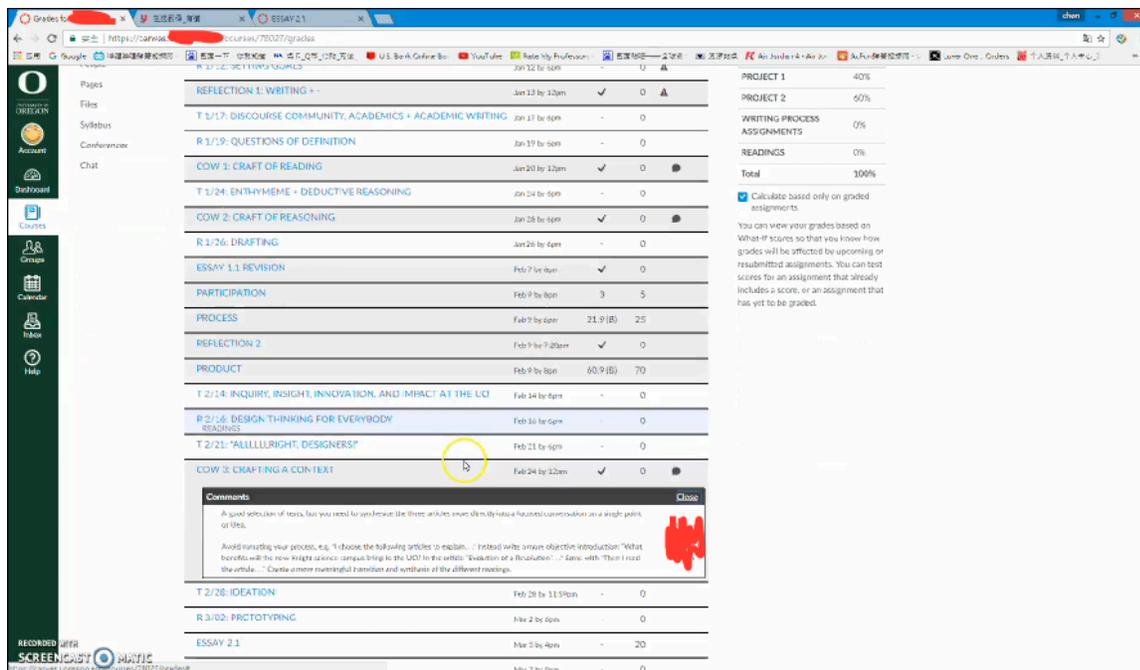
*Figure 6.* Instructor feedback accessed by Zhen on the Internet.

The feedback from his instructor advised about how to use the shorter assignment as a starting

point for the essay. She suggested that he work on synthesizing articles to which he referred and

improving transitions. She also recommended that he avoid "narrating the process." She used an

example from his writing where he was doing this and then modeled an alternative. Before he

started work on his essay, but after he looked at assignment feedback, Zhen opened three more

tabs with the three articles he had already used in the shorter assignment. He then switched his

full screen to the Word document with his assignment as shown in Figure 7.
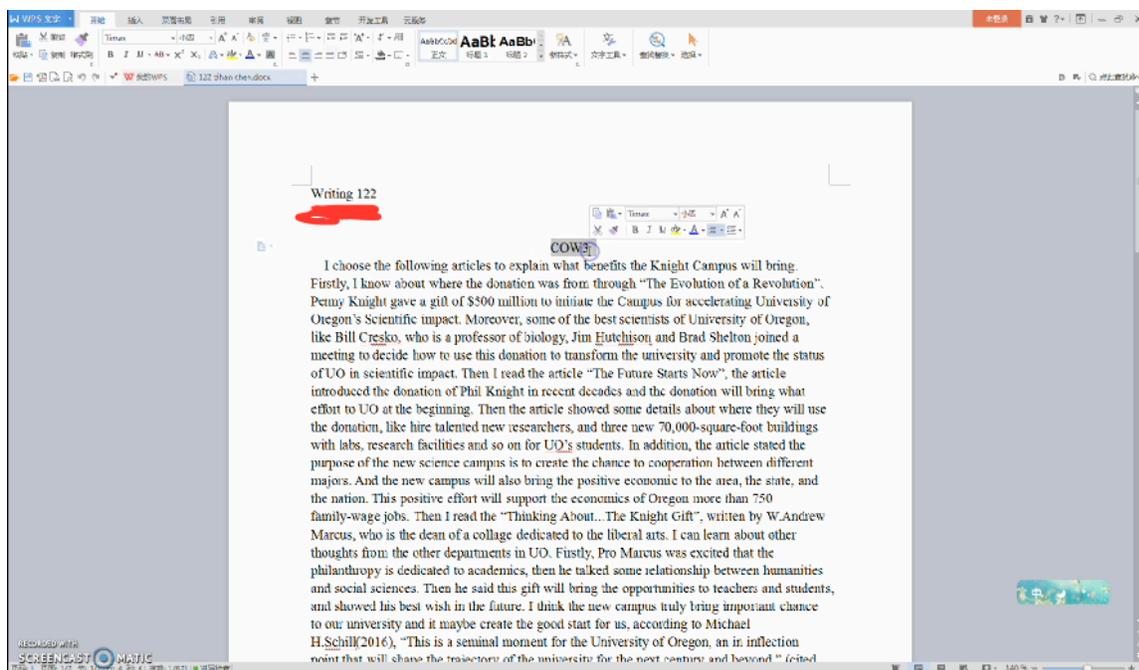
*Figure 7.* Zhen's screen filled by his essay.

To begin writing, Zhen opened the previous assignment about which his teacher commented and saved it as his new assignment. For the remainder of his writing, his screen was filled either by his browser or the Word document. He said in an interview that he prefers to have "just the document I write" on the screen because "I think I should focus on the document and finish it quickly."

Much of the digital writing environment is already created as writers begin their work on each new writing assignment. Through habit and through necessity, writers made decisions about how much of their writing they wanted to see in front of them. These decisions changed throughout their recordings. Rong and Zhen, for example, preferred to have one window in view at a time for most of their writing. Jun and Ye had multiple windows in view on their screens. Jun positioned two windows side-by-side that were roughly the same size. Ye frequently resized and repositioned the window with his Word document and the window with his browser. The different layouts of the environments afforded different kinds of movement. For

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Ye and Jun, movement across languages and web domains was facilitated in the way they positioned their screens. Rong did move frequently between windows, but she also spoke at length about her difficulty in staying focused. Her choice to have one window open at a time, she explained, was an attention management strategy. In the case of Zhen, he demonstrated little movement outside of his essay. Zhen, unlike the other writers, set a time limit for himself for his writing homework. He planned to write for about two hours, and he did. This may also be a factor in his relatively little movement between tools and artifacts as well as his relatively uncluttered writing environment. For each writer in this study, opening and manipulating windows in their digital writing environment was an important and ongoing part of their writing process that helped writers access and efficiently use the range of linguistic and informational resources available on their computers and the internet to negotiate the rhetorical situation of academic authorship.

**Language settings.** Manipulating language settings was another significant part of the ongoing cultivation of the digital writing environment by writers in this study that increased the range of resources available to navigate U.S. academic authorship. Writers changed the settings on browsers, word processers, and translators to provide themselves easy, flexible access to both Chinese and English during writing. Being able to use both languages in the space of their computer screens gave writers access to increased linguistic resources to draw on and test out forms while writing as well as more information about their topics to support development of ideas. Cultivating their digital testing grounds in this way allowed writers access to articles and information from both English and Chinese web domains. Their curation afforded them the choice to read articles, regardless of their language of origin, in either English or Chinese. The process of increasing the range of language-related choices available in their digital writing

testing grounds in turn supported writers' ability to make linguistic and culturally relevant rhetorical choices while writing.

The settings that writers changed included those that allow them to choose the language in which text is displayed on their screen. For example, writers can and did choose to have the names of the tools in Word displayed in Chinese. Writers also have the option of using extensions on their browser that allowed them to toggle back and forth between the original language of the web page and other languages. Writers in this study primarily used this feature to auto-translate text in Internet spaces from English into Chinese. For example, Chrome has an extension that allows users to toggle back and forth between English and other languages. In one example, Ye was reading an email about tuition increases (an activity he does in between sending emails to his professor and to a private business about his paper topic). When he opened the email, he shifted on the auto-translate to Chinese, read through it, then switched his browser back to English. Ye mentioned, without prompting, when we watched this scene together in a follow-up interview, that he does not trust auto-translators to do his writing. Yet, he does rely on them, as well as Google Translate, for reading.

Other settings provided writers the ability use Pinyin, the Romanized version of Chinese characters. This setting on computers converts groups of English letters typed on keyboards into Chinese characters. Writers used this affordance when searching in Google and Baidu and in their use of both Google and YouDao translators. Writers in this study also use this same technology on their phone for searches in their translators and on the internet. The Pinyin setting enables writers to use the English keyboards on their phones to send text and chat messages in Chinese. Writers in this study were well-practiced in using English keyboards to write in Chinese. Setting up the digital writing environment on their laptops in such a way to allow this

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kind of linguistic movement allows writers to work on their essays in the same way they write on their phones.

Writers' actions to change language settings of the tools and artifacts in space of their computer screens facilitated their movement across languages and helped them rhetorically address writing challenges related to word choice and development of ideas that arose as they authored academic texts. The affordance of browsers to auto-translate text into multiple languages increased the choices that writers had in how they developed ideas and made linguistic decisions in their writing. Ongoing manipulation of language settings of tools in the digital writing environment gave writers greater flexibility and more access to vocabulary and information to support their ability to address the rhetorical challenges they faced in navigating U.S. academic authorship.

**Translators.** Because translation was so frequently used by the writers in the writing activities they recorded, it merits its own treatment in explaining how writers set up their digital writing environments to support their rhetorical movement in U.S. academic authorship. All writers reported using the translator application YouDao on their smartphones, and in fact accessed the application during our interviews together. For Jun, digital translation during her writing activities primarily occurred on her phone, in part because her aging computer could not function properly when too many applications are open.

I observed three of the writers, Rong, Ye, and Zhen, using YouDao to translate both English words into Chinese and vice versa on their computer screens. Zhen had placed a translation application on his screen as shown in Figure 7. However, he did not use it during his work sessions on the essay he recorded for this study. Both he and Rong accessed the web-based version of YouDao. Ye had downloaded YouDao onto his computers so that he was able to

launch the application from a menu at the bottom of his screen. Throughout his recordings, YouDao was open on the right-hand corner as shown in Figure 3. A feature of the application that provides an audio pronunciation of words when they are selected was turned on, and I could hear during his writing, just as Ye did, how certain words sound in English.

Rong preferred to use another translation application, ICIBA, on her computer screen. The application had a monster head, Rong explained, because she had recently watched the movie *Monsters, Inc.* when she installed it several years ago. The application allows writers to customize its appearance. For both Ye and Rong, the use of their translation applications as well as the web-based version of Google Translate were visible, integral components of their writing processes throughout the activities recorded for the study. They were key components to their digital writing environments. Translation applications, then, might be considered a standard, or at least unsurprising, component of the multiligual digital writing environment.

Each digital tool has the potential to change the digital writing environment. For example, the recording application used in this study is web-based. Each of the writers had to open a browser and go to the study web page to launch the recorder. In each observed digital writing environment, a browser was open. Given that other tabs appeared on the screen, opening a browser and entering web spaces is likely part of each of the writers' process, even when not participating in the study.

The digital writing environment of each writer observed in this study is dynamic. As writers learn or confront problems in writing, as they encounter new digital tools, their writing environment changes. It changed during the process of writing particular texts, as observed in this study, and it will likely continue changing over time as new technologies and tools emerge

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and as writers gain experience writing and learning what they need to in order to address each new rhetorical situation that they encounter in their digital writing environment. Just as it is difficult to determine when, exactly, writing processes begin and end, so, too, is it difficult to pinpoint when writers begin forming particular digital writing environments for each project. Rather, the formation of the digital writing environment is an ongoing part of 21<sup>st</sup> century writing processes.

**Writer's Digital Environments Facilitate Rhetorical Transliteracy**

The ways in which each writer has set up their digital writing environment allow for movement across languages and web domains and their own previous writing. Being able to use both Chinese and English and to access a broad range of artifacts in their digital writing environments supported writers' ability to address the unfamiliar rhetorical situation of U.S. academic authorship by increasing the range of resources they have to draw on to address writing challenges. In this section, I provide several examples of observed movement to illustrate this digitally-mediated capacity for rhetorical mobility.

**Moving among languages.** The networked nature of the digital writing environment cultivated by writers in this study and the affordances of the applications to display text in both Chinese and English increased writers' options for using both languages while working on their essays. Because of this affordance of the digital writing environment, writers were able to use and access a fuller range of linguistic resources while writing. The observed choices writers made about the languages they needed to draw on in order to address the unfamiliar rhetorical situation of U.S. academic authorship suggest that their writing process is a multilingual writing process. That they were able to move among languages in the digital writing environment further suggests that multilingual digital writing processes are the norm for the writers in this study.

Moving between and among languages for the writers in this study encompasses more than just using translators to look up words. All of the writers in this study composed in English; however, they typed in Chinese in translators, dictionaries, and search engines. They read artifacts in Chinese and then moved back into composing in English. Factors that facilitated this movement include both writers' decisions about what to bring into their digital writing environments as well as advances in translation technologies.

At its most straightforward, the digital writing environments cultivated by the writers in this study allowed movement between and among languages through the use of translators. For example, in several instances, Zhen went to his browser and typed in Chinese in an open tab that already had YouDao opened in it. In one case, his search results included "mess, refectory, eatery, canteen, dining hall" as shown in Figure 8.
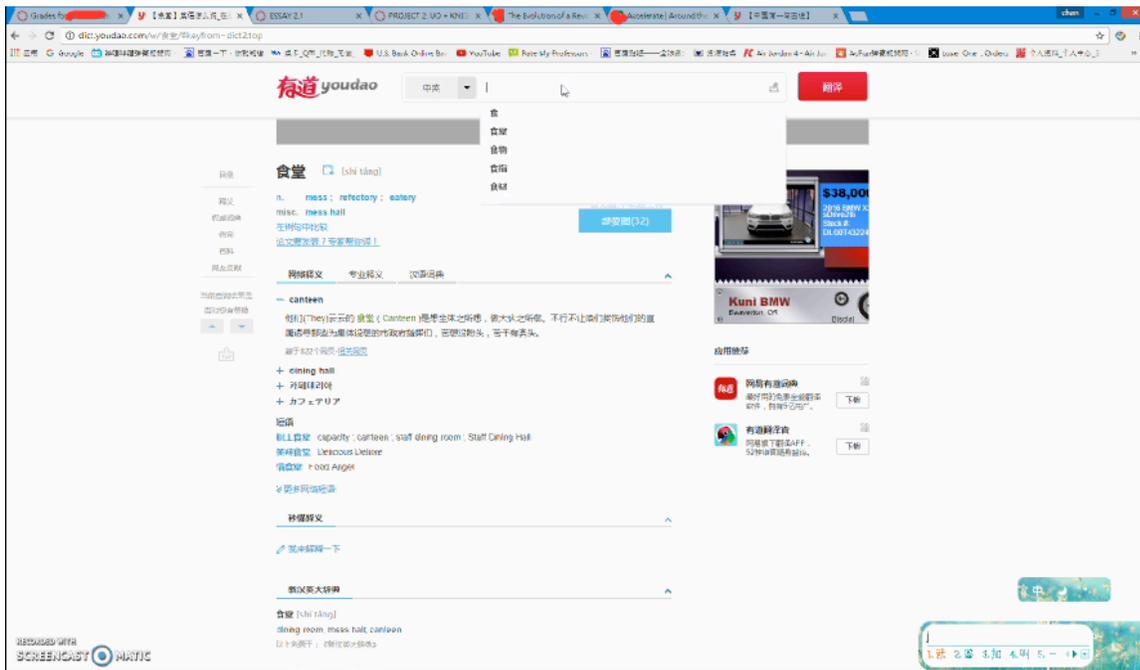


*Figure 8.* YouDao search for "mess hall."

Zhen copied "mess hall" and pasted it into his essay in the sentence: "Through my observation, many students do not like the mess hall's food, and just eat the vegetable salad or eat a boil of

soup." In another instance, his search in Chinese yielded "economic benefit," which he copied directly into his essay. In yet another instance, he searched for a term that equates to "virtuous circle" and copied and pasted it into his essay in the sentence: "This will cause the virtuous circle to make the university better." In each of these cases, Zhen's digital writing environment, which includes access to the web-based version of the YouDao translator, allowed him to move between the words he knows in Chinese and the English he needs for composing in his essay.

Writers also moved between and among languages in sequences where they were reading information. For Ye, this movement was facilitated by the way he used Google Translate and the auto-translate feature on his browser. I observed him copying and pasting paragraphs of English text into Google Translate. When asked about this practice, he explained that this process helps him read more quickly and check his comprehension. Ye also moved between Chinese and English when he asked his social media QQ group about how to write a proposal. His question and background explanation to them about his question was in Chinese. He copied and pasted the English word "proposal" from his assignment sheet directly into the text box on QQ. In another sequence, Ye wrote an email to his computer science professor, who is also from China, in Chinese. When his professor replied back in English asking Ye to use English in his communications with him, Ye was easily able to move back into English to accomplish his goals. His digital environment allowed him to both type and see material in both English and Chinese in the same space and to choose which language he needed to use with minimal extra effort.

Rong's use of Google Translate illustrates yet another way in which the affordances of writers' digital writing environments allow them to move between and among languages. Rong used Google Translate 18 times during her recorded work sessions to move between English and

Chinese. Her use of the translator was more complex than straight one-to-one translation, with each use adapted to the act of composing of which it was part and the purpose she hoped to achieve. In some sequences, she used the translator to check what she had already written. That is, she copied and pasted the English she had typed in her essay into Google Translate, which, on occasion, caused her to adjust her English phrasing. In other sequences, she used it as a kind of brainstorming tool in which she tried out several phrases typed in Chinese before selecting an English translation. In one sequence, she tried out various combinations of Chinese characters that translated to the following: "is a bad guy," "is a thought," "is a want to kill brother usurped the bad guys." She copied the last one into her essay and then reworked it to this sentence: "Similarly, in *The Lion King*, the lion Scar, who is a bad guy that wants to kill his brother to become the lion king."

In each of these sequences, the digital writing environment allowed writers to move among and between Chinese and English on the same screen as they composed their academic essays in English. They used YouDao and Google Translate and took advantage of the features of digital tools that allow them to type in both English and Chinese from their English keyboard. All writers were able to at times type in both English and Chinese because of the ways in which they set up their digital writing environments. Each has developed in their use of the available tools therein an understanding of and ability to use the multilingual affordances of digital tools to move among and between languages.

This digitally-mediated ability to move between languages in their preferred digital writing environment offered the writers choices that would likely not be as readily available to them were they to compose similar texts in a non-digital environment. Still, the choices that writers made were limited and often rhetorically problematic for a U.S. academic audience. But

the choice of moving among languages on the same screen did facilitate language negotiation as writers were able to juxtapose ideas and information in Chinese and English side-by-side as they made writing decisions. The ability to move among Chinese and English on their screens allowed them to engage with their topics and make choices in particular ways that were mediated by digital tools. In using digital tools to move between languages, writers showed an ability to draw on multilingual resources to support their rhetorical mobility. That writers made choices in setting up their digital writing environments to facilitate movement between languages supports understanding digital writing processes as multilingual.

**Accessing information from Chinese and English web domains.** In this section, I describe how writers were able to access information from both Chinese and English websites because of the affordances of the digital writing environment. Writers were able to learn more about and try out words and ideas across web domains to help them make decisions about writing. Being able to access information across languages, cultures, and national spaces in the moments in which they needed them was a resource for writers negotiating unfamiliar rhetorical terrain. That writers routinely and without observed hesitation accessed information originating in both Chinese and U.S. web spaces indicates that accessing information transnationally or across national spaces was an integral part of their writing process.

All writers in this study used the features of their digital writing environment that allow them to search and understand material in both English and Chinese web domains. In the early days of the internet, English was the primary language of web pages and domains. In recent years, as internet access and use has grown among non-English speaking web users, internet content has become increasingly multilingual. The writers in this study came to study in the United States with years of experience searching, reading, and writing in Chinese web spaces as

well as the English and U.S. web spaces that they had access to in China. Their practiced experience moving across web domains became evident during interviews with each writer and was made visible in the ways in which writers were able to relatively quickly move into new web spaces related to the topics about which they were writing.

Writers moved between their essays and Chinese social media and scholarly websites, English and Chinese Wikipedia, and other Chinese- and English-based web sites during their observed writing process. This is in addition to the ways in which writers used the affordances of their digital writing environment to auto-translate English websites into Chinese and the ways in which each writer in this study used both YouDao, a Chinese-based website, and Google Translate, a U.S.-based website, in their digitally-mediated writing processes. The examples in this section are sequences illustrating some of the ways in which writers moved among artifacts from both U.S. and Chinese web spaces to support their writing.

In one example, Jun used both Google Search and English Wikipedia as well as Baidu Search and Chinese textual artifacts to find support for her claim that morality is not an innate human quality but instead is learned. She began by thinking about a story she heard from her mother about children raised by wolves. To confirm that this was an actual example, she first searched for "wolf child" using English in Google and selected one of the alternate searches at the bottom of the search: "wolf children kissanime." Then she tried "wolf-child," which yielded the same results as her first search. Then she added "roma" to the end of her search. In asking her about this moment, she could not recall why she used "roma." She explained that she was trying to discover if a story her mother told her about children being raised by wolves was true. When she typed "roma," the new search results included an English Wikipedia article about the Capitoline Wolf, the bronze sculpture of a wolf nursing twins that references the mythological

founding of Rome. This result did not match the description Jun gave for what she was looking.

