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## **ABSTRACT**

This dissertation focuses on the dynamics between teachers and machines at the intersections of design, teaching labor, and pedagogy when automation is deployed in writing classrooms. My sites of analysis are Eli Review and Turnitin, two technologies that represent different design approaches that center around “informating” or “automating” data about student work. The exigence for this project emerges out of the labor crisis currently enveloping higher education. Traditionally, in times of labor crises, automation and machines are used to replace scarce or imperfect human labor. However, balanced and purposeful design of automated technology has the potential to enhance humans’ labor and protect workers. Using holistic and provisional coding, combined with object interviews, this dissertation analyzes data collected from a national survey distributed to composition instructors and nine interviews about their personal experiences with Eli Review and Turnitin. The data and findings from these methods suggests beneficial relationships between humans and machines are possible in the writing classroom through careful design, integration, and management of educational and learning technologies.

**UNEARTHING ENTANGLEMENTS: HUMAN/MACHINE COLLABORATION IN THE  
WRITING CLASSROOM**

By

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M.A., Northern Illinois University, 2014

DISSERTATION

Submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in  
Composition and Cultural Rhetoric.

Syracuse University  
May 2019

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## Chapter One: Complexities of Automated Labor in Writing Classrooms in the 21<sup>st</sup> Century

“Digital technology...didn’t give birth to free labor, but it has proven highly efficient as an enabler of dicey work arrangements”—Trebor Scholz, *Digital Labor: The Internet as Playground and Factory*

“They never asked us, the workers, if the machines were messin’ us up or helpin’ us out”—James Canzonetta

### Preface

When I was younger, I visited the Post Office with my father on “Take Your Daughter to Work Day.” On these special occasions, I would join him in his daily work routine, waking up before the sun rose, driving downtown, and entering a busy, whirling municipal building. When we arrived at his work station, I watched him sort mail into hundreds of cubbies surrounding him on all sides; his practiced approach was seamless, methodical and quick. He effortlessly sorted through myriad letters, murmuring to himself, adjusting his glasses, and swiveling around on a barstool as he organized his deliveries. He knew the ins and outs of the neighborhoods he served, the names and pets of people he delivered to, and he knew the traffic patterns and fastest ways to deliver mail on his routes. His approach for organizing his delivery load accounted for the inconsistent factors (weather, traffic, driving routes) affecting his route on a daily basis.

When he began his postal work in 1983, he was responsible for manually sorting all different types of mail into what he calls “sequential delivery order.” This included letters, flat mail (such as magazines, newsletters, etc.) and large parcels. Before he could begin delivery, he typically spent about 3.5-4 hours sorting mail into the appropriate order for a specific route. In the mid 1990s, the postal service where he worked attempted to use automation to pre-sort letters and expedite the process of sorting mail for routes. As my father explains, the logic was such that pre-sorted letters would enable “more street time than office time [for mail carriers]...higher-ups figured they could eliminate two routes and absorb them together, which would be two less

carriers they have to have.” However, in practice, this approach was not as efficient as administrators had hoped it would be because mail carriers still had to sort the “flats” (materials that were too large for the machines) and correct the machine’s mistakes from failed letter sorting.

To complicate matters, mail carriers who knew their routes front and back—and who had experienced approaches for dealing with inconsistencies in delivery—were unable to check the machine-sorted letters before their routes began. This meant that mail carriers dealt with incorrect sequencing on their routes as they were delivering mail, rather than being able to fix them before leaving the office. For example, if mail intended for a California address arrived in Ohio, postal workers had to manually reinscribe the correct tracking numbers on incorrect labels, thus consuming time on their routes.

My father explained that neither he nor his colleagues were asked about collaborating on the design or implementation of the machine. In this case, automation was intended to replace two human laborers, but was not efficient enough to do so. Where my father once spent 3.5-4 hours sorting mail, his time was cut back to about 2.5-3 hours of sorting with machine assistance—but he spent more time “on the streets delivering” as did many of his colleagues, trying to mitigate incorrect sequencing the machine had complicated. While the new system of filing mail eliminated (on average) a half-an-hour to an hour of work, it was merely a mild, flawed, (expensive) benefit or nuisance for daily laborers. “They never asked us, the workers, if the machines were messin’ us up or helpin’ us out,” my father declared. “They never bothered asking us for our input; it’s either their way or the highway and their way was a lot slower than the highway... Humans walk the routes, not the machines.”

## Introduction

My father's distrust of automation is rooted in working-class fear about machinery displacing human workers and his first-hand experience with automated mail sorting machines. In the instance of letter-sorting machinery, my father's strengths as a human worker protected him from replacement. His adaptability, his recursive and intuitive knowledge, and his ability to consider multiple factors and discern effective approaches helped him remain a valuable employee. My perception of his experience is different from his: while the attempt at automating letter sorting was poorly executed, pre-sorting mail could offer a viable means of reducing menial, repetitive labor for mail carriers, who could spend more time delivering mail within reasonable work hours. Such an idea is complicated, however, because automating labor in this way can also open up avenues for worker exploitation and replacement.

Thinking through the complexities of human/machine collaboration has inspired my professional career, but I realize now this subject has long been rooted in my working-class history. From my father's flawed experience with pre-sorted mail to my mother's work in steel factories, car manufacturing, and turkey processing plants, automation has always impacted my family's labor and our deep-seated fears about job security. Would mail-sorting machinery result in personnel cutbacks at the post office? Would my mother's body break beyond repair from pushing around thousands of pounds of steel a day without machine help? Will educational technology replace me as a teacher in the coming years? What would more productive relationships between humans and machines look like?

Such questions have been the cornerstone of my doctoral candidacy as I have studied the entanglements humans and machines enter together. This dissertation examines similar questions related to automation and human labor in the writing classroom in higher education. Specifically,

I focus on the dynamics between teachers and machines at the intersections of design, teaching labor, and pedagogy when automation is deployed in two different models: “informating” and automating data about student writing. Eli Review and Turnitin are two technologies, respectively, that represent these approaches and are sites of analysis for this work. Turnitin is an educational technology that was created over two decades ago; the program was designed to deter and find instances of student plagiarism through algorithmic detection. Turnitin automates teaching labor by “finding” matched-text in students’ work that could be plagiarized. Since its inception, the program has grown into a corporate “behemoth” and now offers writing assessment and artificial intelligence features that evaluate student work (Hand, 2018; Vie, 2013b). Eli Review is a learning technology that was created to facilitate meaningful and productive peer-review among students. From its origins at Michigan State University, the program has developed into a platform that uses automation to “informate” teaching labor by using quantitative, automated data from classroom analytics to show teachers where students are struggling and need more help.

As artificial intelligence (AI) is poised to change the technological, economic, and communicative landscape of the 21<sup>st</sup> century, higher education will be (and is already) saturated with emergent educational technologies. Scholars and teachers should continue to resist automated programs that do not benefit their students. Additionally, we should also consider what balanced and productive human/machine relationships might look like, and how teachers might shape their implementation and design. Doing so has the potential to safeguard teaching jobs by creating technology that requires teachers’ expertise to interpret data. Further, embracing technology—with caution—helps students advance and prepares them for the rhetorical writing tasks they will face in their work and everyday lives, which will likely intertwine with

automation. In order to do this work, researchers and instructors must collaborate to determine how to appropriately divide machine and human labor in writing classrooms. In my work for this dissertation, I ask teachers, the workers, how and why machines are “messin’” them up or “helpin’” them out as a means of thinking through potential design and teaching practices for future use of educational (writing) technologies.

### **Exigence**

As Jeff Grabill noted in his keynote speech at the Computers and Writing conference in Rochester, NY, millions of students across the globe are subjected to Turnitin—an educational technology program he implies is a “bad robot” (2016). Addressing a room full of digital writing scholars, he urged colleagues to consider how oversaturated the market is with machines that are alleged to better student writing. Grabill insists none of these programs were designed with consultations from content experts in writing studies; further, he suggests educational technology companies are actively trying to replace teachers and remove them from the classroom. Historically, in times of labor crises, employers deploy automation to compensate for insufficient human labor (McAllister & White, 2006, p. 25). In higher education, this scenario manifests when educational technology is implemented to conduct placement testing or for assessing students’ work. Labor in higher education is in crisis, and thus, the market is rife with technological solutions for pedagogical problems that are exacerbated by higher education’s increased corporatization (Marsh, 2004).

William Hart-Davidson suggests rhetoric and composition scholars’ attention to human and machine collaboration has largely centered around critiquing “machine scoring of standardized essays” (2018, p. 248), and to that, I would add plagiarism detection services

(Howard, 1999; Purdy, 2005; NCTE, 2013b). Despite condemnation from scholars of student writing, automated writing evaluation (AWE) programs and plagiarism detection services (PDSs) have flourished in the last two decades (Grabill, 2016). For example, in 2012, Turnitin (the most globally popular PDS) was implemented in approximately 10,000 institutions and collected over 20 million papers; today, they serve over 15,000 institutions and have amassed over 929 million (and counting) student papers (“Homepage,” Wayback Machine, Sept. 21, 2012; “Feedback Studio,” 2017). AWE and PDS programs often promise respite from pedagogical problems that arise from financial and labor problems in higher education.