Her next step was to open a new tab and go to Baidu where she performed the same search in

Chinese. The same picture of the Capitoline Wolf that was on the English Wikipedia entry

showed up in the images results from her search on Baidu as shown in Figure 9.
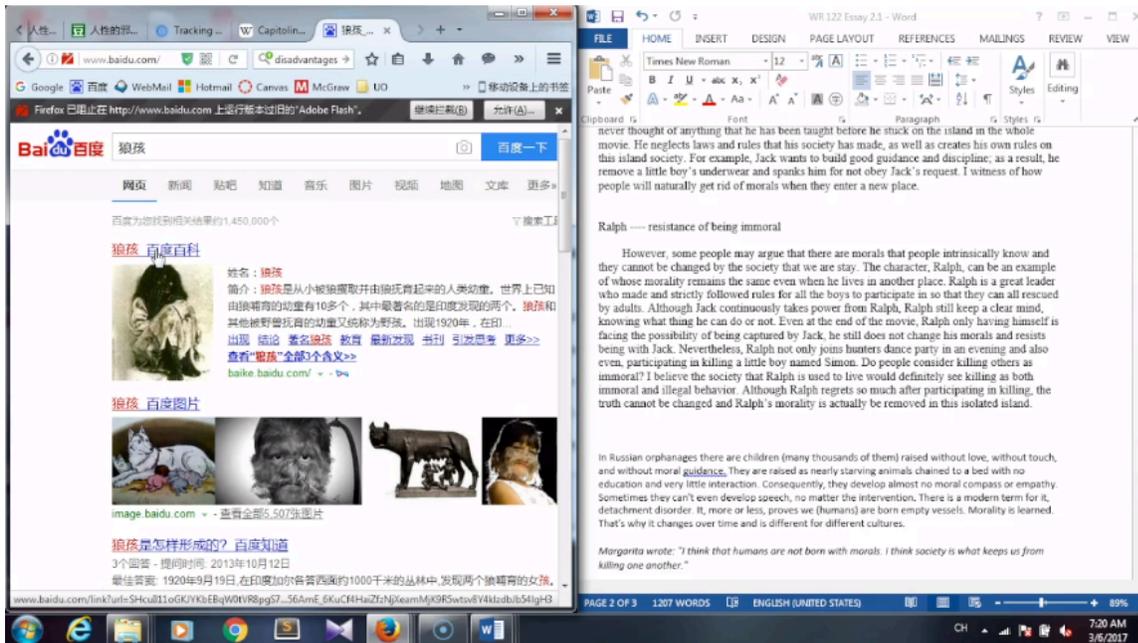


*Figure 9.* Jun's Baidu search results for "wolf child."

Jun went back and forth between an entry she selected from the Baidu results, as shown in Figure

10, and the English Wikipedia entry on the Capitoline Wolf.
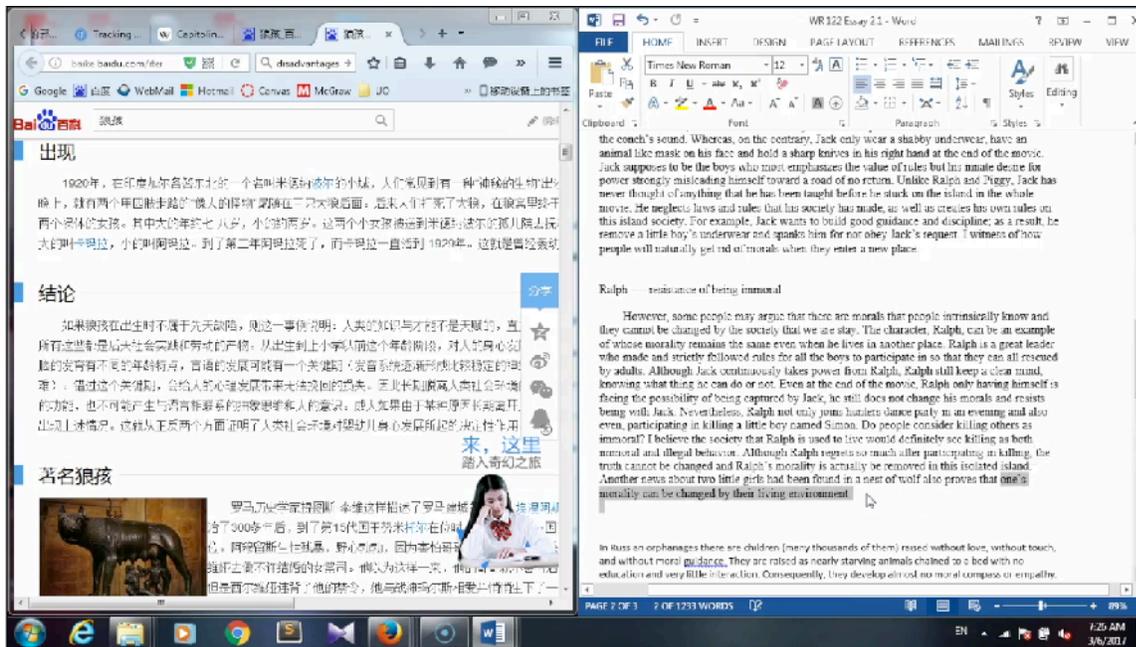
*Figure 10.* Chinese article on morality accessed by Jun using Baidu.

Eventually, Jun typed in her essay: "Another news about two little girls had been found in a nest

of wolf also proves that one's morality can be changed by their living environment."

Rong's digital writing environment also allowed her to access both Chinese and U.S.

websites as she developed support for her argument about the pervasiveness of black stereotypes

in U.S. films and the effect of such stereotypes on U.S. society. Accessing both U.S. and Chinese

web domains helped her check her understanding of material. At one point, for example, she

used Google search to access a New York Times article about the 2016 Academy Awards Show,

which was hosted by Chris Rock, a U.S. black comedian. After reading through the news story,

she searched for Chinese websites using the Baidu search engine which led her to a Chinese

news site with pictures from the U.S. awards show, with text in Chinese, and a meme of Chris

Rock with the caption "otherwise known as the White People's Choice Awards" as shown in

Figure 11. She used this as a quote in her essay with no citation of where it came from.

*Figure 11.* Meme of Chris Rock Oscar speech on Chinese web page.

In a similar example of Zhen searched Chinese websites to help him develop his support for an argument that the academic departments who will occupy a newly planned place on campus should also help develop the non-academic amenities in the space by using disciplinary expertise to create healthy eating options. In this example, he first went to a new tab on his browser and searched for the Baidu search engine by typing the web address in English. Then, he searched Baidu using Chinese characters. He selected one of the results from the search and, after briefly reviewing it, returned to his essay and typed in "like Chemistry Department and Biology" as shown in Figure 12.
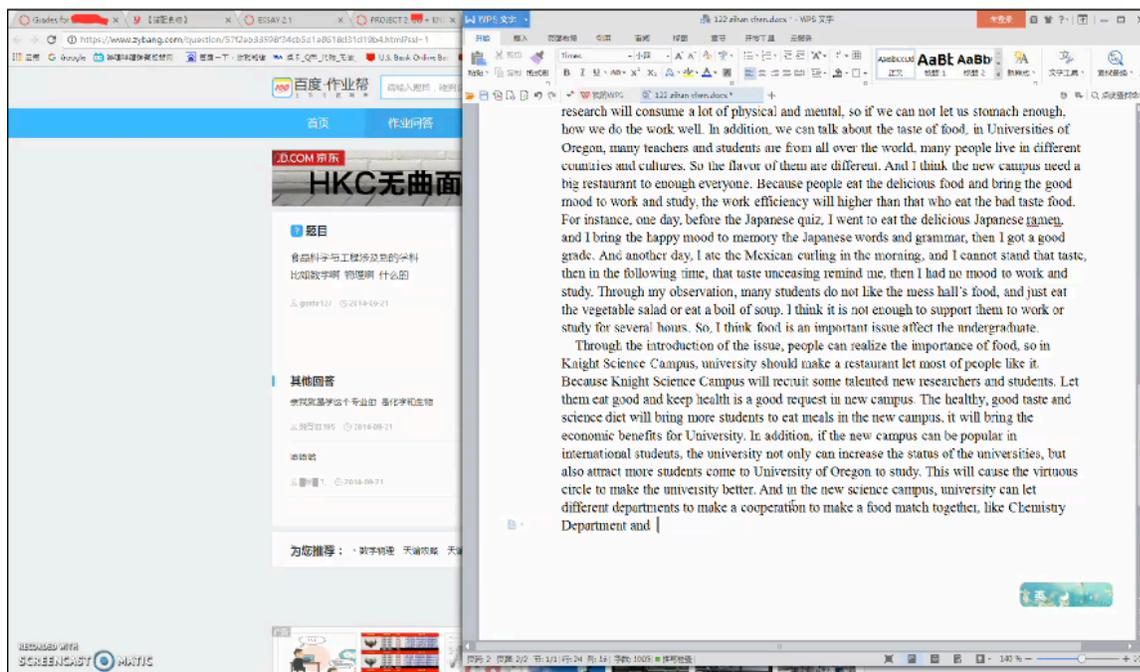
*Figure 12.* Baidu search about scientists' work and their use in Zhen's essay.

Zhen explained in interviews that he felt more confident in looking for material first in Chinese web spaces because he was more familiar with them and because he did not have to work as hard or spend as much time reading them.

Ye also accessed both Chinese and English websites when searching for support for his arguments. In one example, he asked his Chinese-based QQ social media group about Neo4J, the database he wrote about. He then accessed his U.S.-based university web account to email in English the company who makes Neo4J to ask the same question about its limits and potential use for the business purpose he has in mind to explore in his proposal. He also reported that he had looked Neo4J earlier on Quora, the English-based social media website where users ask and answer questions, and Zhihu, the Chinese-based social media website the does the same.

In each of these examples, the writers in this study accessed both Chinese and English websites to support their writing. More specifically, they looked for information to check and confirm their ideas and information they encountered in both Chinese and English spaces. In the

pursuit of academic authorship, writers make claims and support those claims with evidence. In each of the examples here, the writers find that evidence in both Chinese and English web spaces that they then check and confirm across web domains.

The writers in this study were novice writers who were less familiar than their American born peers with U.S. culture with less experience working in academic English. When asked about some of the choices they made to use Chinese web pages, they expressed a lack of confidence in their ability to fully understand complex articles in English. They also reported in interviews feeling uneasy with relying on information in artifacts that originated in Chinese as well as those that were translated from English into Chinese. They located this problem in what they termed the different "logic" in English and Chinese languages. This appeared to refer to their experience with both underlying grammatical differences as well as cultural differences in using the two languages. In response, the writers nurtured processes that helped them take advantage of the multilingual, transnational affordances of their digital writing environments. Their cultivation of and movement within their digital writing environments that allowed them to consult and use information from both Chinese and English websites increased the range of resources available to support their writing. Accessing information across web domains proved to be an important part of their writing processes and their rhetorical mobility toward U.S. academic authorship.

**Accessing material from previously negotiated rhetorical situations.** The final characteristic of the observed digital writing environments that I will mention here is one that is likely common among most digital writing environments formed in the service of academic writing. The ways in which writers in this study organized and stored their previous writing allowed them to draw on their own work from other rhetorical situations, primarily other

classes they have had as well as previous writing for the class for which they wrote the essay under consideration in this study. Canvas, the course learning management tool, facilitated this work. The operating systems on writers' computer also facilitated this work in that they provided a method for organizing and storing previous writing. Although not observed in use by writers in this study, cloud-based storage (such as OneDrive, Google Docs, and Dropbox) also facilitates the ability to store and easily access prior writing. This feature of the digital writing environment merits attention because it is an important observed support for Rong, Jun, and Zhen, who each drew on their previous writing to support their work on the essay recorded for this study. For each of these writers, the affordances of their digital writing environments made available their own writing as another resource that they could draw on to move into and address new and unfamiliar rhetorical situations.

Rong found her way into the rhetorical situation of addressing U.S. racism in her writing class by drawing on material from the education studies class she was taking in the same term. She explained "in our education class. … it really focus on the films and writing class also focus on films. So combining them together, it's a really good combination." A key phrase in her thesis in the essay recorded for this study and, in fact, two concepts underlying her entire argument come directly from her education studies class: common tropes and racism. Rong's use of Google as a tool to find U.S.-based artifacts about common tropes and, more specifically, common tropes about race and her searches for Chinese-based artifacts that help her with names, characters, and plot summaries of U.S. films began when she accessed her work from her education studies class.

Her reliance on rhetorical artifacts from another class is exemplified in one of earliest sequences of writing she recorded for this study. Shortly after adding her thesis statement to her

essay document, Rong went to another window and opened up an article entitled "Themes in Sixty Years of Teaching In Film: Fast Times, Dangerous Minds, Stand on Me" that she read for her education studies class. She then copied and pasted a statement from Alice Walker quoted in the article. She proceeded to add appropriate citation information and create a citation on her works cited page using a citation from an essay she wrote for her education studies class and www.citationmachine.net. She then wrote several sentences rephrasing the quote and framing her new discussion of common tropes of racial difference:

> American novelist Alice Walker once said, "I believe movies are the most powerful medium for change on earth. They are also a powerful medium for institutionalizing complacency, oppression, and reaction" (qtd. in Beyerbach 268). The movie as a means of media transmission has an immense and unpredictable impact, which slowly penetrates people's lives. The images, themes, and other ideas conveyed by a film can determine how a majority of people perceive the world and what they consider to be important.

Unconsciously, the influence and power of the film has been beyond human imagination. The entire beginning sequence took Rong about 15 minutes to complete.

Later in her recording, Rong returned to her educations studies class, this time accessing information on from the class through the course management system. After including several examples of racial tropes in films in the paragraph, she went to a tab in her browser with the Canvas page for education studies course and opened slides from the class about common tropes as shown in Figure 13 and 14.
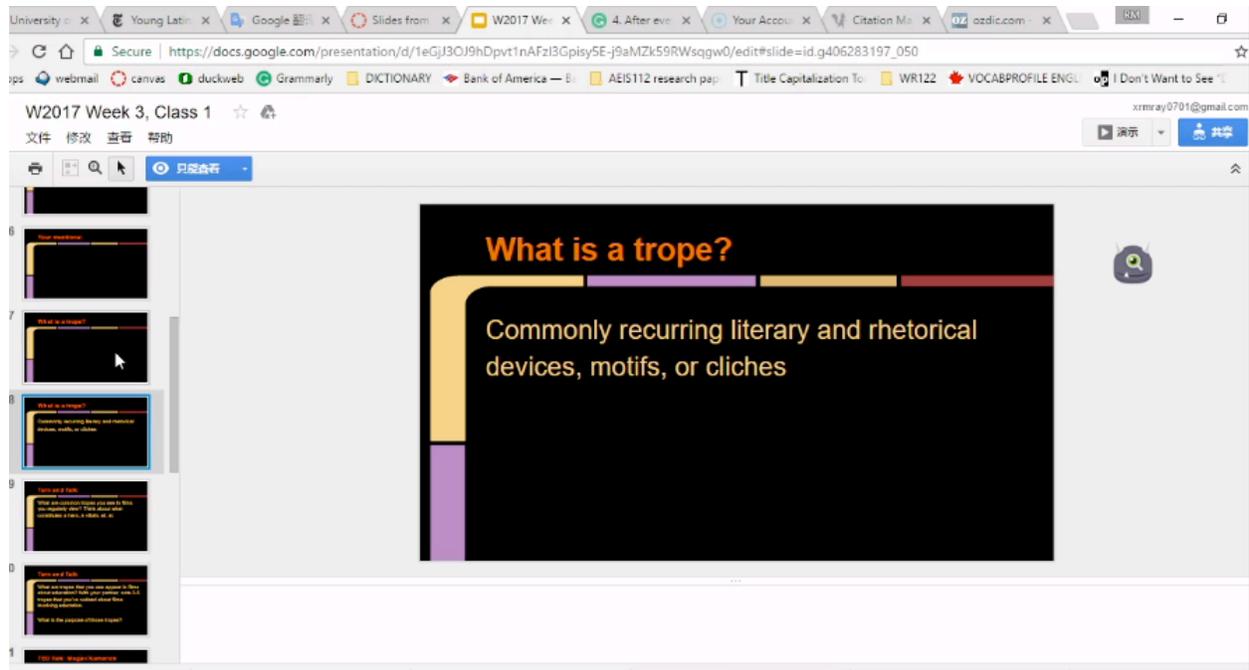
*Figure 13.* Slide defining "trope" from Rong's education class.
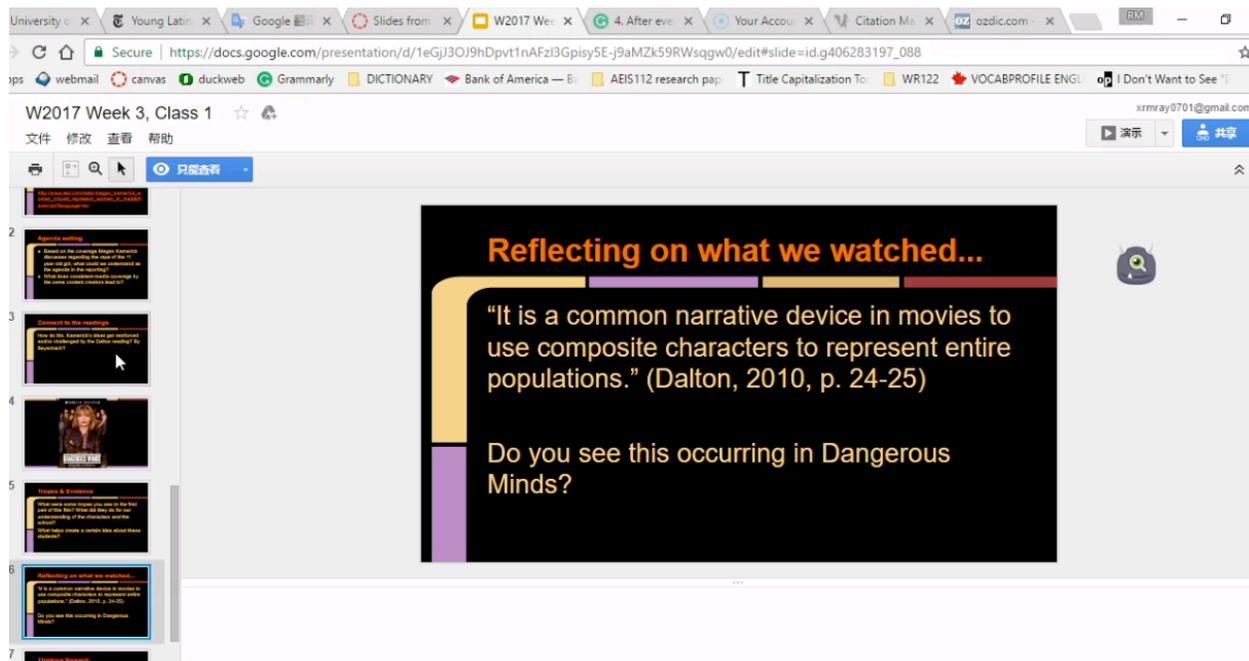


*Figure 14.* Second slide from Rong's education class defining "trope."

After viewing the slides for several seconds, Rong returned to the window with her essay and

typed: "Those commonly recurring literary and rhetorical devices, motifs, or cliches as a

common narrative device in movies to use composite characters to represent entire populations

are racial common trope." The definition and its phrasing is directly traceable back to the slides she looked through before typing the concluding sentence of the paragraph.

Rong's explanations about why she drew on artifacts from her education studies class during acts of composing for her writing class goes beyond noticing the connection between the two. She talks about time and laziness as motivators:

> Since I'm too lazy, I don't want to spend extra time or energy to search other information for one assignment. And so if I can use some information that I learned or some reading I already read before, it can save my time. And also give me more time to think about how I can write about this essay in steps. So if I have to spend time to find new information or new areas, it spend me lots of time. Since I'm taking the film analyze class, I think that I can combine them together.

In addition, Rong said she was not confident in her ability to write about U.S. racism in classes with American peers. She explained, "If there are 10 points, maybe seven out of 10. … since I'm kind of outsider for this problem." Study of race is an explicit component of both classes. Rong wrote the essay for her writing class near the end of the term, and she spoke in her interview about multiple opportunities to write and receive feedback on assignments in her education studies class related to race. Rong also talked at length about her decision to use the Alice Walker quotation, which she encountered in her education studies class, as the beginning of her essay about the common racial tropes in film. Her education studies instructor required students to write a critical response to the quotation after a class lecture and discussion on race, gender, and social class.

> I really deeply thinking about what the professor want us to write about and I look at the quotation again and again and again. Since this is a very simple and direct quotation, I'm

thinking why the professor want to ask us to write based on one quotation without any other explanation? … I checked this quotation online to see how others rephrase or think about this quotation. They write a huge amount of books to talk about this essay. And then I just sit down and think about it for a few hours and suddenly I got some insights and I find I can rephrase this quotation in this way and I write. … This quotation really impressed me most, so when I'm writing my 122 essay, I really think is a good start, like to introduce.

Rong continued to explain how she received feedback on the paper she wrote about the Walker quotation and was allowed to revise and resubmit. Prior to using the quotation in her essay, she had a significant and positive experience writing about it in a class she about which she expressed enthusiasm. In this sequence, Rong purposefully used tools to bring in artifacts already available to her as well as to bring in new material to support her writing from multiple classrooms and cultures in multiple languages. Rong also reported that she has saved printed copies of her previous writing in a box that she keeps with her. She has saved this writing, she said, to help her gauge her progress in academic English.

Zhen explained that he is purposefully seeking to save time when he opened an earlier assignment from his writing class and saved it as the new essay for the class. He used some of the same articles in the essay and was able to recycle the summaries and introductions to the authors and articles. Zhen accessed the previously submitted essay from the course management system, which was where he also accessed the comments on the assignment from his instructor. Jun's previous writing also played a central role in creation of her new essay. Jun has saved all of her writing since high school in folders on her laptop. One of the primary reasons she chose to write about *Lord of the Flies* for her FYC assignment is because she had

access to her own extensive writing on the book from an English class she took in high school in China. She opened several of these assignments and copied and reworked paragraph-sized chunks of texts that supported both development of her ideas and her ability to summarize the story of the novel in the essay she recorded for this study.

In each case, the writer used phrases, sentences, and evidence, even entire paragraphs, from previous writing in their new writing. Because the writing is accessible on the same screen as their new writing, using previous writing is as simple as copying and pasting. In other words, the digital writing environment supported writers moving between their own texts and reusing and building on their own ideas. Each of the writers in this study mentioned a concern for time and for having enough to say on new topics. Using their digital writing environment to access previous writing reduces their overall writing time and allows them to build from assignments in which they say that they are at least somewhat confident about their language use and ideas because the writing has already been read and evaluated. In making allowing for writers to start new writing projects on the familiar ground of earlier writing projects, the digital writing environment allowed writers to find yet another way to move into and engage in unfamiliar rhetorical situations.

The ways in which writers had cultivated their digital writing environments simplified and facilitated the movement of writers across languages, web domains, and their own previous writing. Their digital writing environments allowed writers to create a space of familiarity in which to engage with unfamiliar rhetorical situations. Writers were familiar and comfortable in using Chinese, their first language, on their computer screens. They were practiced and familiar with using translators. The fact that they had downloaded the same translators on their phones and their computers attests to this familiarity. The writers in this study were familiar with Baidu,

QQ, and Zhihu, all Chinese web spaces, because they were part of their digital environment prior to beginning study in the United States. Their own writing was also a space of familiarity. The ways in which writers continually set up and took advantage of the affordances of multilingual, transnational digital writing environments worked toward creating a writing space filled with familiar resources. The ways in which they continued to cultivate resources and the ways in which they used them should be understood as 21st century writing processes developed by writers to increase their rhetorical mobility.