Automated educational technology is happening (and has largely happened) without writing and rhetoric scholars, who could contribute to conversations about appropriate collaborations between human and machine in writing classrooms. Automated educational technologies are already conducting immaterial labor in the academy despite criticism about how they affect students (Grabill, 2016; Reeves, 2016). Communicative jobs that were once considered irreplaceable—such as “psychotherapists, personal assistants, college advisers, telemarketers, life coaches, bank tellers, phone sex workers, and even teachers and professors”—are no longer invulnerable to being replaced by machines (Reeves, 2016, p.151).

Scholars in writing studies have critiqued automated AWE programs for fear that students may write to machines and assessment algorithms instead of human audiences (Herrington & Moran, 2012; NCTE, 2004; Vojak et al, 2011). However, robots are now reading resumes and students are writing algorithms and computer software (Ohikuare, 2018). Machines are becoming an audience students will have to address more frequently in the future, and further still, robots are positioned to become “co-authors” with humans (Gallagher, 2017; Hart-Davidson, 2018; Kennedy, 2016). Such changes in the rhetorical landscape of the 21<sup>st</sup> century



demand a re-orientation toward human-machine collaboration on writing (Kennedy, 2016). Criticism about popular educational technologies is often warranted and necessary, but it is not limiting their presence in higher education. A more proactive approach to resisting unethical programs lies in designing programs that balance and appropriately assign tasks to humans and machines.

### *Automating vs Informating*

Humans are on the precipice of a new technological era—one where immaterial labor is conducted through (or with) automation. In another keynote at Zeeland Educational and Teacher’s Academy, entitled, “Robots are Coming,” Grabill elucidates why robots are an appealing solution to problems associated with human labor:

For the last ten years of years of my life, I have spent plenty of time, plenty of time, at edtech investor meetings. Trust me, if you don’t know this already, they are looking to replace you. You guys are messy. You get in the way. Robots are clean...[they are] Technologies that deprofessionalize teacher work versus technologies that professionalize your work, that require you...to invest your time and energy. (2015)

One approach to safeguarding teaching work is to adopt (and potentially help design) technology that makes teachers a necessary and integral component of classrooms. Grabill suggests the difference between educational technology and the more pedagogically motivated “learning technology” is the difference between passivity and proactivity, and by extension, is also the difference between automating and informating. Educational technology is, to borrow Potts’ (2013) phrase, passed down to users to “complete tasks,” “automate our work” and “turn...[it] into a routine” without requiring any specialized or expert knowledge from humans, which is a typical model for programs that automate human work. Educational technology happens to teachers instead of actively happening with them (Grabill, 2016). Automation is framed as a means of conducting teachers’ skilled labor and doing their work for them. Learning

technologies function “with” teachers and need humans to make sense of the data and interactions between the human and robot, which is the crucial difference between automation and informing. Such models illustrate the difference between including humans in a “tight feedback loop between the machine and the human” or one that flattens complexity and disassociates humans’ skills from tasks (Markoff, 2015, p. 212).

Grabill and two colleagues from Michigan State University (William Hart-Davidson and Mike McLeod) created Eli Review, a peer-reviewing program which applies the concept of learning technology to an application that facilitates human-to-human interaction. He remarks, “learning technologies that informate your work, that add value to your life as teachers but also that require you to add value to the experience” center teachers’ professional skills require them to make meaning out of the data the technology produces. Informating (a concept initially developed by Shoshana Zuboff in 1985 and expanded on in 1988) depends on a teacher’s expertise and interpretation of machine-generated data.

Rather than relying on automation to carry out contextual tasks like grading and assessing, learning technologies instead carry out menial, bounded tasks and require interpretation by a human content specialist. Automation has the potential to enhance human capacity and pedagogy in writing classrooms, but many educational technology programs currently on the market are poorly framed, designed, and implemented. Simply put, automation can help teachers with small, low-order or repetitive tasks, but are instead being proffered as tools capable of handling high-order tasks traditionally assigned to teachers (e.g., grading).