**Writers Move Across Multiple Tools, Languages, and Artifacts in Transliterate Composing**

In this section I provide narrative detail of extended sequences of composing in which the writers in this study draw on multiple tools and artifacts to work through particular kinds of troublesome moments while writing. These sequences stood out as more tool-intense than other kinds of problems that I observed writers working through. The first two types of troublesome moments are closely tied to language knowledge and proficiency: the writer recognizes a language error on their own or with the assistance of an application, and the writer has a word or phrase in mind that they are looking to translate into an English equivalent. The third notable condition is more rhetorical, although it's difficult to tease out language proficiency from rhetorical awareness since rhetorical ability is required to use language effectively in the rhetorical situation of the U.S. academic essay.

This condition or problem can be understood as moments of rhetorical uncertainty about the idea, topic or concept. I am calling this condition "rhetorical" because it appears to be rooted in the writing situation itself. For example, Rong was required to write about U.S. racism in U.S. films. Jun was asked to do a semiotic analysis of a film based to reveal cultural values that to which she herself is just being introduced. The writing problem for Ye was entering into

the rhetorical situation of discipline-based writing. For Zhen, difficulty arose when he tried to write about Chinese cultural ideas in his U.S.-based essay on higher education initiatives. All writers face this condition of rhetorical uncertainty throughout the writing process, and perhaps all writers would and do draw on translingual and transnational resources to which they have access. I observed writers in this study using the resources they had at hand in the digital writing environments they cultivated to draw on multiple languages and digital tools and artifacts originating in multiple cultures and nations to support their rhetorical negotiations of words and conceptual ideas in U.S. academic essays.

Observed challenges requiring more movement among tools and artifacts were related to writers' need to continue to develop their English language proficiency and U.S. cultural knowledge in order to rhetorically address their U.S.-based audience. Although there were patterns to writers' use of multiple tools and resources, their specific use of tools and artifacts varied from challenge to challenge. Writers were required to make continual judgments about the accuracy and relevance of the information provided by the tools. As they wrote, writers gained practice in mobility and continued to increase the range of the ways they used digital tools and artifacts in their writing processes. This observed linguistic and rhetorical negotiation with digital tools and artifacts should be understood as an always emergent, dynamic writing process rather than a stable, predictable activity.

**Condition 1: The writer is alerted to a word-level mistake by an affordance of their word processor.** The significance of writers' use of digital tools to fix noticed mistakes and the significance of word processors to automatically identify and fix some errors is minor. What is more significant in the observed writing processes of the writers in this study was the way in which writers creatively drew on available resources in their digital writing environments to

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negotiate academic English when the autocorrect features of their word processors were inadequate. The process of finding the right word using a shifting array of digital tools and artifacts should be understood as a creative process that, in many cases, is only available for study through observation of writers at work. In other words, the labor is not evident in the textual product of writers. Further, this process is a digital process and further evidence of the importance of the resource-rich digital writing environments for multilingual writers working in transnational contexts.

The recognized mistake relevant to the questions of this study are those in which writers acted after seeing a red underline appear between a misspelled or unrecognizable word. This is the kind of condition that can be mediated in differing ways depending on the tool used. For example, Word, Pages, and Google Docs are all word processing programs. But each has slightly different ways of handling word errors. For example, some words are autocorrected in Pages as the default. The settings in Word can be changed to ensure that each time the word *I* is typed, it is appropriately capitalized. Each of the writers in this study uses Microsoft Word to compose their essays. In each of the sequences narrated in this section, writers first notice the mistake after typing a word is then underlined in red. I am unable to determine if they would have noticed the error otherwise. Likewise, I am unable to determine how other word processing programs might facilitate this part of the 21st century digital writing process.

Ye, who is a self-described bad speller, engaged in four sequences of using multiple tools to correct word errors of the 20 times total in which words he types are marked with a red underline to signal a misspelling or unrecognizable word. Of the 20 marked errors, he fixed four of the 20 with no visible help and used the dictionary in Word to fix 12 others by right clicking on the misspelled word and selecting the correct option provided. For the remaining four, he

began with the Word dictionary but had to go to other tools to find the correct word. In these sequences, his spellings stray too far from the correct spellings for the dictionary in his word processor to provide acceptable alternatives. In his initial interview, Ye explained that he compensates for his bad spelling by using the dictation feature on his phone when "I can remember the pronunciation, but after I type it, I can't get any result because my wrong spelling is so far from the correct spelling." His recorded work also shows a reliance on a combination of his Word dictionary and his downloaded YouDao translator as illustrates in the following sequences.

In one sequence, Ye typed: "For some traditional industries, for example, like running a small grocery store, relational database may be capable to address storage issues, and bussins transtraction issues and." Then he right clicked on "bussins" to bring up the Word dictionary. The options in English include: "basins, bus sins, bussing, buskins, and buss ins." He then retyped the word: "bisnues" and looked it up in Word with these results: "bisques, bisque's, bisques'." Next, he opened his downloaded dictionary/translator and typed in Chinese to receive the following results: "commercial, merchant, mercantile." An example sentence in the translator reads: "I think that is a tragedy of modern business." He typed something else in Chinese into the dictionary/translator, with these results: "consult, business, dealer, discuss, trade." He retyped the word: "business" then right clicked on "transtraction" and changed it to "transaction." The sequence takes just over a minute. I would like to note that when I typed "bussins" using the word processor Pages, it autocorrected to "business."

In two other instances, I observed Ye finding a word he was satisfied with by using both his word processor and his dictionary/translator. In one example, he typed "multpual." His Word dictionary then suggested "mutual" from Word. He copied and pasted his misspelled word into

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his translator, which also brought up "mutual" and "multiwall" in additional to information in Chinese about the word. From there, Ye changed the misspelled word to a word that works in the context of his sentence: "multiple" in the sentence "they might have to deal with multiple problems." In another sequence in which Ye took an additional step with his translator, he began with "formailar," which brought up "formulary" in his Word dictionary. He next opened his translator and typed the Chinese equivalent of the word he was looking for and "familiar" appeared in the results. He returned to his essay, changed to "o" to an "a" to "famailar," then right clicked on the word one more time and selected "familiar." In these instances, Ye navigated to where he needed to go to find the right word. His observed actions also reveal his tendency to rely on copying and pasting instead of retyping of words as he searches for the correct word.

One notable example where Rong used multiple tools to fix a word error was when she misheard her teacher recommend that she replace the term "magical Negro" in her essay with "sidekick." The comment came during a verbal conference after which Rong wrote down "asidedick," the word that she thought she heard. This misunderstanding resulted in a sequence in which Rong used the Word dictionary, Google Translate, Google search, an online English/Chinese dictionary, and her downloaded dictionary/translator app to find the right word. The sequence began when Rong typed in "asidedick" in the Word document of her essay, and a red underline appeared underneath. She right clicked on it and "sidekick" came up in the word processor's dictionary, but she did not fully trust the application as it had steered her wrong before. She then went to Google Translate where she copied in "asidedick" from her paper. Upon receiving no results, she went to a Google search page and copied in "asidedick." The search results included #sidedick, which prompted her to look up "sidedick" in her dictionary/translator. The first result was "sidekick." Rong then copied "sidekick" into her Google search and selected

an entry for the word on www.ichacha.net, an online English/Chinese dictionary. Finally, she returned to her essay and accepted the Word dictionary suggestion for the passage quoted below from the essay she recorded:

> When it comes to the tropes related to race, the first example is the sidekick. These characters tend to be African American men with special powers who make appearances to solely help white characters out of jams and lend a helping hand when the leading role gets into a crisis.

The entire two-minute sequence shows the multiple and complex sequences of acts of composing Rong engages in over time to arrive at a term that is ultimately acceptable for the assignment.

In reviewing tool-intensive correction of words, I am unable to give a definitive reason for why some word errors require additional negotiation for writers. However, I can offer that some words, especially those typed by Ye, raise problems because the way in which they are typed may be more distant from the correct spelling or from the possible errors that Native U.S. English speakers may make. Ye, in particular, experienced this problem more frequently than the other writers in this study because he, as he reported in his interviews, frequently tried to use words that he has heard but not read before. Of all the writers in the study, he is the most verbally outgoing. For Rong, the process of using multiple tools also may be related to trust. Rong trusts her teacher more than her Word dictionary, and she is well aware that her teacher is the final judge of the rhetorical suitability of the languages she uses in her essay. She also has had experience, especially in using academic terms, where the word she was aiming for was not in her word dictionary. A secondary complication in the example presented here is that Rong did not recognize that "a" was an article and not the start of the word.

What is clear is that writers' digital writing environments provided access to multiple tools they could use to "fix" errors. This was work that, when writers were successful, was hidden from those who read their finished texts. Knowing when and how to use digital tools in combination was shown to be a capability that the writers in this study had developed to help them be more successful in new writing situations. Creative negotiation of words through the use of multiple tools and artifacts should be considered an important part of the multilingual, transnational digital writing process. This always-in-development process is necessary for writers working in dynamic digital writing environments. Writers must make continual judgments about results they receive and about new tools and artifacts they encounter because the technologies in digital writing environments continue to evolve.

In the sequences presented here, the writers have a "close enough" acquisition of the word they wish to use. In the following section, I examine sequences in which writers do not yet have an English word in mind to do the rhetorical work they need in their essays.

**Condition 2: The writer has a word or phrase in mind that they need to translate into English**. The very purpose of translators and dictionaries is to help language users find the right word. However, this is not always a one-to-one activity. For the writers in this study, sometimes the translator or dictionary did not produce on the first try a word that was satisfactory to the writer. One reason revealed in interviews included that the writer was not familiar and therefore not trusting of search results; another reason was that the result was unsatisfactory in some way, such as the result was considered a "non-academic" term by the writer. In addition, each writer expressed distrust of some translation tools during interviews. They all mentioned that, at times, Google Translate had given them a bad result. As an example,

when the autocorrect feature of their word processors failed to provide an acceptable option, writers used multiple digital tools and artifacts to arrive at a final word choice.

The ability to use multiple digital tools to seek translations of words and ideas required the ability to make judgments about the quality and credibility of the tools and the rhetorical relevance of the results they suggest. Digital translators and dictionaries have been developed to facilitate communication between people who use different languages. When these tools become an integral part of digital writing environments, the ability to make judgments about the results in rhetorical terms with specific audiences and purposes in mind becomes a necessary part of digital writing processes. And, indeed, the ability to make continual judgments about translation and dictionary results was observed in this study to be an important part of writers' digital writing processes and developing rhetorical mobility.

The situation in which the writers in this study have a word or phrase in mind in that they seek to translate into English likely happens much more frequently than in the sequences observed in this study. Certainly, there may be many moments in writing in which writers begin with a word in another language or register in mind in which they eventually connect with an academic English term that would not be observed in how writing progresses across the essay documents in their digital writing environment. What *can* be observed through the methodology of this study are moments in which writers pause and begin their searches for the word or phrase in Chinese instead of English. The moments that I am interested in, because I am interested in how writers use digital tools to enter into and address new rhetorical situations, are those which are tool-intense or in which writers rely on multiple tools and artifacts to get to a word or phrase that allows them to continue in their writing process.

In one example, Rong looked for both the English name of a movie she had in mind and adjectives to describe a character in the movie. She intended the example she was developing to support her argument about the pervasiveness of racial stereotypes in U.S. films. She began by searching for information about the film she had in mind, *Dumbo,* using Chinese characters in the Google search bar. She said in her interview that she remembered reading about the film from an earlier search. She wanted to write about the character Jim Crow. From the Google search results generated, she selected the entry for the movie on Chinese Wikipedia. She went to the page and selected and copied the English name of the film (one of a few proper names in the page in English instead of Chinese) and pasted it into her essay. To complete the example in her paper, she then went to Google Translate and typed in Chinese words to get to English adjectives to describe Jim Crow in the film. One search result was "Love Cengfan." She opened her ICIBA translator on the screen to look that up as shown in Figure 15.
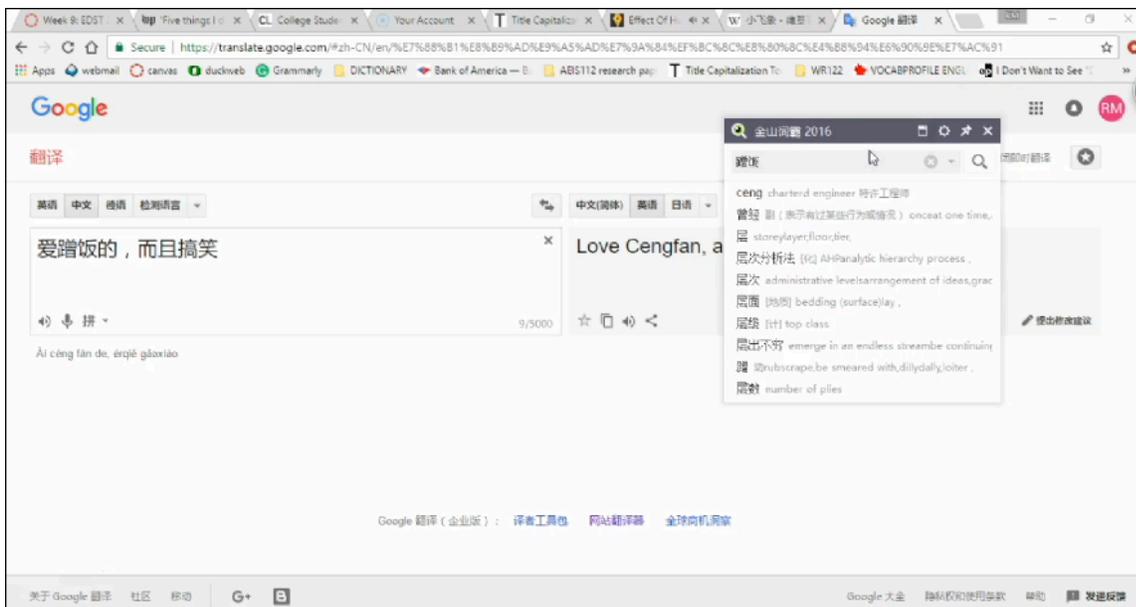


*Figure 15.* Use of two different translators by Rong to select one phrase.

Rong then looked up "free load for a meal," which she typed in her essay. She returned to her translator to find the adjective "comical" to add to her description as shown in Figure 16.

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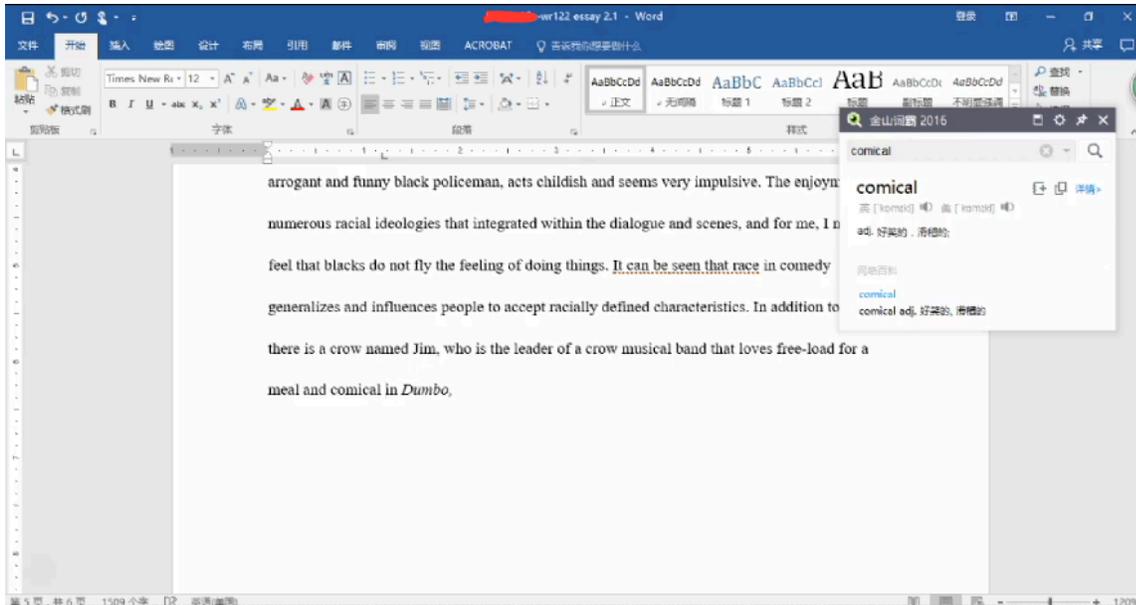
*Figure 16.* Use of translator installed on top of word processor.

Rong's final sentence reads: "In addition to that, there is a crow named Jim, who is the leader of a crow musical band that loves free-load for a meal and comical in Dumbo." In these examples, Rong used Google Translate, Chinese Wikipedia, and her downloaded translation application to figure out how to write a description of the example of a film and character in her essay. She began this sequence in Chinese and moves to the English expression of her ideas.

In another example from Rong's recorded work, she began with the idea to use the film *12 Years a Slave* as example of a movie that draws on the history of racism in the United States. In a sequence in which she is trying to summarize the plot of the film, she supplemented her memory of watching the film a few years ago after it won best picture during the 2014 Academy Awards by looking it up on Chinese Wikipedia and using Google Translate to find a way to translate what she wanted to write into English.

The sequence began when she looked up *12 Years a Slave* in the Chinese version of Wikipedia and wrote: "For example, in *12 Years a Slave,* a film adapted from the same name novel, tells the story of a black man was kidnapped and sold as a slave to start 12 slave career,

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but finally get freedom." After moving her cursor through the sentence to review it, she went to Google Translate and started typing in Chinese characters. This generated "begin a slave career." She went back to her sentence and changed "start" to "begin a." She immediately returned to Google Translate where she typed Chinese characters to get "abolition of slavery." When she returned to her document, she typed "This film has made a positive contribution to the abolitionist movement and influenced the modern history of the United States."

Here, Rong relied on Google Translate. The result was a phrase that did not quite work. Someone who had grown up in speaking English in the United States would likely not connect "slavery" with the idea of a "career." In the second instance, she took the results from Google Translate and reformulated them into the correct form of the word. In one case she used Google Translate to give her the English expression for an idea. In the other case, she used it to remind her of a word or phrase she would likely come across in reading about race. In the final version of her essay "begin a slave career" becomes "sold to become a slave," a phrase suggested to her by a classmate during peer review.

Ye's search for what eventually becomes "grocery store" is another example of how writers in this study use the features of digital writing environments to move from a word or idea in Chinese to an English expression about which they are satisfied. The sequence began with Ye typing "For some traditional industries, for example, like a running a small…" Then, he opened his dictionary/translator and typed Chinese to get to the English result of "small supermarket." He selected this in his dictionary and several model sentences using the term appeared on the screen. One of the model sentences read: "But the large-scale supermarket management system function too was formidable creates the operation tediously to reduce the small supermarket working efficiency." Ye selected the word "creates" in the model, and his application brought up

the definition of the word in Chinese. His dictionary also pronounced the word for him, which can be heard on the video screen capture. The sentence reads like it might have been translated from Chinese, but there is no way to tell based on what is happening on the screen. It may be important to note that the model sentence itself appears to be either translated or composed by a non-Native English speaker.

Even though, at this point, Ye could use the term "supermarket," he was not satisfied. He next typed a new series of Chinese characters into his dictionary that produced the following: "an investment boutique, boutique, a small shop." He selected and copied the Chinese characters he has typed in his application and went to his browser, opened a new tab, went to Google, and pasted in the word. All of the search results are displayed in Chinese. Ye read through the results, as indicated by his cursor hovering over certain entries. He selected an entry that takes him to a definition of "boutique." The first sentence with the word used reads: "Many small businesses are ordered to take loans and give credit on which they smash beyond recovery." This also appears to be a sentence that has been translated into English. Ye then highlighted "boutique" and another box appeared with a definition of the word in Chinese characters. While still on the page, Ye brought up his dictionary and typed in Chinese with the English result of "variety shop, variety store, general store." The sample sentence on the screen reads: "With the help of a real estate broker, I chatted up at the grocery store, I manage to rent a big enough house to take in a handful of people."

From here, Ye copied "grocery" into the search bar of his dictionary. Then he copied "grocery store" into the search bar in Google. This search brought up a map with the closest grocery stores to his location as the first result and the English Wikipedia entry for "grocery store" just below. Ye selected the Wikipedia entry and spent 10 seconds reviewing the page.

Then he returned to his research proposal and copied in "grocery," formatted it, and then typed "store." The entire process lasted almost exactly two minutes, and during the sequence, Ye used six tools in both English and Chinese before settling on what an English speaker from the United States would consider a mundane term. In all, he uses his Word dictionary, his downloaded dictionary/translator, Google, another dictionary, a Chinese web page, and English Wikipedia.

In another sequence, Ye's search for the right English word took him across tools, languages, and nation-specific web sites. The sequence began when he types: "Also, I will use MySql data base as a," and then searched for the word that should come next. He opened his dictionary/translator and typed in Chinese to get the English result: "'representative; on behalf of,' 'magnum opus; master work,' 'representative,' and 'delegation; deputation; mission; delegacy." He selected "representative," then removed the "ive" to get the verb form. Then he selected "represent" after which a menu with different forms of the word popped up. He selected "representation." The awareness of the different parts of speech on the screen is supported in his initial interview during which he described the way he uses his translator to find an English equivalent of the Chinese word he wants to use. In the interview, he used the example of the Chinese word for "hibernate." He demonstrated on his phone his process by typing in the Chinese word for "hibernate" and then explaining how he would change the resulting noun that was brought up as the result into a verb if he needed a verb. In the case of the "representation" sequence in his essay, he knew that he needed a noun.

After "representation" comes up in his dictionary/translator, he selected and copied it. He went to Google and typed Chinese characters into the search bar and received results in Chinese with the first from www.ichacha.net, an online Chinese/English dictionary. He copied the English word "deputy" from the list of results, brought up his dictionary, and pasted it in. He

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then copied "deputy" and added the word "of" into a Google search bar to search "deputy of."

He selected the English Wiktionary entry for the word, listened to the pronunciation which it

offered on the screen, then went back to the search results page and typed in "repersent" into his

dictionary, making a spelling error. The dictionary made a suggestion of "represent" which Ye

then selected. He next scrolled through the 15 entries on the word, then seven uses of the word as

a noun. He scrolled back up and down the list twice more. Then he went to Google and typed in

"repersent," making the same spelling error as before. Once again, the application corrected the

error for him and displayed results for "represent." When asked about this sequence, Ye talked

about his appreciation and frequent use of the affordance of Google to autocorrect and provide

"guesses" about what he searched for as he typed each letter.

After results for "represent" appear, Ye selected the correct spelling for the word and

added "ive" onto the end, even though none of the search results have this form of the word on

the screen. This brought up a definition, a map of the offices of a political representative, and an

ad for a loan representative. Below this was the directory for the U.S. House of Representatives.

He clicked on this, auto translated the web page to Chinese, reversed it back to English, selected

"Representative" from the header on the page, "Directory of Representatives," then returned to

his proposal and copied and formatted the word into his sentence. The word remained capitalized

during the recorded sequence but was lower case in a later draft. The entire sequence lasted two

minutes and 50 seconds. The resulting sentence is "also, I will use MySql data base as a

Representative." The word is correct; the meaning of the word in the context from which Ye

copied it is only somewhat related to the meaning of the word as it is used in his sentence. The

House of Representatives web page is not intended as a dictionary tool as Ye is using it. Rather,

his acts of composing include drawing on less obvious affordances of digital tools, like auto-

correction and auto-population, and adapting artifacts to meet his goals of completing the assignment and finding words that he believed sound more American.

The sequence here is a version of what he described in his initial interview when he explained: "Firstly, I would, in some cases, know the Chinese name first, and I just translate using the dictionary. … Then I would copy that in English and put my whole sentence in Google and look if there is results or return. It means, I want to know does it make sense to Google?" Ye explained that he developed this process in response to comments from his instructors who "circled some combinations which does not fit that sentence. Maybe it makes sense, but it is very weird." In using multiple tools when selecting words, he said that he wants to know "does my word make sense to Americans?" In this example presented here, both the process for coming to the term and the motivations behind it are complex.

In the examples presented here, using multiple tools and artifacts when the result of an initial search in a translation application produced an unsatisfactory result was a part of the writing process. This observed process extended beyond "getting a second opinion." Writers' use of tools was more complex than simply typing in a word in Chinese and accepting the English result provided by the tool. The opportunity to choose tools that seemed best suited for each instance of negotiation was an affordance of the dynamic, Internet-connected digital writing environments in which students wrote. Writers had to make judgments about the accuracy and credibility of the tools and artifacts they used to identify possible word choices, and they had to make rhetorical judgments about the choices offered. Both the ability to use tools and make judgments about their validity were important for the writers' digital writing processes and, ultimately, their rhetorical mobility.

The examples presented here are ones in which writers use multiple tools and artifacts before settling on specific English words. In the next section, I describe sequences in which writers draw on multiple tools and artifacts to address moments of more generalized rhetorical uncertainty.

**Condition 3: The writer is uncertain about the idea, topic, or concept about which she is writing.** As in moments when writers do not yet have an acceptable word in mind as they write, the condition of rhetorical uncertainty in writing about concepts or ideas is common across many writing situations. What makes this of interest in this study is the observable ways in which writers drew on a range of digital tools and artifacts to better understand cultural-based concepts in order to write about them for a U.S. academic audience. In fact, drawing on multiple digital tools and artifacts to address knowledge was an important part of writers' digital writing process and one that was mediated by the digital writing environment, in particular the way in which it provided access to such a wide range of materials for the writers in this study. As with the use of translation and dictionary tools making judgments about the reliability of the tools and artifacts and their rhetorical potential was also part of the process.

When considered together, many of the sequences from Rong's recordings presented in this chapter illustrate the ways in she used multiple digital tools and artifacts across languages and from various cultural and national origins to support her understanding U.S. racism and the concept of "tropes," the lens through which she wrote about U.S. racism in films. In the remainder of this section, I describe some additional observed ways that Jun and Ye used digital tools and artifacts to help them write about morality and college disciplinarity, respectively.

In her interview, Jun described how she came to be writing about morality, a concept that she said that she is not interested in: "I need to choose the film first, then the question exists in

this movie," adding, "It may be talk about humanity, morality, this kind of thing." She began

with a movie she was familiar with, *Lord of the Flies*. Jun had already written about the book

upon which the film is based in a previous writing class. Before making a final decision, she said

that she did a preliminary search online to determine if her idea about the film was controversial

and whether there were sources she could use to help her find enough ideas to write about. To

support her writing on morality in *Lord of the Flies*, Jun drew on her own previous essays;

sources in Chinese that she found while searching Baidu as shown in Figure 17; a discussion

thread on Goodreads, a social media site about novels; and various educations resources about

the book upon which the film is based that she found when searching Google.
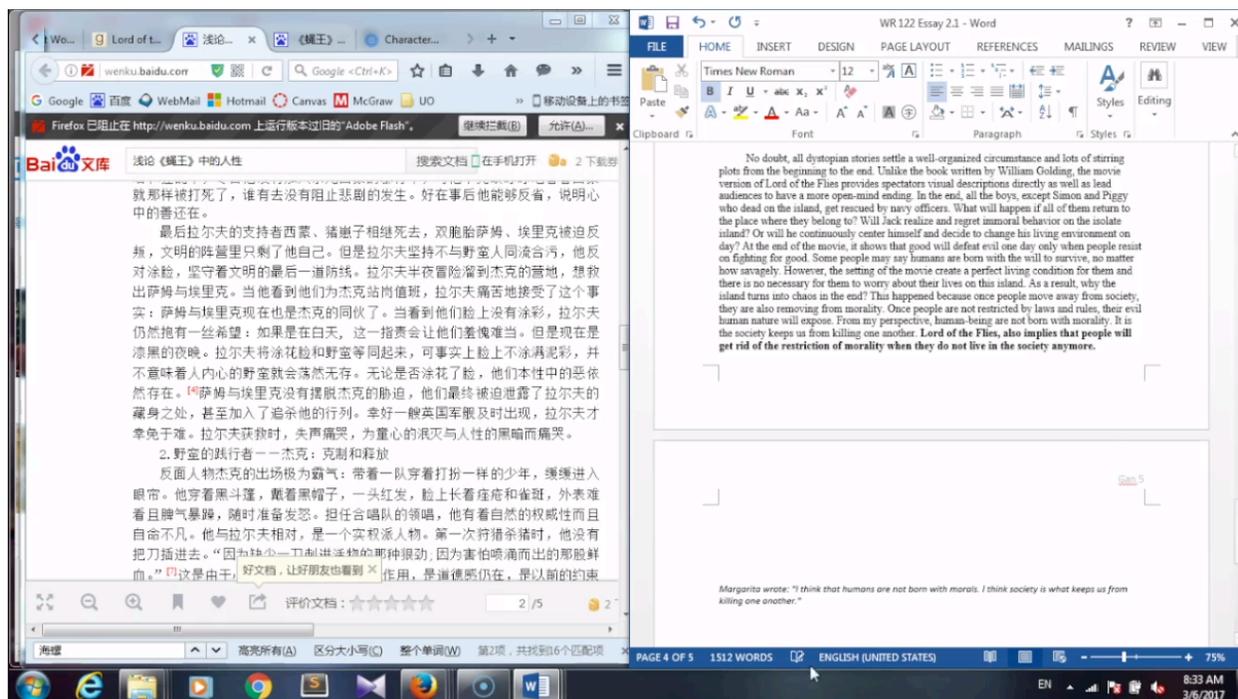


*Figure 17.* Chinese article and English essay sharing the same digital screen.

The first thing that Jun typed in the Word document of her essay was the question at issue

she explored throughout the essay: "Is morality the thing that our society sets upon us?" At 11

p.m., an hour and a half into her all-night work session on her essay, Jun returned to a discussion

thread she had found prior to starting work on her essay on Goodreads that asked and answered

the question "are humans born with morals or does society set it upon us?" This could be the site from which the question for her paper originates. It was the first result in the 11 p.m. search, and it was colored in purple, indicating that it was a page that Jun had already at some point clicked on. Jun moved through the Goodreads page for about three minutes. In her follow-up interview, she explained her actions: "I first read through all of them, and try to find those who stand on the same side as I have, so I was doing that. I just think we have same thoughts so I can use as reference. … I can see how others thoughts, yeah, because we all think that the society set it upon us, so maybe … it just help me." Jun explained that the Goodreads thread helped her feel confident that she had uncovered a controversy, which she said was important for the assignment, and that her idea is one that is shared by others. The discussion posts also provided English models for her to use as she phrased her ideas about morality in her essay.

Jun's digital writing environment, in which she positions the window with her essay on the right side and her browser on the other, facilitated how she used the artifacts she found online. In the sequences described here, she copied and pasted segments of text from Goodreads into her essay and then edited them to varying degrees. In the first of such sequences, Jun typed in her essay: "From my perspective, I," then she copied a statement from a Goodreads user with the screen name Domina: "believe that people do have instincts for social behavior and survival, but morals, as difference between right and wrong, are in my opinion constructed by our experiences and social norms of a society we live in, adopted through socialization," as shown in Figure 18.
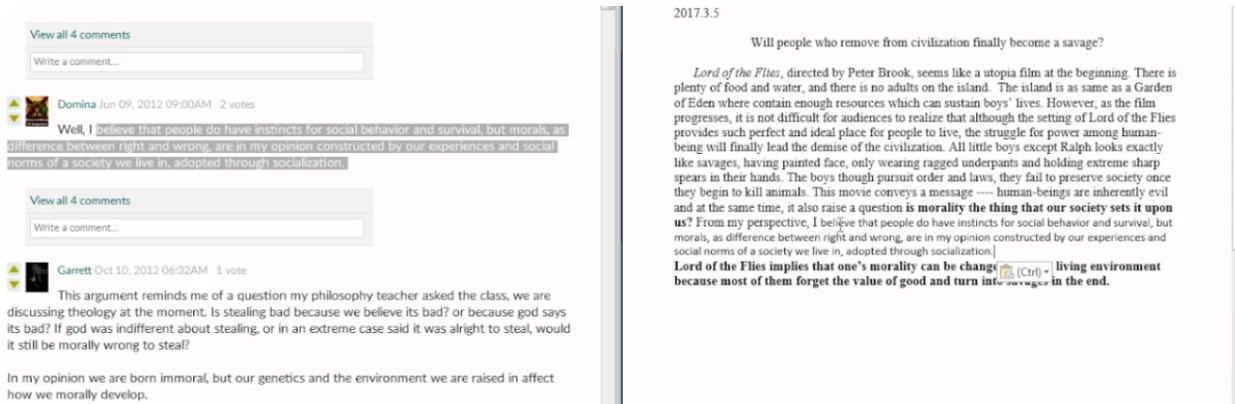
*Figure 18.* Goodreads thread next to essay facilitating transfer of ideas.

Jun then started a new line in her essay: "I believe that people have instincts for social behavior but they are not born to recognize what kind of thing is right or wrong. Morality are constructed by people's experiences and social norms." Upon finishing the sentence, she deleted the statement from Domina that had been in her document directly below where she was typing. Later, she copied and pasted a statement from another Goodreads user into her text with the screen name Margarita: "'I think that humans are not born with morals. I think society is what keeps us from killing one another,'" as shown in Figure 19.
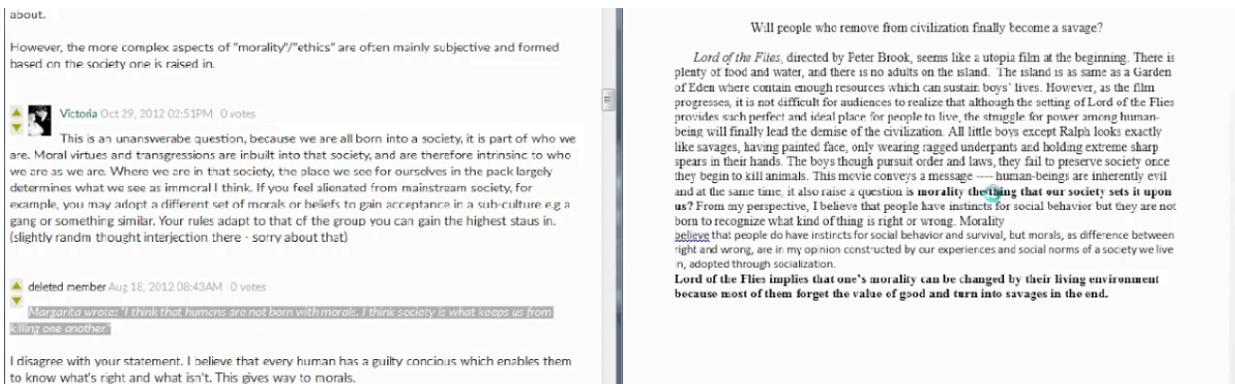


*Figure 19.* Statement from Goodreads copied into Jun's essay.

Much later in her work session, at 8:08 a.m., Jun returned to Goodreads and the statement by Margarita. At this point, she was working on her conclusion. She copied the statement from Margarita that remained at the end of her essay. She pasted it into a Google

search bar. This brought up only one result: the Goodreads discussion thread from whence it came. Jun edited the statement down to "I think that humans are not born with morals." This resulted in Jun selecting and browsing through an article from *The Atlantic* entitled "As Babies, We Knew Morality," which remained in the left-hand window for several minutes but did not visibly influence what Jun typed about the character Jack. Jun returned to the quote once again at 8:30 a.m. as she typed the final three sentences in her essay: "From my perspective, human-being are not born with morality. It is the society keeps us from killing one another. Lord of the Flies, also implies that people will get rid of the restriction of morality when they do not lie in the society anymore."

Jun then deleted Margarita's statement from the bottom of the screen. Jun's perspective is nearly identical to Margarita's. She identified this act as using a native English speaker's writing as a model to help her express her own thoughts. She said, "I think they are pretty good structure and they speak in English and the things they write is more like in English, like American thoughts. If I translate Chinese to English the reader won't understand what I am talking about. I'm just learning how to write essay from others." She explained that the strategy displayed here of keeping quotes or ideas at the end of her essay is part of her regular writing process. She said, "when I am writing this essay, I'm always trying to find something that I can write in my conclusion. And, when I find the right one, I will put it in the end of the essay, and I will use it later." In the sequences here, she relied on Goodreads, which led her to an article in the *Atlantic*. Her search for information about the wolf children described earlier in this chapter also originated because of the material she found on Goodreads. One of the users in the thread wrote about orphans in Russia who develop no moral code. This, Jun explained, reminded her of

something her mother mentioned to her about children being raised by wolves. This in turn initiated a sequence where Jun goes to Baidu, Google, and Wikipedia.

In these sequences detailed this section, Jun relied on the words and ideas of others without giving them citation, a clear violation of U.S. academic authorship. In speaking about her decisions, she explained her actions as rhetorical or to help her phrase her ideas to a U.S. audience in a U.S. context. Jun might have an incomplete understanding of the rhetorical situation she finds herself in and the ways in which she uses digital tools and artifacts may be problematic, but she did act like the other writers in this study in her use of multiple tools and artifacts to address her uncertainty about the topic and how to write about it.

For Ye, the need to use multiple tools and artifacts came from his uncertainty about the research proposal as a rhetorical form for academic authorship in his computer science class. Ye explained in his interview that he was uncertain how to write a research proposal because he had never written one before. While watching a sequence in which he used an entry on Zhihu to help him format his proposal, he explained:

> I didn't know what exactly does it look like before so I just search on Google. So I search like several pages, and I get some ideas from them. For example, the second website. And I know the structure of that and I want to confirm that is correct format. I should not use the format just from one website. Maybe that website not very reliable resources. I should go to other website. So that's why I searched it on another website and find like, I, like make that as my structure. And then I talked to my professor and asked "does that makes sense to you? is that acceptable? He said, yeah, that's acceptable.

In the sequence that follows, Ye's actions on the screen reveal some of the ways in which Ye used multiple digital tools and artifacts from multiple languages and sites to understand what a research proposal should look like and do.

This sequence occurs after Ye has been writing for quite some time in a Word document. He next created a new Word document and then brought the window with his browser in it to the front of the screen and selected a tab with assignment guidelines on the course's online page. He selected the word "proposals" and then copied it into a new Google search. The search results were displayed in Chinese. The first result was a definition, followed by an entry on Douban, a Chinese social-networking site, and an entry on Zhihu, the Chinese social media question-and-answer site that Ye said he uses frequently for both entertainment and homework. He said, "Like 20 to 30 percent of the time, I use Zhihu for academic work, but the rest of the time I use for entertainment." Ye selected the Zhihu entry for a general outline as shown in Figure 20.



*Figure 20.* Results on zhihu about requirements for proposals.

Ye selected the outline, opened a new Word document, and copied in the outline. He formatted it into the font he wanted and then copied the references from an earlier version of his project in another Word document into the new document. He next opened up the tab with the assignments guidelines and selected and copied the word "proposal," brought the new Word document to the front of the screen so that it was on top of the browser window, and saved the document pasted in the word "proposal" that he copied from the assignment guidelines.

Ye then spent two minutes clicking through tabs on his screen and going back and forth between the Zhihu entry on proposals and his new Word document. He situated the Zhihu results and the new document side-by-side on the screen. He spent about five minutes continuing to copy what he had already written in his first Word document into the headers in the new document from the Zhihu entry. All told, this sequence of events spans about 10 minutes.

This sequence was the second time in his recorded work that he used multiple tools and artifacts to help him understand proposal writing. Early in his recording, about 15 minutes in, he brought the application running his QQ chat group to the front of the screen, then he went to the online assignment guidelines where he copied the word "proposal," and then went back to the QQ chat. In his chat box, he typed in Chinese and then pasted in the English word "proposal." He explained that he was asking his QQ group what they knew about proposals. This early sequence did not provide him much help in figuring out how to write a proposal. However, it is one more example of the ways in which the writers in this study relied the tools and artifacts in their digital writing environment to navigate U.S. academic authorship.

The movement among and use of digital tools and artifacts from multiple cultural and language sites was observed to be common to the writing processes of each writer in this study. Each of the writers in this study began their projects faced with gaps in their conceptual, cultural,

and linguistic knowledge that they needed to cross in order to successfully enter into U.S. academic authorship. They began to bridge those gaps by drawing on a range of tools and artifacts that they had currated their digital writing environments. In each situation, the writers had to make a judgment about the relevance, applicability, and quality of the information they accessed in relation to the audience and purpose for which they wrote. Developing the ability to use multiple languages, tools, and artifacts afforded by the digital writing environment was central to how the writers entered the unfamiliar rhetorical situation of U.S. academic authorship.

**Chapter Summary**

The writers in this study were motivated to improve their academic English and as efficiently as possible find and develop ideas that were suitable for the purposes of their respective academic writing assignments and the U.S.-centered audience for whom they wrote. Close observation and analysis of recording previously hidden activities in which the writers in this study engaged support three primary findings about the writers' multilingual, digitally-mediated writing processes:

1. The transliterate writing process involves cultivation of the computer screen as an individualized digital writing environment that can be used as a testing ground to try out in-development linguistic forms and cultural knowledge; this includes continual downloading and searching for applications that assist in writing, choosing default settings that display languages in certain ways, and selecting translators and dictionaries that writers trust.

2. Writers' digital environments facilitate transliterate composing processes by allowing writers to move across linguistic, rhetorical, cultural, and national boundaries and allow access to emergent resources from multiple web domains (Chinese and English) for

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dynamic, mediatory use in academic writing. Writers acquire and develop rhetorical tranliteracy as a result.

3. Writers bring together multiple languages, tools, and applications in their digital transliterate testing grounds to acquire in-the-moment, good-enough literacies to address linguistic and rhetorical differences in academic writing. These differences include when the writer notices word mistakes that are not easily corrected with word processor dictionaries; when the writer is working to translate a word or phrase into academic English; and/or when the writer is faced with rhetorical uncertainty about the idea, topic or concept about which she is writing.

The findings described in this chapter address the study's questions about the kinds of digital tools that multilingual international students use in academic writing, how those tools mediate writers' processes, and what that might mean for understanding how writers use available resources in their digital writing environments to engage rhetorically, with purpose and audience in mind, in academic authorship.

Each finding was explored in-depth in this chapter using a combination of narrative description of observed sequences of writing as they unfolded, screenshots from the recorded videos, and writers' own words describing select sequences recorded of their writing processes. This detail illustrated how writers used and adapted multiple tools in both Chinese and English in a range of acts of composing. Writers cultivated their digital writing environments in such a way as to enable them to draw on a variety of tools and artifacts in multiple language from multiple classroom and cultural sites to mediate acts of composing such as selecting words, developing knowledge about their topics, and navigating new generic forms.

Digital tools used by writers directly and indirectly helped them enter into the unfamiliar rhetorical situation of U.S. academic authorship. Video screen capture made visible some of the ways in which the tools and artifacts created or brought into a continuously cultivated digital writing environment mediated acts of composing and influenced the words and ideas that writers settled on in their essays. Writers' use of digital tools and artifacts in their digital writing environments were rhetorical, purposeful and evidence of their developing rhetorical mobility. The ways in which they used the available resources in the digital writing environment supported them as they bridged gaps in linguistic, conceptual, and cultural knowledge that were necessary for them to complete their academic writing.

The writing processes through which the writers cultivated their digital writing environments and then drew on the available resources should be understood as transliterate writing processes that all writers might use to enter unfamiliar rhetorical situations in an increasingly global, transnational communication context. Such rhetorical mobility can increase writers' flexibility and adaptability to participate in both academic and civic issues of importance. The behind-the-scenes ways in which multilingual international novice writers move rhetorically within their digital writing environments should be used to refine the understanding of academic authorship as it is taught in FYC in the multilingual, digital age.

CHAPTER V

ANALYSIS, INTERPRETATION, AND IMPLICATIONS OF FINDINGS

I set out in this study to better understand the multilingual transliterate writing processes of novice academic authors such as those I encounter as a teacher in FYC classes. I developed a method to observe long stretches of student writing on computer screens and to ask writers follow-up questions to interpret what I saw. I sought to answer the following research questions:

1. What digital tools mediate academic work by novice multilingual international student writers? What acts of composing are mediated by these digital tools?

2. What linguistic and cultural knowledge do novice multilingual international writers draw on in acts of composing, and how do these relate to notions of academic authorship?

I found that creation and ongoing cultivation of the computer screen as a transliterate testing ground is a central rhetorical process for the writers in this study. By downloading translation applications and dictionaries, reshaping and positioning windows of their word processors and browsers, and selecting settings that allow them to read and type in both English and Chinese on their screens, the writers created an environment on a single computer screen that allowed them to move across linguistic, rhetorical, cultural, and national boundaries and allow access to emergent resources from multiple web domains (Chinese and English) for dynamic, mediatory use in academic writing. Then, when writers encountered writing problems related to their developing English proficiency and relative newness to U.S. culture, they were able to draw on multiple digital tools and artifacts in this environment to address the rhetorical situation of U.S. academic authorship in which they found themselves. As a result, writers acquire and develop rhetorical transliteracy. The transliterate writing processes that I observed support writers'

rhetorical mobility. Further, they occur in a visibly transnational digital space that suggests the transnational potential of all U.S. academic authorship.

Given the potential for mobility across linguistic, national, and cultural borders on digitally networked devices and the widespread access to such devices and networks in U.S. higher education contexts, I submit that all academic writing can be understood and taught as potentially transliterate and transnational. If that is the case, then close attention is warranted to how writers like those in this study move into U.S. academic authorship. I might add to my initial questions: What tools and artifacts appear in a transnational writing space? How do these digital tools mediate and cultivate rhetorical mobility in transnational writing? What might this mean for understanding academic authorship and how it is taught in First Year Composition (FYC) at U.S. universities?

Crosswhite's (2015) list of the rhetorical capabilities is useful in this new framework in analyzing transliterate writing processes for use in moving among transnational rhetorical spaces. Crosswhite (2015) formulated in a conference presentation his rhetorically-focused list as a response to U.S. education reforms related to the teaching of language arts that have led to increased privileging of testing methods that "ignore the ways in which education is supposed to promote the growth of human individual and to prepare people for membership in at least partially self-governing communities and organizations." Such communities and organizations in the 21st century should be understood as global given the ways in which people and resources move across borders physically and virtually and the ways in which local policy decisions can reverberate in multiple geopolitical spaces at once. To address this emerging multilingual, transnational reality, Crosswhite (2015) formulated a description of what he argued are basic rhetorical *capabilities*, adding to the capabilities approach to human development forwarded by

Nussbaum (2011) and Sen (2009). Capabilities work is concerned with influencing development of policies on local and global scales to focus on people and their abilities rather than on nations and their economic resources. Two capabilities from Crosswhite's (2015) list are particularly relevant to this study and rhetorical mobility of academic writers: "being able to learn and share a language" and a "capability for understanding and using a cultural commons." In a digital transnational and transliterate communication environment, like that cultivated by the writers in this study, "cultural commons" might be understood to be the digital environments that writers create and use. The shared language needed by the writers in this study for rhetorical mobility is academic English.

As part of their writing processes, the writers in this study created, cultivated, and nimbly moved on their computer screens in such a way as to facilitate use of multiple languages and travel across transnational spaces. As the writers in this study accessed artifacts across Chinese and U.S. web domains and brought them to bear in their activities of writing, they expanded the "commons" of the rhetorical situation they found themselves in. Writers accessed artifacts as a way of "making do" (Leonard, 2014, p. 228) in an unfamiliar rhetorical situation for which they were not quite prepared. The very act of doing so developed within the writers the capacity to build and move within a space that crossed cultures and nations. Similarly, writers in this study used digital translators, grammar checkers, and other artifacts in multiple languages on the same topic or concept to help them in "sharing a language." The language expected in U.S. academic authorship that writers developed the capacity to share is Standard Written English (SWE). They did so as novices to academic authorship and as English language learners. In fact, the ways in which writers used and adapted digital tools and artifacts could be understood as both processes to address new rhetorical situations and self-sponsored language learning. For example, Ye

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acquired both the visual and aural representation of certain words using the affordances of the dictionary/translator he had installed on his computer screen as he wrote his proposal to analyze two computer databases. Jun purposefully searched for, examined, and modeled her own writing on writing in English on social media sites that she identified as sharing her ideas of morality in *Lord of the Flies*. All of the writers spoke about using the exigence of the academic rhetorical situation to increase their academic vocabulary and improve their English.

In recording the screens of writers at work, the methodology developed for this study reveals the importance of transliterate writing processes for rhetorical mobility and expands the imagined territory of academic writing. The window opened onto in-the-moment transliterate writing processes uncovered some of the ways writers can exploit the affordances of the computer screen in order to try out new linguistic forms and cultural knowledge to address the challenges of sharing a language and finding common cultural ground on which to base rhetorical arguments. What is brought to light is not a discrete, stable set of digital tools that grant writers rhetorical mobility but a transliterate capacity to identify and draw on available resources in particular moments.

The in-development capabilities of the writers in this study to critically use tools to share a language and find common ground with their readers made their rhetorical movement into U.S. academic authorship possible. These are the kind of capabilities, or rhetorical transliteracies, that can support writers in their rhetorical engagement in global, transnational communication situations, and, as such, I believe they are ones that FYC teachers and administrators can and should develop in *all* writers. Increased capacity for critical performance in transliterate composing processes would allow the writers in this study, indeed, all student writers, to enlarge the academic sphere into which they might rhetorically move and deepen their contributions.

Reframing 21$^{st}$ century academic writing processes as transnational, multilingual, and transliterate is a step toward further understanding the need for such critical performance and developing strategies for enlarging writer's capacity to understand and take into account the ideologies and systems of globally mobile power embedded in the digital tools they use. Framing the digital writing processes observed in this study as transliterate and transnational supports revision of FYC curriculum and pedagogy to a transnational approach that 1) acknowledges the transnational reality of 21st century academic authorship for all writers and 2) cultivates the capacity to critique and move within transnational digital spaces.

**Observing Digital Writing Processes and Rhetorical Mobility**

Understanding rhetorical mobility and academic authorship in the 21$^{st}$ century requires recognition of the centrality of digital writing environments, particularly computer screens, to writing processes. The methodology developed for this study showed the integral role that digital tools played in writers' processes. These processes largely occurred on a single computer screen in a digital space connected to other multilingual, transnational digital spaces via the internet. Video screen capture proved to be a crucial tool to study 21$^{st}$ century academic writing activities because, for the writers in this study, a preponderance of their processes occurred in or were mediated by the multilingual and transnational digital writing environment captured in screen recordings. These digital writing processes only become visible and available for study by being recorded. The significance of these writing processes is revealed in the recordings.

The writing processes of the writers in this study primarily occurred in digital spaces. Rong reported in her interview that she almost never chooses a pen and paper as she writes except when asked to do so in class. Even when off-screen writing processes came into play, Rong's writing activities were ultimately mediated by her digital writing environment. In a

sequence described in further detail below, Rong changed the phrase "magical Negro" to

"sidekick" after her teacher suggested the term during a face-to-face writing conference.

However, the process of changing the word was more complex than simply removing the phrase

and adding the new one. Because she had misheard the word, she mistyped it. This led to an

extended sequence, made visible by recording her screen, her use of and reliance on multiple

tools that she brought into her digital writing environment. She used Google search and translate,

the dictionary on her word processor, and another translation application. In another example,

Rong used comments from a peer-review activity in class to make changes in her draft. Again,

the process was more complex than simply transcribing suggested changes into her essay. Rong

continued to use digital tools to confirm and negotiate the suggestions her peer had made. As she

did so, she used tools and artifacts in both Chinese and English based in both China and the

United States. The video recordings of her work showed the importance of the digital writing

environment and its transnational nature for her rhetorical mobility even in moments that might

otherwise be understood as located in her U.S. classroom experience.

Video screen recordings also made visible the ways in which writers have some measure

of control in how they set up their screens to facilitate their work. The fact that they were able to

manipulate the digital writing environment and that they showed practice in doing so attests to its

importance in digital writing processes and rhetorical mobility. Jun set up her screen in such a

way as to facilitate her use of websites and her own previous writing to find ideas and English

words and phrasings as she wrote. She created two windows on her screen with the right window

containing her essay and the left containing either her browser, with tabs open to both U.S. and

Chinese-based website, or previous essays. This allowed her to easily copy and paste text from

the left window into her essay in the right window. Similarly, Ye opened and positioned

windows with his essay, his browser, and various articles he was referring to in such a way as to make transferring information to his essay relatively simple. Because of her priority to remove distractions from her writing environment, Rong preferred to have one window filling her screen at a time. However, she did position her favorite translator application, a Chinese-based product, so that she could have access to it while working on her essay.

The ways in which the writers set up their windows and the apparently seamless manner in which they moved between windows, websites, and their essays suggest that such actions have become second nature to them through their experience and practice of writing in digital writing environments. Using Google and Baidu and multiple translators and dictionaries on their computers as they wrote is a habit born out of necessity in their attempts to share a language and find common rhetorical ground with a U.S. audience. Their digital writing environment expanded to include both U.S. and Chinese web spaces out of the circumstance of entering U.S. academic rhetorical situations with in-development English language proficiency and cultural knowledge about the United States. But, given the open and accessible nature of the Internet, especially when connected to it in the United States, finding and using the tools in the service of this rhetorical mobility was relatively simple. Digital writing environments were the setting and facilitator of rhetorical mobility of the writers in this study.

However, computers were not the only digital device available and used by writers in this study as they worked to share a language and find common ground with their audiences. One limitation of the particular digital tool selected to record writers at work in this study is that it did not work on smartphones. In interviews, each writer in this study talked about the role their smartphone plays in their writing processes. While Rong and Ye spoke about making an effort to not use their phone while writing because of its potential as a distractor, Jun did nearly all of her

translation and dictionary work on her smartphone. All writers reported having their smartphone available while writing. Because smartphones give writers access to another digital writing environment, further study is needed to better understand the role that smartphones play in digital academic writing processes and transnational rhetorical mobility. However, writers used the same tools and applications across their devices. While observing writing processes on smartphones might certainly reveal other kinds of tools and processes, the current trend of cloud-based computing and syncing of devices might mean that processes fluidly move across devices.

Because writers exert some control over their digital writing environments, and because so much of their writing processes is affected by the environments they create, recording writers' full computer screens and analyzing the actions therein is especially important to understanding 21$^{st}$ century writing processes. Video screen recordings captured both the mobility of writers within a digital writing environment and the rhetorical mobility of writers in their attempts to share a language with their audiences and employ culturally relevant evidence in support of their arguments. Technology has long been understood to mediate writing. The recorded digital writing processes of the multilingual international students in this study demonstrate some of the ways currently available technology mediates and makes possible rhetorical mobility. Digital writing processes should be understood as central for writers moving into the rhetorical situation of academic authorship. Methods of recording writers at work in their digital writing environments should be further refined and employed as an indispensable composing process research method.

## Rhetorical Movement Toward Critical Performance

Videos of writers at work in this study made visible some of the ways in which digital writing environments and the transliterate writing processes therein can facility writers'

rhetorical mobility. All academic writers experience gaps at times between their linguistic and cultural knowledge and the demands of particular rhetorical situations. How well the writers in this study were able to address the gaps they encountered corresponded to their development of rhetorical capabilities to share a language and create a "cultural commons." Further, the development of these rhetorical capabilities was dependent on their awareness of their own limitations related to linguistic and cultural knowledge and their developing *critical* performance of transliterate composing in which they demonstrated, or didn't, awareness of the limitations of the tools and artifacts used to address writing challenges related to rhetorical word choice and idea development. The described sequences that follow can be understood as evidence that the writers in this study were developing rhetorical capabilities that allowed them to *begin* to share the language of academic writing and use some features of the "cultural commons" of U.S. academic writing.

Writers were aware of the need to improve their academic English, the shared language of the audience of academic writing, and purposefully worked to do so while composing their essays. Writers also demonstrated awareness of the need to "sound American" or use words and ideas that were understandable and acceptable to their U.S. audience. Sequences in which writers sought out and used multiple digital tools and artifacts to address writing challenges related to word choice and idea development suggest that writers were making judgments about results offered by the tool. In other words, writers assessed certain results and found them lacking. During interviews, writers explained that in some of these sequences their evaluation of tool-generated results was based on a lack of confidence or wariness of the tool. That is, writers, at times, performed critical awareness of the limitations of the digital tools and artifacts in their digital writing environment. However, each writer in the study encountered challenges that they

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were not able to fully address. Both moments of success and failure in negotiating the unfamiliar rhetorical situation of U.S. academic authorship support the need for writers to be able to critical perform in the transliterate space of their computer screens.

Rong's efforts to define "common tropes of racial difference," a key phrase in her essay, illustrate her digitally-mediated process to search for academic English that she believes her audience expects and to find culturally relevant examples that her audience will recognize. The sequences in which Rong addressed these challenges demonstrates her awareness of her own limits and a developing critical awareness of the tools she is using. The sequences also indicate that Rong's rhetorical mobility is not yet fully developed. In one example, Rong eventually chose to use the term "sidekick" to describe the trope in U.S. films in which the black character is always in the supporting position and never in the lead. The term, which was suggested by her teacher, is one whose meaning is likely understood within the discourse community of Rong's writing class. However, there is not a clear indication that Rong fully understands that term or why the phrase it is replacing, "magical Negro," is problematic in the rhetorical situation in which she is writing. There is no recognition of the ways in which the term "sidekick" removes the focus from race and undermines the connection between racial tropes and films that Rong is attempting to make.

After two separate extended composing sequences using multiple tools between which she had a writing conference with her teacher, Rong arrived at this sentence in her final essay:

When it comes to the tropes related to race, the first example is the sidekick. These characters tend to be African American men with special powers who make appearances to solely help white characters out of jams and lend a helping hand when the leading role gets into a crisis.

Rong used Google search, an About.com article on racial tropes, her teacher, and various dictionaries to finally arrive at the word "sidekick," a deracialized synonym for "magical negro," which she came to as part of an extended search in Google in her first draft of her essay.

In her initial version of her essay, Rong found the term "magical Negro" after she typed "black tropes in film" and then "blacks in film" in English into Google. From the results, she selected an About.com article entitled "5 Common Black Stereotypes in TV and Film." One of the tropes she noticed was the "magical Negro." Before using the phrase in her essay, she went to Google and typed the phrase into the search bar. She followed the English name with three Chinese characters. The search results for the term began with the Google Translation results, likely because her browser had "learned" that from her repeated selection of Google Translate that this might be a result she would select.

After pausing briefly, Rong then opened a new tab and accessed Baidu, the Chinese search engine, performed a similar search, and found a Chinese-web opinion page that she selected and scrolled through briefly. This satisfied her concern that the term she was using had an acceptable meaning. She then continued to find further details for her sentence about the trope. She did this by opening a new tab, typing in Chinese characters followed by the English word "cast." The results page began with the Chinese Wikipedia entry for *Shawshank Redemption,* a well-known film in which Morgan Freeman plays the kind of supportive Black character that could fit into the description of the common trope she was investigating. During the course of writing the essay, Rong repeatedly used Chinese Wikipedia to find the names of movies and characters in the movies to add to her paper. In her interview, she explained that she is a movie fan and had watched all of the movies she uses in her paper, mostly on the same

laptop in which she writes. However, she could not always remember the names of the movies or the characters in English.

Finally, Rong returned to her essay and typed: "The first one is the magical negro. These characters tend to be African American men with special powers who have make appearances to solely help white characters out of jams, seemingly unconcerned with their own lives." In this first sequence of searching for an example of a common racial trope, Rong's actions reveal her strategies for finding a culturally and topically relevant example to define the concept of "common racial tropes." She first used Google, the U.S.-based search engine, to identify an example from an "American" source. But she did not accept the example without question. She then turned to Baidu to look it up to make sure she understood the concept to help her make a judgment about its relevance and use in her essay. She continued transliterate composing as she used multilingual and transnational resources to develop the example when she looked up *Shawshank Redemption* in Chinese Wikipedia. In the end, Rong did find an example that supported her effort to define "common tropes of racism" for her audience. However, despite her efforts, her use of digital tools and artifacts to determine the relevance and appropriateness of the example did not adequately provide her with enough information to understand that the term had pejorative and oppressive overtones and that she, at least in her teacher's view, might not have the authority to use the term. Her developing critical performance in transliterate composing involved recognizing the limits of her own knowledge and of the information available on the Internet was not adequate in this situation. Even though she used multiple tools to verify her choice, it was not acceptable to her teacher as her audience.

Rong's negotiation of the term continued after her teacher read her first draft and recommended during an out-of-class conference that she replace the problematic term "magical

negro" with "sidekick." Rong wrote it down immediately upon leaving her teacher's office. However, she misheard the term and did not have the proficiency in English to recognize her mistake. She wrote down: "asidedick." This misunderstanding led to a second sequence in which Rong used the Word dictionary, Google Translate, Google search, an online English/Chinese dictionary, and her downloaded dictionary/translator app to find the actual term that her teacher suggested. This digitally-mediated sequence began when Rong replaced "magical negro" with "asidedick" in the Word document of her essay. A red underline appeared underneath. She right clicked on the tem and "sidekick" came up in the word processor's dictionary. Rong did not initially choose to accept the suggestion. She explained that the word processor sometimes gives a bad suggestion and that she has to make judgments about the appropriateness of the words it suggests. Rong believed that she had the correct word from her teacher, so she judged that the result from the dictionary was wrong.

To check this idea, Rong next went to Google Translate where she copied in "asidedick" from where she had typed it in her paper. Upon receiving no results, she went to a Google search page and copied in "asidedick" into the search bar. The search results included #sidedick, which prompted her to look up "sidedick" in her dictionary/translator. The first result it gave was "sidekick." She then copied "sidekick" into her Google search and selected an entry for the word on www.ichacha.net, an online English/Chinese dictionary. Finally, she returned to her essay and accepted the Word dictionary suggestion.

In this second sequence, Rong demonstrated persistence in using multiple digital tools and artifacts to check the term. In her interview, Rong spoke about the gap in her knowledge about U.S. racism and expressed an understanding that the language used to talk about racism can be politically charged. From her experience in her classes, she said, she was learning about

the harm that language associated with racism can cause, and she said that she was cautious in entering discussion in class because she did not want to say something that might sound racist. She could not find an appropriate term through her own use of digital tools. Her determination to figure out how to use the term her instructor gave her demonstrated her persistence and her use of multiple digital tools to do the work of meeting her teacher's rhetorical expectations.

However, the sequence points to the limits of Rong's awareness and the exigent need for writers to enter the digital commons with care in order to critically perform transliterate composing. Rong's teacher intervened to prevent Rong from inadvertently using a loaded term in her essay. But this intervention, when it became digitally-mediated in Rong's process, very nearly took Rong into inappropriate and vile territory on the Internet. Rong did not have the linguistic or cultural awareness to recognize the sexual overtones of her misspelling. Moving about her digital writing environment allowed Rong to begin to productively enter into U.S. academic discourse about racism and tropes. However, videos of her work revealed unintended negative consequences. There was not in the digital writing environment Rong created, nor in her actions toward sharing a language and creating a digital "cultural commons," any visible protection against the "dark" side of the Internet. In addition, the sequence reveals both the power of language and how its use is rhetorically situated. Rong's initial term, "magical Negro," was doing the rhetorical work she intended; the term was an example of a *racist* trope in film. The reason her teacher asked her to change it is unknown. However, I can surmise that her teacher's decision may have been based in protecting Rong from using a racially-charged term she had neither the authority to background knowledge to use. Given Rong's purpose in writing, the substitute term undermines her argument.

The sequence also reveals Rong's understanding of what information on the Internet is acceptable for use in academic authorship. In her interview, Rong spoke about the importance of finding credible sources. She was able to speak about the importance of distinguishing good sources from bad. And she did in her recorded actions consult multiple sources for each of the ideas she developed in her essay. In her interview, Rong explained that she knows that she should not accept every result from Google and other web sources. However, she did not articulate nor did she demonstrate a clear strategy for making critical judgments about the artifacts she encountered on the Internet. Her strategies for determining appropriate words using multiple translators and dictionaries was much more systematic and based on her articulated understanding of the limits of various translation software. Rong's developing critical awareness of the limits of translation tools could be built upon to help her develop critical performance of judgments about the artifacts she needs to build a "cultural commons" with a U.S. audience.

Through use of multiple resources, Rong began to partially share a language and enter a U.S.-based "cultural commons" where certain ideas are held about race and racism. Rong's continuous movement across Chinese and English and artifacts in her digital environment was necessary for Rong to be able to rhetorically engage with the topic in the context of a U.S. writing class. That work included learning the features of an unfamiliar genre. Her movement can be understood as a recognition of her limits: her lack of historical and cultural knowledge about U.S. racism and her lack of language to express her ideas and fully explore the idea of the power of film to shape cultural norms and identities that she is interested in writing about. She might be understood to be teaching herself the concept and the language in her movements across the digital environment she has curated. Her way into the rhetorical situation is through digital translation tools, Google, Baidu, and the artifacts, most of them not peer-reviewed, to

which Google and Baidu gave her access. Her ability to perform critical judgments about the results of the tools is still developing. Further development of how to critique digital tools and artifacts would further develop Rong's rhetorical transliteracy.

Jun's digitally-mediated writing processes also provide evidence of just-beginning development of critical performance, if less so than Rong. In one example, Jun used both Baidu and Google to determine if supporting evidence she heard in one place was true in multiple places and therefore usable in her essay. In this sequence, she used her digital writing environment as a type of cultural commons to test out the idea. Jun was looking for a way to support her point that morality is learned and not an innate part of human nature. When she looked through the discussion on morality in *Lord of the Flies* on Goodreads, she copied into her essay a statement from a user that referenced the lack of morality of children raised from infancy in orphanages in Russia. This connected with a story Jun recalled her mother telling about children being raised by wolves.

Jun explained in her interview that she wanted to use the story as evidence, so she used her digital resources to determine if it were accurate. To find out, she turned to both Google and Baidu. On Google, she searched for "wolf child," "kissanime wolf," "wolf-child," and "wolf child roma." During her interview, she could not recall why she used those particular terms. From the given results, she selected the English Wikipedia entry for "Capitoline Wolf," a bronze statue depicting the mythological origin of Rome in which a wolf suckles the twin brothers Romulus and Remus. Jun did not recall why she initially selected this site, but it did lead her to try the same search on Baidu. On Baidu, she found a similar a web site with a similar entry about the statue. She also found what she described as a "news story" that confirmed what she believes to be true: that there are actual children raised by wolves. The "news story" was only on the

Chinese site. In her interview, she said she trusted the story that resulted in the passage quoted below in the essay she recorded for this study:

> Another news about two little girls had been found in a nest of wolf also proves that one's morality can be changed by their living environment. These two little girls grew up with a female wolf and after they had been found, they sent to an orphanages but they cannot fit into that group. They were children raised without people's care, without human's touch, and without moral guidance.

In this sequence, Jun used multiple digital tools and looked over multiple artifacts before deciding on what to include in her essay. She explained that she consulted both Google and Baidu because she had an understanding that the searches operated differently and searched from different sources of information. Jun could not find what she was looking for on Google, but she did find confirmation of the story on Baidu. The sequence demonstrates that Jun had developed a capability or an awareness that not all search engines are equal. She had more experience on Baidu, which she had used in high school in China. She could not use Google in high school because it had been banned.

Jun's use of the "news story" as evidence is very problematic. Jun demonstrated an awareness of the types of evidence that are available for academic writing. "News story" is one such type of evidence. However, what she called a "news story" in her essay is clearly not an actual news story. No evidence was visible in the recording to indicate that she has understood what she looked at on both Chinese and English entries about the Roman myth related to children being raised by wolves. Given that she looked at information about the myth in both Chinese and English and remained confused indicates a gap in reading comprehension rather than language proficiency. The sequence also reveals that Jun's understanding of evidence in

U.S. academic writing is in early stages. Developing reading comprehension would be a must for Jun to become genuinely rhetorically transliterate. Gaining a deeper understanding of the types of writing available on the Internet that might be used in academic writing in support and development of ideas is also clearly necessary for Jun's continued development as a writer. Better study habits might also help given that Jun wrote the entire draft of her essay in an overnight 12-hour homework marathon. The misunderstandings demonstrated in this sequence, searching only for information that supports what she wants to say rather than approaching a search with an open mind and not having a clear sense of what genres she was looking at, is also one that is common among novice academic writers. The sequence provides less evidence of how critical awareness of the tools and artifacts available in a rich, transnational cultural commons supports writers than of its potential to do so.

Just because information resides in different places does not mean that the information is equal in its veracity. Had Jun developed a more critical awareness of both Google and Baidu, she might have been able to develop a theory about the variance in the search results which in turn might allow her to make a more rhetorically sound choice. She might also benefit from a more nuanced understanding of what a "news story" looks like in both Chinese and U.S. web domains as well as the nature of Chinese and English Wikipedia. Using both Google and Baidu did give Jun more tools for finding ideas to support her writing. However, her critical awareness needs significant development. The roots of such awareness might be understood to reside in Jun's experience of not being able to use Google in China and her experience of having both Google and Baidu available for use in navigating U.S. academic authorship. Both tools have become embedded in her digital writing processes. Awareness and critical reflection on their nature and relationship to each other, the nations from which they emerge, and their use transnationally

certainly would have helped Jun in her judgments. Recognizing the existence and use of both tools might be of use to all academic writers.

In their respective digital processes in which they search in Chinese for an English word, Ye and Zhen demonstrated both an awareness of their linguistic ability and varying degrees of critical performance of rhetorical transliteracy with the digital tools and artifacts they used. Ye had a visible habit of casting a wide net for information about words before making his choice and moving on to the next rhetorical task. This is demonstrated in the process he used to select the word "representative" in the following sentence: "Also, I will use MySql data base as a representative." His first search for "representative" in his YouDao translator gave him that term. However, he spent several minutes in continued exploration by changing the suffix to "tion" and then removing the suffix all together. He also took his search online to Google and selected a result from another web-based Chinese to English dictionary. He then explored one of the alternate results, "deputy," and searched across several tools and websites for information about that word. He eventually returned back to searching and selecting results for "representative," concluding his search at the House of Representatives web site. He copied and pasted "representative" into his paper from this site, even though the meaning of the word as he used it is not about political representation. In his interview, Ye explained that he never uses Google Translate for writing and that his process frequently includes looking for the results that his YouDao translator gives him on the internet. He explained that doing so allows him to check the word in use in "real" English writing. In these actions, Ye demonstrated that he was aware of the limits of any given translator, if not *critically aware* in the sense that he could not speak about the specific reasons or forces that might decrease the reliability of the digital tools and artifacts he used.

Zhen used relatively few digital tools compared to other writers in this study, but he did exhibit the beginnings of awareness of the limits of tools. In his use of YouDao to find English equivalents for Chinese words, Zhen appeared to be unquestioning of the results that he received. That is, he spent little time reviewing the words and did not seek verification of the words using other tools and artifacts. In each sequence in which he used YouDao, he brought his browser to the front of his screen and searched in Chinese in the YouDao translator web site. The words he found might best be characterized as idiosyncratic rather than "wrong" words. For example, he used "mess hall" to describe a proposed area for eating on campus, which is not a commonly used expression in the context of the study site. Unlike Ye and Rong, who both frequently checked multiple sites in sequences beginning with searches in Chinese, Zhen trusted YouDao to provide him with an acceptable term.

In his interview, Zhen expressed distrust of Google Translate, explaining that it is less useful than YouDao because it is built on "English logic" instead of "Chinese logic." What Zhen means when he uses the term "logic" isn't clear. Of all the writers in this study, his spoken English was the least developed. Based on his responses, "logic" might be Zhen's way of communicating that using YouDao is more intuitive for him. He also indicated that he believes that YouDao, a Chinese company, understands Chinese better than Google, a U.S. company. His idea of "logic" also appeared to be connected to the ideas of grammar and word order. The problem demonstrated by Zhen's use of YouDao, however, was more closely associated with usage and cultural relevancy of the words on which he settled.

An awareness of the difference between translators originating in the United States and China was shared by all of the writers in the study. For Ye, a distrust of Google Translate was built upon his experience of receiving poor grades on writing in which he heavily relied on the

application. All of the writers mentioned that teachers had told them not to use Google Translate. Writers had an awareness of the limitations of tools and had begun to develop theories related to their potential for use in writing. A more explicit critical awareness of how the tools work and the goals and reach of the two companies involved in their production could add to and enrich writers' theories and use of translators. This, in turn, could further increase their rhetorical mobility.

Observation of writers in this study demonstrated the multilingual, transnational, transliterate nature of the writing environment. As such, attention to when and how writers critically perform rhetorical transliteracy with the tools and artifacts in that environment is needed in order to understand how to assist writers to more meaningfully and rhetorically move into the situations at play within the environment, including U.S. academic authorship. The affordances of the computer screen as a dynamic, mediatory testing ground can help facilitate rhetorical transliteracy, but the extent to which it does so is writer-driven. That is, writers are required to continually make judgments about the tools they use and the artifacts they encounter. Writers' previous experience and practice in drawing on multiple tools and artifacts helped them use, to a certain extent, rhetorically appropriate language and examples for their respective rhetorical situations. But each writer engaged in problematic practices. Moreover, the rhetorical situation that Rong found herself in as a multilingual international student from China asked to write about U.S. racism raises important questions about transnational engagement with complex identity constructions and material made politically charged by current local and U.S. events. Her negotiation of racially-charged language and her own recognition of her discomfort in writing about U.S. racism and her lack of authority to do so supports the need for United States. FYC to take up these questions and to consider how students find their way into writing about

such issues. Explicitly orienting FYC toward a transnational framework, as I describe below, is one way in which to do so. In fact, each of the sequences mentioned here are exemplary of moments that demonstrate not fully formed rhetorical capability but the potential and need for a more complete critical awareness of digital tools to increase writers' rhetorical mobility.

## Towards a Transnational, Transliterate Orientation

In observing, interpreting, and analyzing writers transliterate writing processes, I found the need for an analytic framework, in addition to Activity Theory, that could shed light on the implications of writing in what is essentially a transnational digital space. A transnational framework that explicitly recognizes the cultural and political influences of the origins of digital tools and artifacts multilingual international students use and might use in the future in writing is useful in interpreting observed writing practices. Further, the need for writers to be able to develop more critical judgments of the digital tools and artifacts they draw on in their digital writing environments supports an argument for a transnational approach to FYC that cultivates the capacity to critique and move within transnational digital spaces. Such an orientation should also acknowledge the transnational reality of 21st century academic authorship for all writers.

The writers in this study cultivated their digital writing environments in such a way as to facilitate their movement across nation-affiliated web spaces. They had already developed the capacity for transnational movement as they wrote. However, the sites they access are available to any writer with a similar computer and network access in the United States. All writers in FYC U.S. classrooms have access to and are likely using Google in similar ways to the writers observed in this study even if they are not doing so to cross linguistic, national, and cultural borders. A transnational orientation toward all FYC, then, may be warranted to analyze and interpret the digitally-mediated writing process of all novice academic writers in the United

States and to consider how best to develop 21st century rhetorical capabilities for engaging in the global communication context. A transnationally-oriented FYC could be a productive setting in which to help all novice writers cultivate a critical transliterate rhetorical awareness of how to engage with digital tools and artifacts in the inherently transnational setting of networked digital environments.

Writers' observed digitally-mediated writing processes crossed national boundaries as well as Chinese and English as they moved among digital tools and artifacts deeply embedded within the values of the tools' and artifacts' countries of origin. The topics that writers addressed were observed to be taken up differently in different cultural spaces. For example, while the U.S. racism that Rong wrote about has global implications, it is a rhetorical problem inextricably situated within the history of the formation of the United States as a nation. Jun found it difficult to reconcile how the English-based websites she visited treated morality and how the Chinese websites she visited addressed the same topic. The words and phrases that were suggested through translators carry with them cultural and national echoes. When Zhen searched for the English word to describe the place where students eat on campus as a "mess hall," there was likely a disconnect between what he imagined, what he typed, the sources the YouDao translator application drew from, and the English word that a U.S.-born reader of Zhen's writing might expect.

Activity Theory has usefully provided categories to isolate and describe the tools, artifacts, rules, communities, and labors that mediate the activity of U.S. academic authorship for the writers in this study. However, Activity Theory's acknowledged limits for analysis of agency, position, and power of subjects as they move across activity systems (Engeström, 2015) reinforces my sense that an additional analytic framework is needed to clarify the implications of

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the observed digital writing processes of the writers in this study. A transnational framework that builds on recent work to explore the possibilities of a transnational orientation to composition brings another lens into play that draws attention to the political and economic affiliations of the communities, or nations, that writers move among in their digital writing environments. Doing so specifies that significant "activity systems" that writers engage in as they write in digital spaces are also "nations." This specification sets the stage for future description and analysis of unequal position and agency of writers as they act in digital spaces that bring together multiple systems/nations at once. A more detailed discussion about the limits of Activity Theory for analysis and interpretation of the writing processes observed in this study is beyond the scope of this chapter. However, given both the usefulness of Activity Theory in categorizing and explaining the writing processes and the continued use of the framework in Writing Studies, a more thorough examination of its affordances and constraints is an area for future research arising from the current study.

A transnational orientation toward composition has been gaining visibility in recent years. Donahue (2009) drew attention to the relative insularity of FYC and scholarship therein, which has assumed a position of "exporter" of writing pedagogies rather than an "importer" of transnational approaches to teaching and researching writing. The newly-formed Transnational Composition Standing Group at the Conference of College Composition and Communication, as stated on their public blog (https://transnationalwriting.wordpress.com) promotes coordinating ideas about how teaching and researching writing and literacy practices happen outside of the United States and how those literacy practices in one location or national space might influences another. Leonard, Vieira, and Young (2015) further defined transnational inquiry as "an analysis of movement" that can and should be turned toward how "writing…shapes and is shaped by

transnational lived experiences and the infrastructures that govern transnational mobility" (p. vi).

A transnational orientation to writing also sees movement as not just exchange or physical

movement across national borders, but across institutions (Guerra, 2015; Rounsaville, 2015) and

the "familial, economic, social, organizational, religious, and political that span borders" (Basch,

Schiller, Blanc-Szanton, 2005, p. 6).

The writers in this study have moved from one national educational space in China to one

in the United States, bringing with them experiences with and beliefs about writing and how

digital tools might be used for writing. Their movement was not just a physical movement across

borders. They also moved across institutional and classroom borders even as they maintained ties

with friends and family in China using some of the same digital tools that they cultivated in their

digital writing environments prior to studying in the United States. The findings of this study

reveal some of the ways that their writing was shaped by their experience as transnational and

multilingual students and the digital infrastructures that "govern" their mobility between

languages, cultures, and nation-influenced artifacts in the transnational space of their digital

writing environments. A transnational orientation toward composition might be thought of as a

way to draw attention to and critique the "infrastructures" and economies that "govern" mobility

into the writing classroom and the transnational digital rhetorical spaces that the writers in this

study move into as part of enacted writing processes that before have been assumed to be local.

The writers observed in this study have moved both into the physical space of the writing

classroom and the virtual, digital space in which nearly all of their recorded academic authorship

takes place. The digital tools they used, such as Google and Baidu, both mediated and

"governed" the ways in which the writers in this study wrote their way into their respective

rhetorical situations. Those two tools in particular are embedded in ideologies of the places of

origin and are implicated in "globalize power" and "works at the microlevel" that Dingo,

Reidner, and Wingard (2013, p. 524) identified as operating in transnational rhetorical spaces. If,

as many U.S. universities attest, including the one at which I work, students are being prepared

to be global citizens, then perhaps attention should be paid to the networked power in

transnational spaces (Dingo, 2012). The writers in this study moved transnationally and engaged

with tools, languages, and artifacts from widely varying rhetorical situations on their screens as

they wrote, tools that are available and, in some cases, already in wide use by all novice writers.

The writers in this study drew on these tools in order to meet the challenges of sharing a

language and creating a "cultural commons" with their audience. As Crosswhite (2015) argued,

all rhetors must develop such rhetorical capabilities to engage in the global 21st century

communication context. Recognizing the transnational reality of the transliterate writing

processes of the writers in this study as developing rhetorical capabilities supports a transnational

approach to FYC that would focus on considering how to analyze the digital writing environment

and digital writing processes of all writers through a transnational lens.

Additionally, in interpreting sequences in which the writers in this study used multiple

digital tools and artifacts to address moments of rhetorical uncertainty, I found that they were at

varying stages of development of critical awareness of the limitations of digital tools and the

ways in which those digital tools mediate their writing. They recognized that the tools have

limits and sometimes give them a bad result. They recognized that tools created and

disseminated from different national spaces might have different "logics." They were aware that

Google has been banned in China, but had a limited understanding about why. Writers also made

decisions about what tools to use based on their convenience and their familiarity, but they did

not yet have the understanding, or perhaps the language, to explain why the differences exist or how those differences might affect their rhetorical mobility.

At the same time, the digital tools gave them the rhetorical mobility to engage in U.S. academic authorship. Or, in Crosswhite's terms, the tools and artifacts they cultivated in their digital writing environments in turn cultivated their rhetorical capability to share a language and create and use a digital "cultural commons" to engage in ongoing conversations about racial tropes in U.S. films, the utility of computer databases for certain kinds of work, the relationship between humans and morality, and shaping academic environments to better integrate international students. I submit that their success or capability to rhetorically move into their respective situations of U.S. academic authorship would be deepened by a more critical awareness of how the tools and artifacts they used exert and bestow power unequally across users and have values that may be counter to the rhetorical work writers may hope to achieve. What I argue for here goes beyond helping writers understand that Google frequently produces bad search results and that much that is important is lost in digital translation. A transnational approach to FYC could draw attention to *why* search results lead writers astray and *who* benefits from the ways in which digital tools and writing environments are designed.

This is the kind of work that could happen in a transnationally-oriented FYC, echoing what Jay Jordan (2012) called for, as his title suggests, in *Redesigning Composition for Multilingual Realities*. He argued that all writers are also English users and learners and that FYC should be a place to develop intercultural communicative competencies. A transnational framework could build on Jordan's work. Rhetorical capabilities that increase writers' rhetorical mobility in transnational digital spaces are 21$^{st}$ century intercultural communicative competencies.

The observed processes of the writers in this study reveal that academic writing processes are digital writing processes. Further, these digital writing processes are occurring in a multilingual, transnational space. A transnational orientation to FYC could influence both how administrators and teachers conceive of writing processes as well as how students themselves are taught to analyze and interpret their own writing practices. Both teachers and students could engage in an explicit project to develop rhetorical capabilities of sharing languages and creating cultural commons by recognizing the multilingual, transnational communication context in which academic writing processes take place. The power dynamics embedded within digital tools and the cultural commons they create could also be attended to by approaching FYC as a transnational enterprise. The work of scholars like Leonard (2014) and Dingo (2012) could inform how teachers and students together work toward critical awareness of the ideologies, affordances, and constraints of the digital tools and artifacts used in digital writing processes to support rhetorical mobility.

## Revisiting Academic Authorship

At the outset of this study, I was interested in considering how multilingual international novice writers' use of digital tools relates to notions of academic authorship. As I have argued throughout this chapter, writing that occurs in networked digital writing environments is inherently transnational. Academic authorship is not different and should be considered a transnational enterprise. Ultimately, understanding academic authorship as transnational reflects the realities of the multilingual digitally-mediated writing processes and can enrich models of writing like that of "knotworking" developed by Fraiberg and Cui (2016) that attempt to account for the multiple activity systems in play during writing. The observed ways in which the writers in this study drew on a range of tools and artifacts in different languages and from different

cultural spaces as a transnational undertaking also suggests a reconsideration of key tenets of academic authorship, in particular the ownership of words and ideas and how writers might acknowledge and trace the ways in which they use those words and ideas in their essays.

"Knotworking" as a description of academic authorship as developed by Fraiberg and Cui (2016) is useful but incomplete when considered as a model for interpreting what the writers in this study actually did as they enacted academic authorship through their transnational digitally-mediated writing processes. Fraiberg and Cui (2016) applied and developed the concept of "knotworking" from Engeström, Engeström, and Vähäaho (1999) to explain digitally-mediated activities of Chinese students studying in the United States. As described in the study, "knotworking" is a concept developed out of Activity Theory in which people are continually "tying and untying…an array of texts, tools, tropes, ideologies, and people, as part of an ongoing struggle" to write (Fraiberg & Cui, 2016, p. 86). Writing as knotworking extends how Engeström, Engeström, and Vähäaho, (1999) used Activity Theory to describe and analyze new conditions of "work that requires active construction of constantly changing combinations of people and artifacts over lengthy trajectories of time and widely distributed in space" (p. 345). Fraiberg and Cui (2016) argued that the use of writing in Chinese social media by multilingual international students was an activity of "tying" together words and ideas of actors from an increasing array of contexts and artifacts. In a sense, this fits with some of what I observed the writers in this study doing as they drew on the language and ideas in digital artifacts from both Chinese and English web domains. They could be understood to be "tying" together words and artifacts in the pursuit of academic authorship.

But an uncritical adoption of "knotworking" to describe the work of the writers in this study is problematic. "Knotworking" does describe and argue for the necessity of recognizing the

degrees of intertextuality made possible and occurring across digitally-interconnected systems. What scholars who have used the model have not yet done is fully account for how the work, such as writing, is affected by the knowledge, authority, and power that actor/writers have within each system they move through while engaged in the activity. The field has not yet reconsidered which rules and conventions should be valued in the final product given the multilingual, transnational, digital experience of writing. Actions writers take in their digital writing processes that are revealed in this study could either enrich "knotworking" as a model for 21st century academic authorship or suggest a new model altogether.

Jun's actions are particularly suggestive of both the utility of "knotworking" to describe academic authorship as well as its shortcomings. Much of Jun's digitally-mediated writing processes involved bringing together words and ideas from a variety of artifacts including her own writing from previous classes and passages from social media conversations, summary services, and artifacts from both U.S. and Chinese web domains. She could be understood to have been "tying" together the discussion threads on Goodreads, the summaries on eNotes, and the Chinese articles she accessed through Baidu in her essay. However, Jun tied together material from these sources *without* the necessary citation that is a central convention of U.S. academic authorship. Academic authorship requires that writers acknowledge and make explicit the connections between their own words and ideas and those of others. Failing to do so means failing to follow the conventions of U.S. academic authorship and committing plagiarism.

The writers in this study also violated conventions of U.S. academic authorship by using sources that would not be considered appropriate for academic authorship. Rong used About.com*,* Vox, and other "popular" news sites. Jun relied heaving on eNote*s*, an online web site similar to Cliff Notes. Rong, Jun, and Ye frequently drew on information from Wikipedia.

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However, they did not necessarily break the conventions of writing in the systems from which the artifacts they tied together originate. If writing is "knotworking" and transnational, then a method is needed for analyzing which conventions get privileged by writers and their audiences and why such conventions are understood as the standard.

One productive use of considering "knotworking" as a model for academic authorship is that it draws attention to the process or the way in which work gets done. Evidence of academic authorship has largely been understood to reside in the textual product. That product is what receives evaluation in a writing class, for example. Harris (2016) explained that, in order to for students to be recognized as academic authors, they need to "1) be as transparent as they can about who their influences are, and 2) show what they are doing with those influences" (p. 203). This requirement is fulfilled in the text by citation and the words that writers use to contextualize, develop, and refer to their sources.

However, as demonstrated in this study, there is a difference between what is revealed in reading the finished text and what is revealed in observing the digitally-mediated writing processes through which the text was put together. Only through direct observation is it revealed who and what was influencing many of the passages that the writers in this study created. In other words, the writers in the study were not being transparent about the words, phrases, and ideas across languages, web domains, and rhetorical situations that influenced their texts and their relationship to those words and ideas. Even Rong, who was meticulous in citing the quotations she used, including every single one of the seven movies she mentioned in her essay, did not provide a citation for a Chris Rock quote embedded in a meme that she found on the internet. Rong likely did not recognize the need to show her reader where this quote came from. She trusted it because she saw it in two separate places, once in a *New York Times* article about

the Academy Awards and once in the meme on the Chinese news site. In this sequence, and in others observed in all writers, there was not evidence in the text about where this information came from. This is a clear instance of failure to fully enact academic authorship.

However, the observed actions of writers suggest that it is insufficient to label such sequences as cheating. Writers were diligent and exhibited rhetorical awareness as they accessed the words and ideas of others and incorporated them into their texts, even if they were not transparent about what they were doing. They frequently consulted multiple sources before using the words and ideas of others without citation in their texts. They copied and pasted text from sources directly into their text to make sure they were using and spelling the unfamiliar English words correctly and not inadvertently changing words and phrases during the transfer process. Writers relied on the words and ideas they obtained through searching their translators. They described some of this work as trying to find a more "academic" and more "American" ways of expressing their ideas for their American audience. This rhetorical action observed by writers as they used multiple digital tools and artifacts to move into U.S. academic authorship suggests that there is a difference between "cheating" and purposefully using a digital tool to do some of the work of writing in an unfamiliar rhetorical situation. Rather than seeing such sequences as cheating, they might instead be considered evidence of writers' in-process development of the rhetorical capability of using a shared language through cultivating their digital writing environment in such a way as to "divide the labor" of choosing rhetorically appropriate words with digital tools they select.

Indeed, sequences where writers use word processors or translators to help notice errors and suggest changes might be understood as evidence of writers' rhetorical mobility. Writers approached authorship feeling like they lacked vocabulary. In making choices about what tools

and artifacts to use in their digital writing environment, writers were "assigning" some of the labor of academic authorship to the tools. Many word processors automatically mark misspelled or unrecognizable words and faulty grammar constructions and even automatically correct certain errors. Google and other searchable application like some dictionaries and translators provide suggestions after one or two letters are typed. During interviews, the writers talked about their awareness of and purposeful use at times of these kinds of auto-affordances. Tools such as these are "participating" in the acts of composing of the participants in this study. A complete model of 21st century writing might account for such changing roles of digital tools and their integral part of academic writing processes. Recognizing the need to use a particular kind of language is rhetorical work. The writers in the study chose to use affordances of digital tools in the rhetorical work of language negotiation. This work might be considered a legitimate labor.

Writers also spoke about using digital tools and artifacts to help them find ways to summarize plots that they had some level of experience with but not in English. This movement across languages and web domains for the purpose of summary is closely related to developing English language proficiency. Rong explained that she visited so many Chinese *Wikipedia* pages about movies to help her remember and write plots and characters of movies that she had watched in English with Chinese subtitles. Jun used eNotes, a web-based company that markets itself as learning environment," to help her with plot summary and character description of *Lord of the Flies*. She explained that the website helped her check her understanding of the plot. She also used summaries she wrote of the book in high school. Sometimes she incorporated words, phrases, and sentences directly from eNotes and frequently from her work from high school. A reader of Jun's work might not immediately notice the influence of eNotes. A reader of Rong's work certainly would not assume that she found plot summaries for the films on Chinese

Wikipedia. In these examples, the writers were not transparent about their influences and did not abide by the conventions of academic authorship.

When questioned, neither Rong nor Jun considered the work they were doing as plagiarism. They both were also well aware of the importance of citing work. Rong gave an unsolicited and detailed explanation of why she would never copy another writer's work or, for that matter, pay someone to write her papers. She expressed confidence that she could do a better job than people who "sell" paper. In fact, writers viewed using digital tools and artifacts in the ways described here that could be defined as plagiarism as helping them succeed as in their assignments while at the same time move forward with their language learning goals. The purposeful and rhetorical motivations and use of the words and ideas was not transparent in writers' texts and only revealed through both observation and follow-up interviews.

There are likely multiple reasons why Rong and Jun did not cite the sources they used in their papers. Neither of the essays they wrote were assigned to them as "research papers," and both were given direction not to use more than two outside sources in their paper. The decision might also have been, in part, rhetorical. Perhaps they assumed or understood the information they gathered from sites like Wikipedia to be "common knowledge." And, indeed, it would not be too radical to consider information easily found through a simple Google search as commonly available to the readers of their papers. Or, equally as likely, they might have thought using non-academic sources in their paper would affect their own credibility as authors. The error might also be rooted in continued misunderstanding of academic citation practices that can present certain difficulties for international students who have not had as much exposure and practice in U.S. academic citation. Writers might be distinguishing between sources consulted and sources

quoted. If they were not intending to use a direct quote, they might not have recognized the need to make transparent to their reader that the source in question had influenced their texts.

Many of these possibilities suggest a disconnection between digital writing processes and citation practices still rooted in the print era. More research is needed to understand how digital writing processes and the digital writing environment mediate the ways in which writers come into contact with the words and ideas of others and how those words and ideas influence textual production. One area for further exploration might be to consider ways for writers to more easily make transparent the ways in which they use translators and summary-based sites like Wikipedia in their transnational, information-rich digital writing environments. Further consideration of how the growing range of transnational resources that writers use to support their rhetorical mobility might change notions of academic authorship is also warranted.

As demonstrated by writers in this study, digital tools and artifacts from transnational spaces are influencing writing processes and increasing the range of possible web spaces writers visit during academic authorship. A transnational framework for understanding academic authorship will require revisiting the definition of "appropriate" sources for academic writing and perhaps a revision of citation practices that make it easy for the writer to be transparent about the digital tools and artifacts that they use in writing and how those tools and artifacts influence their own words and ideas. Observed digitally-mediated writing processes should influence or perhaps inspire new models and conventions of academic writing.

### Interpretation and Analysis in Summary

Without the luxury of a lifetime to become "rhetorically attuned," like the writers in Leonard (2014), the writers described here purposefully and creatively use digital tools and artifacts in the moment to approximate a "literate understanding that assumes multiplicity and

invites the negotiation of meaning across difference" (p. 228). This transliterate rhetorical mobility, much like attunement, allows writers to enter and meaningfully engage new rhetorical situations despite their still-developing English language proficiency. The writers in this study first moved into the rhetorical situation of U.S. academic authorship in classes at the English language institute on campus designed to support international students with limited English proficiency. In these classes, they used tools that they already knew, such as Zhihu, YouDao, and Google Translate. As they moved into FYC, their experiences continued to shape their orientation toward the tools. They attribute human characteristics to tools like Google Search, describing it as "smart" and "knowing." They speak about the "logic" of their translators. Ye is aware of the usefulness of autocorrect and the suggestions that appear in Google when typing in a search, and he says, "I know that Google is very smart. It's like a kind of intelligence."

What the writers in this study might benefit from, and perhaps what *all* student writers might potentially benefit from, is a critical framework through which to question the accuracy of, the gaps within, and the difference between tools and artifacts in the digital environment. All writers in the study, at some point, opened a search engine and looked up information about their topic. This practice is widespread among student writers and not just limited to the multilingual international students in this study who have less experience in writing in academic English and navigating the cultural referents that permeate the writing classroom. This practice alone should inform changes to FYC and teaching practice.

Rather than propose corrective measures, I see potential in writers' observed actions and would like to frame what they do as developing transliterate rhetorical capability. Rong does not yet have a fully-developed critical framework to draw on as she makes judgments about the information she encounters. She does not yet have the tools to fully understand the consequences

of choices for her credibility as a writer and the experience her classmates and teacher, the audience for her essay, have in reading her work. A transnationally-oriented FYC might provide writers like Rong a critical lens to focus and reflect on the nature of the tools and artifacts they use in order to make better, more rhetorical judgments as they write. Rong already knew to question the accuracy and appropriateness of the results that the translation applications and search engines she used provided. For example, she already had a sense that About.com is not a "scholarly" source, and she had definite opinions about the "faulty logic" of Google Translate. A next step might be to invite critique of the apparent neutrality of About.com and the implications of widespread use and increasing reliance on tools produced by mega companies like Google in the United States and Baidu and YouDao in China. This work would make visible the common practice of consulting "popular" sources during academic writing and give student writers the space to inquire into the relationship of this practice to what they understand to be academic research. Students could inquire into why they do not feel compelled to cite popular sources and to consider the meditational affect such consultation has on how they develop their words and ideas.

Development of a disposition toward transliterate rhetorical mobility and questioning and a framework for analysis in the moments of negotiation in transnational spaces is some of what a transnationally-oriented FYC might offer students. Google, as the world's largest search engine, is an U.S.-centric transnational tool. Writers would be well-served to consider the global and economic forces that shape the spreading and sharing of information in these spaces. Thinking about a transnational FYC might also encourage U.S.-born students to consider and move into new linguistic, rhetorical, and cultural spaces using the same kind of technology that the writers

in this study used to support their work as relative newcomers to U.S. academic authorship and English.

The ways in which transnational writers, such as those in this study, rely on tools such as translators and search engines to check and produce correct forms of words, access cultural referents, and supplement their knowledge about their topics may be understood as something more than "use." New categories and descriptions of the digital tools of writing whose affordances and constraints appear increasingly "human," in that they appear to act independently and can be "assigned" tasks, are needed to recognize the changing nature of the work of writing. Writers who move readily across transnational digital spaces are at the front line of this emerging reality. The observed digital writing processes of multilingual international students shed light on the need for new directions in FYC. Orientations toward and policies about technologies and their use in academic writing directly affect these writers and should be revised accordingly. At the same time, a critical lens is needed to consider the embedded ideologies in the tools that are becoming increasingly prominent and active in the academic writing of all writers.

The small sample of this study, the continued evolution of writing technologies, and the observed personalized construction of the digital writing environment on computer screens raises productive questions about where FYC should go next. This might begin with inquiry into the consequences of writers "tying" together social fields where terms and concepts, such as "racial tropes," have varying histories and meanings. Other questions might include: How are U.S.-based websites and tools privileged by the gatekeepers of academic writing (teachers, program administrators, scholars)? What factors limit rhetorical mobility, given that some networked spaces, like those in China, are governed by different rules and regulations? How do ideologies

embedded in tools designed and marketed by the monoculture of the US tech industry (white, middle class, male) mediate writing? What support do novice writers need to understand the complexities of writing in a multilingual, multicultural geopolitical context with competing motives and outcomes attached to the objects that circulate within it? Should the United States be at the center of academic writing environments? Is there any way for it *not* to be at the center?

Downs (2015), in describing what FYC might be given the competing interests and needs of its many stakeholders, argued: "First year composition can and should be a space, a moment, an experience – in which students might reconsider writing apart from previous schooling and work within the context of inquiry-based higher education" (p. 50). I would argue that this should include experiencing writing as transliterate and transnational and investigating what it means to share a language and move rhetorically among the spaces in which arguments about issues of global impact take place. Student writers could be afforded an opportunity to move across languages, rhetorics, cultures, and national boundaries try out words and ideas as they engage academic authorship. This could mean code-switching between Englishes or considering how to use other languages in addition to English in academic authorship. Doing so could lead to understanding academic authorship as a digital, multilingual, transliterate activity and work to unsettle lingering monolingual orientations toward academic writing in U.S. universities that inherently multilingual spaces.

I submit that further study of digitally-mediated rhetorical transliteracy is an important next step in more fully articulating a transnationally-oriented FYC. Continued study of these questions using the methodology developed for this study can lay the groundwork for a more fully-developed transnational FYC that 1) acknowledges the transnational reality of 21st century academic authorship for all writers and 2) cultivates the capacity to critique and move within the

power of transnational digital spaces. If we are to prepare students to be global citizens, then we must ground our work with students in understanding how power moves through the transnational digital environment in which they write.

## Additional Recommendations

In this section, I propose recommendations for future research, policy, and teaching that are warranted in addition to development of a transnational orientation to FYC. The findings, analysis, and conclusions of this study support recommendations for researchers, for writing program administrators, and for writing teachers.

### Examine Data in Relation to Writing Development

I focused analysis on the actions and processes of the writers in this study in relation to the digital tools that they used as they worked on academic writing assignments. As such, the findings center around writers' practices and meso-level in-the-moment processes. The data gathered in this study, including interview data, could be further analyzed to explore the role of motivation, emotion, and the embodied experience of writers as they have developed over time. More specifically, study data and methodology could shed light on key dispositions such as attribution, self-efficacy, persistence, value, and self-regulation that researchers have identified as important for writing transfer and development (Driscoll, et al., 2017).

### Explore the Range of Automated Technologies

The changing nature of tools in and of itself merits further study. In this study, the function of Microsoft Word to mark and correct unrecognizable words was observed to mediate acts of noticing and revising in composing. A focused look at other applications that automatically provide suggestions or change text to "conform" with certain standards of U.S. grammar and style may be warranted. For example, Grammarly, a grammar- and spellchecking

application available online as a browser extension, was mentioned by two participants but not used by them in the work they recorded for the study. The application has a free version that addresses what it calls basic issues but works only when typing in online spaces, like blogs, social media, and email. Grammarly is commonly advertised on social media sites and officially recommended by some writing programs. Tools for dictation also were mentioned by participants but not observed in use in the study. Google Drive, a commonly used suite of digital tools used by academic writers, did not factor into this study but should be examined for the ways in which it "automatically" acts in multilingual digital composing. Similarly, writers should be questioned further about why they chose the tools they do. More information about how tools work could in turn enrich understanding the agentive choices writers make with tools.

**Identify and/or Develop Strategies to Observe Acts of Composing on Phones**

The nature of the smartphone as a digital tool in academic writing still remains largely unexplored. Because of its obvious role in connecting people, the smartphone may be a digital tool that is an important place for "knotworking." At the outset of this study, I had expected to be able to record and observe acts of composing on multiple screens identified as common among US university students (Fraiberg & Cui, 2016; Moore, 2016; Monty, 2014; Pigg et al., 2014). However, even though study participants agreed to record writing activity on their phones for the study, they did not. When asked why, they said either they could not get the suggested recording tool to work or they forgot. Because the participants in this study all have Apple products, recording phone screens at the time of the study was not possible without either "hacking" the phone to get unrestricted access to its file system or recording the phone's screen by displaying it on the screen of a computer. There are more options for non-Apple products.

Access to writing activities on phones could reveal tools, artifacts, and actors taking part in significant acts of composing on what might be considered a secondary writing screen or, for some writers, a primary writing screen. The ways that writing on phone coordinates social lives and communities has been studied (Fraiberg & Cui, 2016; Pigg et al., 2014). More research is warranted in how the screens of smartphones and the acts of writing on the screens of smartphones might divide labor, for example, as writers work on academic projects. One participants in this study used communication tools on his primary writing screen (QQ and email) to develop his understanding of genre requirements and the content of his writing. Another participant described in detail during an interview how she used Wechat on her phone with her father to develop ideas for a paper she wrote in a class previous to the term of the study.

All of the study participants described ways in which their phones distract them while writing. They also all mentioned using their phones for writing activities, either before beginning work on an essay on their primary writing screen or during to look up words and notes and to provide access to another internet browser. All participants demonstrated a strong relationship toward their phone. Their failure to provide much more than a few screenshots of their phones for the study might be because they consider it more personal or private space than the laptop or desktop they use to write their essay. Investigating writers' relationships to their phones may be another area of fruitful inquiry in the pursuit of enriching understanding of multilingual digital composing. A complete picture of a multilingual writer's self-created learning environment is not complete without further research about the role of smartphones in multilingual digital composing.

**Integrate Critical Digital and Information Literacy in Course Assignments**

The changing nature of digital tools and the recognition that "error" may result from the acts of curious writers engaging with a wide variety of tools suggest the need for a more targeted focus in writing classrooms on information and digital literacy and how they overlap. Searches for both background information and "evidence" are closely connected to the digital tools that are easily accessible in students' primary writing screens. Assignments that ask students to investigate and rhetorically analyze artifacts they encounter in the initial searching they do to start an assignment could productively help students understand how to "find" appropriate material for academic projects as well as better understand how search engines and keywords work and how they are embedded with ideologies. This work could be folded into a "Writing About Writing" curriculum. For example, an analysis of eNotes as a literacy artifact would be of interest to writing scholars and give students the opportunity to add to the collective knowledge of the field. Teachers could also create assignments that ask students to research and consider the origins and ideologies of the tools they use most, such as Google and other search engines. Recognizing that student writers turn to Google and other technologies for many of their acts of composing should guide creation of all writing assignments. Knowing, for example, how students look for topics and what others have said about issues on the internet before they start writing could lead to different kinds of scaffolding assignments.

This should also be considered an opportunity for instructors and administrators as well as students themselves to recognize the wide array of resources that multilingual international students with experience in multiple countries' Internet spaces bring to academic writing.

**Embed Translation Applications in FYC**

Multilingual digital composing is already shaped by translation applications and may become even more so in the future as the nature of this particular tool continues to change and the need to move across languages continues to grow. In the mid-1990s, as the Internet began to gain traction among, about 80% of the content was in English. As of 2013, just 30% of the content of the internet was in English. In the first 10 years of the 21st century, Chinese steadily grew to become the second most used language of the internet (Young, n.d.). If the work of academic writing can be considered "knotworking" or as an activity in which artifacts and ideas across cultures are used together, then its workers may find themselves relying on tools of translation. At the same time, it may be the tools of translation that make such transnational work the expectation for all of academic writing.

The study and use of translation in writing could become a more integral part of FYC and other academic writing classes; it may even be an emerging threshold concept. As such, writing teachers should stay informed about how tools such as Google Translate are changing and should be in discussion with multilingual students about how they are using such applications. The writers in this study consider Google Translate a faulty tool and are quick to explain that they would never use it. They, like other international students I have worked with, spoke of using the tool in the past with unsatisfactory results. I, myself, have warned my students about using Google Translate to automatically translate large pieces of writing in their first language into English. However, the tool I warned my students about is rapidly developing. Just weeks before this study began, Google launched major changes to the applications and announced more on the horizon. Given the reach of Google, how Google Translate might change writing and composing practices of writers in the languages supported by Google Translate and the Internet should be

considered. The same could be said for Youdao and other popular translation applications coming out of China.

Assignments that give students practice in using and understanding how translation applications work as well as leading them in critical evaluation of the ideologies embedded in them will become increasingly important as their use grows. As I watched the participants in this study use a range of Google products in their writing in the summer of 2017, controversy erupted from a leaked memo by a Google employee criticizing the company's diversity efforts and arguing that women are not biologically suited to work in the tech industry. The incident draws attention to the environment in which Google was born and nurtured: a US-centric, white, male economy. The interfaces through which we interact with technology have never been neutral (Selfe & Selfe, 1994). Making students aware of how ideologies shape the technologies that dominate primary writing screens can lead to more informed choices and perhaps call out sexism, racism, xenophobia, and other forms of discrimination that infect the industries in which they are produced. Multilingual international students are well-positioned to join in this work. Assignments that call for rhetorical analysis of applications like Google Translate and Youdao and consider their ideological heritage would give multilingual international students the opportunity to draw on and examine their own acts of composing. Doing so in a cross-cultural multilingual classroom would privilege the multilingual digital literacies of international students and provide opportunities for English-only students to consider how applications such as Google Translate might figure into their own scholarly work.

**Revise Technology-Related Policies and Program Outcomes**

The findings and conclusions of this study illuminate different kinds of labor and motivations in acts of multilingual digital composing. They also emphasize both the importance

and dynamic nature of the tools available for writers' use in academic work. Guidelines for teachers and students outlined in writing program manuals and syllabi should reflect, respect, and guide the labor of multilingual digital composing. For example, the explicit technology policy in the FYC program manual at the study site portrays technology as either a rude, invasive distraction (cell phones ringing or being used for unrelated texting; laptops being used to access social media or shopping sites) or as a note taking tool. Both uses of technology addressed in the policy certainly happen in today's classroom. However, such a limited acknowledgement of the affordances and constraints of technology may prevent teachers and students from recognizing how technology can facilitate writing, discussion, and rhetorical mobility. The structure of feeling created by this stance toward technology may also lead to downplaying or ignoring the value of skill and labor it takes to use tools for self-sponsored language learning and expansion of rhetorical capability.

This study offers a view into the rich array of tools and acts of composing that participants engage in when they write. This study also provides evidence that student writers are using technology with awareness and purpose to support their individual learning goals. For example, the writers in this study express both an awareness of the importance of reading and frustration at how much time it takes them because they are reading in English and not their first language. To solve the problem of reading, all participants explained how they search for online versions of the articles assigned in class so they can use their digital translators to read them. A more capacious policy about technology use may serve as a starting point for open discussions about how writers are purposefully using technology to mediate their reading and writing activity. Teachers should be made aware of this use of tools. Assignment and program outcomes could be revised to acknowledge such work and consider how to develop writers' capacities to

productively use tools to solve problems they encounter on their own. Because FYC is seen as a gateway to academic writing in the university, building program awareness about multilingual digital composing could lead to a more widespread recognition of its value and potential.

**Revise Plagiarism Policies and Procedures**

Re-imagining error, acknowledging the changing nature of tools, and developing "knotworking" or new models of academic authorship necessitate a closer look at how student plagiarism is addressed. Participants in this study had already taken four writing classes prior to the classes in which their writing activities were recorded for this study. They expressed an awareness of citation practices. Two of them created works cited pages during the work session recorded. One participant described at length without any prompting or questioning why she would never pay someone to complete her assignments like some of her friends have done. Multilingual international student writers are aware of plagiarism. A murkier area for all students is understanding when to give explicit recognition of the words and ideas of others. Further, how does one make explicit the ways in which one is knotworking? Are style conventions, such as MLA citation practices, adequate? How are they communicated to novice writers?

The digital tools that check for plagiarism also should be included in analysis and ideological critique of digital tools. A plagiarism policy that clearly explains what plagiarism checkers look for might be useful for student writers like those in this study. Recognizing what happens on writers' primary screens might further inform decisions about how to provide instruction about plagiarism and use digital plagiarism checking tools. Further description of acts of multilingual digital composing might add to the definition of what constitutes plagiarism in academic writing in the multilingual digital age.

## Final Reflections

This study has uncovered digitally-mediated transliterate writing processes of the writers in this study that would otherwise be hidden from the readers of their essays. Writers spent significant labor to identify, try out, and choose English vocabulary using multiple digital tools and artifacts made available in their digital writing environments through their own careful cultivation. Writers worked across Chinese and English as well as tools and artifacts originating in the United States and China. They did so with ease in what was revealed to be a transnational academic writing environment. Cultivation of their computer screens as a type of testing ground in which they could draw on emerging tools and artifacts to solve writing challenges is not separate from writing but an integral and ongoing part of writing. These digitally-mediated transliterate writing processes are vital for the rhetorical mobility for the writers in this study. The labor of writing, the writing process itself, was inextricable from the digital writing environment and the rhetorical mobility it afforded.

This study focused on four multilingual international students. Their observed writing processes invite further study of rhetorical mobility in the transnational digital writing environment that is available for academic authorship for any writer working on an internet-connected computer in the United States. The ways in which the writers in this study cultivate and draw on digital resources to be able to enter into their respective rhetorical situations suggests that to be rhetorically mobile in the transnational digital writing environment requires developing the capabilities of sharing a language and creating and using the digital writing environment as a kind of cultural commons. All writers could become more rhetorically mobile by developing these transliterate rhetorical capabilities.

Observing digitally-mediated writing processes also has drawn attention to certain prominently used tools common across writers and the power relations embedded within the tools. Google and Microsoft, Baidu and Netease, as well as the respective U.S. and Chinese mega-companies that make these tools, are influencing the choices that writers are making about the words they use, and these companies are influencing the ways that writers develop ideas. These tools are part of the transnational digital writing environment. A critical awareness of the ideologies embedded within these tools may be increasingly important as their use spreads.

The transliterate writing processes revealed in this study also work toward unsettling monolingual notions about writing and language that continue to permeate academic contexts. The language that writers use shapes the digital resources to which they have access. English is not the only language on the Internet, and the English language Internet does not contain the only resources that allow for rhetorical mobility. Translation and dictionary tools are not just used by writers to overcome linguistic deficits. Google Translate is a tool that helped the writers in this study think through their composing choices and to more deeply read information that helped them develop their ideas, even if they did not trust it for simple translation purposes. Further, the writers in this study do not need to develop a habit of paying attention to language: They already have done so. The writers in this study paid considerable attention to words and phrasings. What the writers in this study need, what all writers need, is metacognitive practice using a robust critical framework through which to better rhetorically judge the words and ideas available to them in the transnational digital writing environment.

The transliterate writing processes of the writers in this study support respecting student motives and goals. Students have a lot to learn, but they also bring a lot to learning. Reading and writing in a second language takes more time. The labor of reading and writing in a second

language is about more than "catching" up to so-called native speakers. The negotiations, use of digital tools, and sophistication of decisions made while writing are ones that have value on their own. That is not to say that each word, phrase, or idea has academic merit on its own. The work I have observed is the work of novice student writers, after all. But the potential is there. The previously hidden but now observed digital writing processes of the multilingual international students in this study have much to add to what is known about 21$^{st}$ century academic authorship and the direction FYC should and must go.

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Appendix A

Survey Questions

Link to survey on Qualtrics.: https://oregon.qualtrics.com/SE/?SID=SV_9LWsS68jVP31KpT

1.  (Record browser meta-data to determine which browser/device type was used for survey)

2.  How would you describe your confidence using digital devices (laptop, tablet, smartphone) for the following activities at the university? (not confident, somewhat, confident, very confident)
a.  academic writing
b.  non-writing homework
c.  multi-tasking
d.  making social connections
e.  accessing email, Canvas, and other school applications

3.  How important are digital devices (laptops, tablets, mobile phones) in your academic writing process? Rate on a scale from 0 (not important at all) to 10 (very important)

4.  Which of the following devices do you use to do academic writing? Check all that apply.
a.  My own desktop computer
b.  Desktop computer on campus
c.  My own laptop computer
d.  Borrowed laptop computer
e.  My own computer tablet
f.  Borrowed computer tablet
g.  Smart phone/cell phone
h.  I don't have access to a computer, laptop, tablet, or phone to do writing homework.
i.  Other (please specify)

5.  How important are each of the following in your academic writing process?
a.  pen and paper
b.  physical references (such as books or magazines at the library)
c.  friends
d.  tutors in Sky Lab
e.  tutors in the writing tutorial lab
f.  hired tutors
g.  instructor/GE
h.  other (please specify)

6.  What application or program do you most often use to do your academic writing?
a.  Microsoft Word from UO
b.  Microsoft Word purchased somewhere else

c. Google Docs
d. Pages
e. Other

7. What problems have you with the program you use most for academic writing (such as Word, Google Docs, etc.)? Check all that apply.
a. setting the correct line spacing
b. setting the margins, such as for reference pages or block quotes
c. creating and using headers
d. finding spell check or grammar check
e. dictionary not in English
f. dictionary/autocorrect giving me the wrong word
g. incorrect grammar suggestions
h. version of Word not from U.S.
i. other (please specify)

8. What changes have you made to your word processing program to help you with academic writing? Check all that apply.
a. changed dictionary language
b. added a dictionary
c. customized toolbar
d. changed formatting
e. other (please specify)
9. What operating system is on your cell phone?
   a. Android
   b. iOS (Apple)
   c. Other

10. Which type of apps are you aware of that were pre-loaded onto or came with your smartphone? Check all that apply.
a. I don't own a smartphone.
b. Writing apps (Word, Google Doc, Pages, etc.)
c. Communication apps (Skype, WhatsApp, Messenger, WeChat, QQ, etc.)
d. Social networking apps (Facebook, RenRen, Twitter, Weibo, Snapchat, Instagram, etc.)
e. Study apps (iTunes University, Flashcards+, Dictionary.com, etc.)
f. Organization apps (Trello, Todoist, Dropbox, Evernote, etc.)
g. Research-related apps (Easybib, Ebscohost, TED talks, etc.)
h. Course web sites apps (Canvas, etc.)
i. Dictation apps (Dragon Dictation, etc.)
j. Translation apps (Google translate, iTranslate, etc.)
k. Presentation apps (PowerPoint, Keynote, Prezi, etc.
l. News apps (local news, national headlines, sports news, etc.)
m. Entertainment apps (Netflix, YouTube, music apps, games, etc.)
n. Other (please specify)

11. Which type of apps have you added to your smart phone? Check all that apply.

a.  Writing apps (Word, Google Doc, Pages, etc.)
b.  Communication apps (Skype, WhatsApp, Messenger, WeChat, QQ, etc.)
c.  Social networking apps (Facebook, RenRen, Twitter, Weibo, Snapchat, Instagram, etc.)
d.  Study apps (iTunes University, Flashcards+, Dictionary.com, etc.)
e.  Organization apps (Trello, Todoist, Dropbox, Evernote, etc.)
f.  Research-related apps (Easybib, Ebscohost, TED talks, etc.)
g.  Course web sites apps (Canvas, etc.)
h.  Dictation apps (Dragon Dictation, etc.)
i.  Translation apps (Google translate, iTranslate, etc.)
j.  Presentation apps (PowerPoint, Keynote, Prezi, etc.
k.  News apps (local news, national headlines, sports news, etc.)
l.  Entertainment apps (Netflix, YouTube, music apps, games, etc.)
m.  Other (please specify)

12.  Which type of apps do you have on any device (laptop, smartphone, tablet)? Check all that apply.
a.  Writing apps (Word, Google Doc, Pages, etc.)
b.  Communication apps (Skype, WhatsApp, Messenger, WeChat, QQ, etc.)
c.  Social networking apps (Facebook, RenRen, Twitter, Weibo, Snapchat, Instagram, etc.)
d.  Study apps (iTunes University, Flashcards+, Dictionary.com, etc.)
e.  Organization apps (Trello, Todoist, Dropbox, Evernote, etc.)
f.  Research-related apps (Easybib, Ebscohost, TED talks, etc.)
g.  Course web sites apps (Canvas, etc.)
h.  Dictation apps (Dragon Dictation, etc.)
i.  Translation apps (Google translate, iTranslate, etc.)
j.  Presentation apps (PowerPoint, Keynote, Prezi, etc.
k.  News apps (local news, national headlines, sports news, etc.)
l.  Entertainment apps (Netflix, YouTube, music apps, games, etc.)
m.  Other (please specify)

13.  Rank the following apps on any device (laptop, smartphone, tablet) from most to least used. Click and drag the options in the order that you want.
a.  Writing apps (Word, Google Doc, Pages, etc.)
b.  Communication apps (Skype, WhatsApp, Messenger, WeChat, QQ, etc.)
c.  Social networking apps (Facebook, RenRen, Twitter, Weibo, Snapchat, Instagram, etc.)
d.  Study apps (iTunes University, Flashcards+, Dictionary.com, etc.)
e.  Organization apps (Trello, Todoist, Dropbox, Evernote, etc.)
f.  Research-related apps (Easybib, Ebscohost, TED talks, etc.)
g.  Course web sites apps (Canvas, etc.)
h.  Dictation apps (Dragon Dictation, etc.)
i.  Translation apps (Google translate, iTranslate, etc.)
j.  Presentation apps (PowerPoint, Keynote, Prezi, etc.
k.  News apps (local news, national headlines, sports news, etc.)
l.  Entertainment apps (Netflix, YouTube, music apps, games, etc.)
m.  Other (please specify)

14.    Describe the ways in which you most often use digital devices in your academic writing process.

15.    Think about recent academic writing you completed. Indicate whether each app was helpful or not helpful in writing (helpful, not helpful, did not use):
   a. Writing apps (Word, Google Doc, Pages, etc.)
   b. Communication apps (Skype, WhatsApp, Messenger, WeChat, QQ, etc.)
   c. Social networking apps (Facebook, RenRen, Twitter, Weibo, Snapchat, Instagram, etc.)
   d. Study apps (iTunes University, Flashcards+, Dictionary.com, etc.)
   e. Organization apps (Trello, Todoist, Dropbox, Evernote, etc.)
   f. Research-related apps (Easybib, Ebscohost, TED talks, etc.)
   g. Course web sites apps (Canvas, etc.)
   h. Dictation apps (Dragon Dictation, etc.)
   i. Translation apps (Google translate, iTranslate, etc.)
   j. Presentation apps (PowerPoint, Keynote, Prezi, etc.)
   k. News apps (local news, national headlines, sports news, etc.)
   l. Entertainment apps (Netflix, YouTube, music apps, games, etc.)
   m. Other (please specify)

16.    Describe a time where technology (your laptop or an application, for example) didn't work while you were trying to complete an academic writing assignment.

17.    Describe the steps you took to solve the problem with technology described in the previous question.

18.    What types of technologies would you want to have that would make your academic writing process easier? Think as big or small as you want. For example: "voice feedback from my computer while I'm writing drafts."

19.    Are you typically connected to the internet on one or more of your devices when working on academic writing?
a.    Yes
b.    No

20.    If you answered yes, what activities do you most often use the internet for while you are doing academic writing? Check all that apply.
a.    Access Canvas or other course web site
b.    Use online Word Processor (Google Docs, Word, etc.)
c.    Research academic articles or books
d.    Practice using a new language
e.    Play music
f.    Play podcasts
g.    Play games
h.    Watch videos (Netflix, YouTube, etc.)
i.    Check the weather forecast

j.      Start new friendships
k.      Pay bills
l.      Keep up with current events
m.      Find local events
n.      Shop
o.      Start new dating relationships
p.      Read other people's comments (on blogs, news stories, etc.)
q.      Send or receive instant messages
r.      Use social networking websites
s.      Other (please specify)

21.     Where do you most often do your academic writing?
a.      Home
b.      Friend's home
c.      Library
d.      Café or coffee shop
e.      Work
f.      Other (please specify)

22.     How long do you typically spend during a writing session when working on academic
writing?
a.      15-30 minutes
b.      30-45 minutes
c.      45-60 minutes
d.      60-90 minutes
e.      90-120 minutes
f.      more than 2 hours

23.     Rank in order from most important that factors that influence where you work on
completing academic writing. Click and drag the options in the order that you want.
a.      Wifi access
b.      Number of people around
c.      Proximity to friends
d.      Affordability
e.      Access to books and articles
f.      Access to food and beverages
g.      Convenience
h.      Other (please specify)

24.     Which application do you use the most to chat with other students or friends about school
work?
a.      WhatsApp
b.      Facebook Messenger
c.      QQ Mobile
d.      WeChat
e.      Skype

f.      Standard Texting

g.      Other (please specify)

25.     Think about a time you used IM, online chatting, social media, or texting to get help with academic writing and answer the following questions:

a.      Who did you chat with?

b.      What did you ask?

c.      In what specific ways did this help you with writing?

26.     Think of a writing class you have taken or are currently taken. Which best describes the technology policy in your class? Check all that apply.

a.      You are not allowed to use a smart phone in class.

b.      You are not allowed to use a laptop in class.

c.      Laptops and/or smart phones can be used in class to take notes.

d.      Laptops and/or smart phones can be used in class for writing activities.

e.      Laptops and/or smart phones can be used in class however you choose.

f.      Other (please specify)

27.     Think about your most recent academic writing project. What rules were you required to follow? Check all that apply:

a.      You CANNOT use the internet to find information or sources.

b.      You are required to use the internet to find information or sources.

c.      You shouldn't use a translator in any part of the writing process.

d.      You shouldn't use Google in any part of the writing process.

e.      You shouldn't use Wikipedia in any part of the writing process.

f.      Your must use a specific format (MLA or APA).

g.      You were required to print a draft of your paper to submit.

h.      You were required to submit your paper on Canvas.

i.      Other (please specify)

28.     Have you ever been required to use a digital device (laptop, smartphone, tablet, computer in a lab) in a writing class?

a.      yes

b.      no (skip to question question 28)

29.     Did you have access to a digital device so that you could participate in the activity? This could include having a laptop, tablet, smartphone, or being in a computer lab for the activity.

a.      yes (skip to question question 27)

b.      no

30.     What has prevented you from participating in activities that use digital devices (laptop, smartphone, tablet) in academic writing classes?

a.      I don't own a laptop.

b.      I don't own a smartphone.

c.      I forgot my device.

d.      My device was broken.

e.      I didn't want to use my own device in class.

f.      Other (please specify)

31.      What activities using digital devices (laptop, smartphone, tablet) have been part of writing classes you have taken at the university? Check all that apply.
a.      peer review
b.      discussion with classmates
c.      drafting
d.      research
e.      grammar
f.      editing
g.      revision
h.      collaboration
i.      other (please specify)

32.      What year in school are you?
      a.  First year
      b.  Second Year
      c.  Third Year
      d.  Fourth Year
      e.  Fifth Year
      f.  Other (please specify)

33. What language did you first learn to write in?
      a.  English
      b.  Spanish
      c.  Chinese
      d.  Arabic
      e.  Korean
      f.  Japanese
      g.  German
      h.  Farsi
      i.  Other (please specify)

34.      Which writing class are you enrolled in this term?
      a.      WR121
      b.      WR122
      c.      WR123
      d.      I am not enrolled in a writing class this term
      e.      Other (please specify)

35.      How many academic writing assignments do you expect to complete this term?
      a.      1-2
      b.      3-4
      c.      5-6
      d.      More
      e.      I have not been assigned any academic writing this term

36.	Because you will be writing academic texts this term, you are invited to participate in a study in that builds on the questions in this survey. If you are interested in being interviewed further about what you do and experience with academic writing, please include your name and e-mail below. Study participants will receive free writing tutoring in the term following the study. By selecting "yes, I am interested," your name will be connected to your responses on the survey. If you select "no," your responses will remain anonymous. Are you interested in being interviewed further about your experience using technology in academic writing?
a.	Yes, I am interested in participating further in this study.
b.	No, I am not interested in further participation.

37.	Please write your name, email, and phone number so that the researcher can contact you with more information about further participation in the study.
a.	name
b.	email
c.	phone (optional)

Appendix B

Interview Questions and Prompts

**Initial Interview:** Tour of Digital Devices (30 minutes)
Participants will be asked to bring as many of the digital devices they use in writing as they can. If they use a desktop computer, we can use my office computer as a model. For example, if a student mentions an app they use, we can look it up on my computer. If they mention a web site they use, we can look it up on my computer.

1.   Please show me the devices you interact with as you work on academic writing. Talk to me about the role each device play in writing or completing writing homework (laptop, tablet, smartphones).
2.   Please show me any apps you routinely open or look at as you complete academic writing (including apps that you didn't use directly in your essay; for example, if you checked Facebook to take a break, let me know).
3.   Please show me any web sites you typically go to as you work academic writing (including web sites with material you didn't use directly in your essay). Talk to me about the role these sites have in completing writing homework.
4.   Please show me the software you used as you worked on academic writing. What aspects of the software are helpful to you as you write? What features of the software were frustrating or challenging?
5.   Thinking about the digital artifacts (devices, apps, software, web sites) we've talked about, please show me where in your writing some of these helped or hindered your ability to do your work.

**Initial Interview:** Recording Writing Sessions (30 minutes)

1. How long is a typical session when you work on academic writing?
2. What kinds of activities typically happen during a session of work on academic writing?
3. What is an essay assignment that you are working on this term that you will agree to record?
4. Have you used video screen capture before? Which ones?

Answer to the above questions will be used to formulate a recording plan to capture activities on digital devices during writing sessions. Participants will be provided demonstrations of QuickTime, Screencast-o-matic, and Reflector (a mirroring app for recording work on tablets and smartphones). Other options include Screenflow for Macs or Camtasia.

**Follow Up Interview:** Reflection on recorded activities (approximately 60 minutes)

The primary researcher will identify moments from the recorded videos and writing session surveys to ask participants to reflect and elaborate on. Participants will be asked to bring paper materials and other artifacts that they used while working on the academic essay under investigation. In addition, the researcher may ask:

1. What devices and applications were most important as you worked on your academic writing assignment?

2. Did you use digital technology in any unusual ways as you worked on this academic writing assignment?

3. What digital technologies do you wish you had available to help you with your academic writing?

4. What non-digital factors helped you while you worked on the essay?

Appendix C

Recording Instructions Given To Participants

You may use any video screen capture software you would like. I have tested the following two options.

**To use QuickTime (for Macs)**:
1. Go to your finder and click on "applications." Find + open QuickTime Player.
2. Click on "file" and select "new screen recording."
3. Click on the little arrow next to the red button and make sure there is a check mark by "built-in input: internal microphone."
4. Click on the red button and then click on the message that pops up in the middle of your screen.
5. Say aloud what you plan to work on during the session.
6. If you use your smartphone or another device during your writing session, use the Reflector app to mirror your screen to your computer to record what you are doing. If Reflector doesn't work, take screenshots of texts, notes, etc.
7. End recording by clicking on the small black dot at the top of the screen.
8. Save your video to your UO One Drive account with your name and writing session (ws) number (Jane Smith ws1; Jane Smith ws2). Share the file with me using directions.
9. Complete a brief survey at http://tinyurl.com/zbqg772 at the end of each writing session.

**To use Screencast-o-matic.com**:
1. Go to: http://screencast-o-matic.com/digitalwritingstudy. If you have a Mac, you will need to download the recorder.
2. The password is: student.
3. Click on "start recorder." You will want to make sure that you are recording your full screen.
4. Say aloud what you plan to work on during the session.
5. If you use your smartphone or another device during your writing session, use the Reflector app to mirror your screen to your computer to record what you are doing. If Reflector doesn't work, take screenshots of texts, notes, etc.
6. Save your video to your UO One Drive account with your name and writing session (ws) number (Emily Simnitt ws1; Emily Simnitt ws2). Share the file with me using directions.
7. Complete a brief survey at http://tinyurl.com/zbqg772 at the end of each writing session.

Once your paper is done, share a copy of your completed paper with me through One Drive. I will contact you to set up a follow-up interview.

For long sessions, try to remember to stop, save, and upload every half hour or so. This will prevent your computer from slowing down.Keep track of and share assignments, handouts, and other artifacts you use to complete the academic assignment.

Using Reflector2: Go to: http://www.airsquirrels.com/reflector/try/. Select the free 7-day trial. Follow directions for your device and laptop (Mac or Windows). If you use a smartphone or tablet during a writing session, mirror the device using Reflector 2 on your screen. This will record what you are looking up or doing on your phone. You can leave the phone mirroring in

the background or you can end airplay when you are finished and connect again if necessary. If the app works for you, and you will be recording multiple writing sessions, email me and I will send you a license to continue using.

Problems or questions? E-mail me at esimnitt@uoregon.edu.

**To Upload Videos:**
1)    Go to http://office.uoregon.edu/ and sign in with your University of Oregon email and password.
2)  Select **OneDrive**.
3)    Select **Upload**.
4)    Select the file you want to upload, and then select **Open**. The file will be uploaded to **OneDrive**.
5)    To share your file look for the three dots to the right of the file name, click them and select **Get Link**.
6)    Copy the link and share it with your faculty member.

Appendix D

Pre- and Post-Writing Session Protocols

**Pre-Writing Protocol:** Participants will identify sessions of writing to record for one complete essay assignment. At the beginning of each session, participants will be asked to speak aloud to briefly describe the purpose of the session, such as what they will be working on.

**Post-Writing Session Protocol/Survey Questions:** At the end of the session, participants will be asked to fill out a brief reflective questionnaire to capture what was significant about the session for them related to technology use. Participants will be given the link to the questionnaire at the initial interview. Questions will be shaped for each participant during the initial interview to capture the most relevant activities and technology use. This information will be used along with recordings to guide follow up interviews.

Post-Writing Session Survey Questions. Qualtrics link:

https://oregon.qualtrics.com/SE/?SID=SV_9vmzkScw6hkd313

1.  Name, date, length of writing session.
2.  List any applications/digital tools that were helpful as you wrote.
3.  List any application/digital tools that presented a challenge as you wrote.
4.  Which of the following activities did you engage in while work on your academic writing assignment? Mark all that apply.
    1.  IMing/chatting with a friend about writing assignment
    2.  Googled words or concepts about the assignment
    3.  Looked up information about the assignment on Canvas
    4.  Engaged in other writing activity not related to the assignment (please specify)
    5.  Other (please specify)
5.  What non-digital tools did you use during the writing session?
    1.  Pen/pencil and paper
    2.  Physical references (books, magazines, etc.)
    3.  Friends or other people in the room with you
    4.  Other (please specific)
    5.  I recall using only digital tools while writing
6.  If you used IM/chatting/social media which of the following best describes what you chatting about? Check all that apply. (question only displays if participant selected item "a" in question 5)
    1.  Assignment details (requirements, due date, etc.) with a student in your class
    2.  Assignment details (requirements, due date, etc.) with a student in another section of the course
    3.  Asked about friend's thesis statement/enthymeme
    4.  Asked for help with your thesis statement/enthymeme
    5.  Asked for ideas to develop your paper
    6.  Discussed possible topics for your paper
    7.  Arranged a time to meet and work on papers together
    8.  Asked for an example paper from friend
    9.  Discussed grades
    10. Discussed other classmates
    11. Discussed teachers

12. Other (please specify)

7.  Thinking back on your writing session, write a few sentences about your writing process. What this writing session "normal"? Why or why not? Add any details that you think are not captured by the video screen recordings.

Appendix E

Analytic Questions

For each identified sequence of acts of composing, I ask:
- What is happening? Why is a response called for by the condition?
- What acts of composing are involved in addressing this condition? What new understanding of what "writing" is does this condition/response and/or the acts of composing involved suggest?
- Why did students use multiple languages, tools, and artifacts to respond to the condition? Is this necessary?
- What other tools and artifacts might they have used or be using outside of the primary writing screen, including other screens in their writing environment?
- How might the condition/response be different on primary writing screens with only one language?
- What factors might explain the differences between participants in the frequency of the condition/response?
- Does an Activity Theory framework provide allow for adequate description and analysis to capture what is happening in the condition/response? Why or why not?
- Are the results "acceptable" academic discourse/authorship?
  - Does the response align with the study site's writing outcomes ("produce written work that displays adherence to the conventions of academic writing, including control of grammar, spelling, word usage, syntax, and punctuation; appropriate tone, style, diction, and register; proper formatting, use, and documentation of sources)? Why or why not?
  - Does the response align with academic authorship as an act of inquiry and knowledge-making that responds to others within the disciplinary community by taking "ownership" and building on a tacitly agreed upon project (Bartholomae, 1985)? Why or why not?
  - Is this an example of "difference in language" that is "a resource for producing meaning in writing, speaking, reading, and listening" (Horner, Lu, Royster, & Trimbur, 2011)? or the "intercultural and linguistic negotiations" that Jordan (2012) calls for? Why or why not?
  - Does the response suggest other ways to think about academic authorship?
- What might the condition/response sequence be other than academic authorship?
- What are my assumptions as a writing teacher and a writer who only uses one language on my primary writing screen? (especially my belief that we should understand student writing as something other than "practice" or an exercise to prepare for "real" academic writing?)