Automation becomes problematic when administrators and teachers expect it to comprehensively replace teachers’ skilled labor. Although requirements differ by state and institution type, most instructors are required to have a graduate level of education of a master’s

degree or PhD to teach (“Postsecondary Teachers”). This extensive level of subject-matter training can take approximately 6-10 years of graduate school and requires ongoing professional development and publication. At its worst, “in the face of high-tech capitalism,” automation can render humans to “role[s]...of subordination, supervision, and diminished responsibility” (Reeves, 2016, p.153). Given the laborious training university-level instructors undergo to develop critical thinking and teaching skills, relegating instructors to passive teaching roles is a waste of specialization and expertise. Further, automation cannot (yet) account for the specialized, adaptable, and complex reasoning processes teachers bring to their work. In most cases, automation is restrictive and bounded to parameters established by a designer. If students need help outside of those parameters, automation cannot appropriately respond. What automation can possibly offer is facilitation of more human interaction between students, and it can address lower-order issues in class that free up teachers’ time to focus on their main pedagogical priorities. Doing so requires teachers’ input throughout the design process to ensure expert skills and sound pedagogy are at the core of technological design.

### **Research Questions**

Scholars of rhetoric and composition need to consider both humans’ and machines’ strengths and weaknesses to appropriately divide, share, and assign labor in the writing classroom. Machines cannot run classrooms and grade papers, but what lower-order tasks might they be able to carry out that would free up teachers’ time for more creative and high-order priorities? Instructors who teach and study writing are uniquely positioned to make observations about appropriate divisions of labor between machines and humans in composition classrooms. Such attention to how educational technologies frame writing, teaching labor, and pedagogy is

critical because college instructors across the curriculum are attracted to programs that help them cope with teaching and grading writing, an area outside of their expertise. Who better to make suggestions for these kinds of technological design than the people who work most closely with student writers?

To learn how automation might benefit human labor in writing classrooms, the following conceptual framework motivates this dissertation project: there can be productive, appropriate uses of automated technology in a writing classroom; researchers can learn from the ways teachers are currently repurposing or neglecting the educational or learning technologies; and insight into teachers' practices can illuminate automation's potential and limitations in regard to teaching labor and writing pedagogy.

This dissertation project presents an in-depth materialist comparative analysis of two different programs that approach improving writing through different methods: 1) an educational technology (Turnitin) that automates teaching labor and 2) a learning technology (Eli Review) that informs teaching labor. Findings in Chapter Three and Chapter Four illuminate how technological design actively engages teachers or is passively handed down to them, outlining the benefits and pitfalls of each Turnitin and Eli Review.

To investigate teaching labor and machine/human entanglements in writing classrooms, I asked the following questions:

1. What are the constraints and affordances that these technologies impose on human/machine collaborative teaching labor?
2. How can teachers' current practices with educational and learning technologies inform guidelines for appropriate divisions of labor between humans and machines in the future?

3. How can machines and humans work together in ethical and productive ways to automate or informate student work?
4. How can we make power dynamics and relationships between humans and machines more visible?

To pursue answers to these questions, I distributed a survey to 49 college writing instructors who have worked with either Eli Review or Turnitin. Thereafter, I conducted nine interviews (one interviewee had engaged with both Turnitin and Eli Review, equaling five interviews for each program) to gain a qualitative understanding of instructors' interactions with the programs. The interview responses were designed to 1) align with Catherine Adams and Terrie Lynn Thompson's methods of Interviewing Objects, a guide for posthuman analysis that centers non-humans and 2) understand how these technologies are affecting teaching labor. A more detailed discussion of the project's methodological approach is located in Chapter Two; I discuss findings in Chapters Three and Four, and I offer concluding remarks in Chapter Five.

### **Emotional Labor & Automation: Instructors' Responses to Educational Technology**

Current labor conditions in higher education are tied to the prevalent deployment of automated educational technologies in college classrooms. As part-time contingent instructors are sleeping in their cars and turning to sex work to pay bills, and as institutions are asking alumni to hold voluntary instructional positions without pay, administrators continue to turn to technology to manage labor and budgetary problems across campuses in the U.S. (Gee, 2017; Gluckman, 2018; Vie, 2013a).

Automation is so ubiquitous in higher education that it may be second nature to educators who interact with technology in their courses. For instance, automation takes the shape of class

organizer through learning management systems, grader through scantron assessments, and bookkeeper through digital gradebooks and attendance trackers (“Gradebook Pro,” 2018). Whether using Blackboard to mass email students or to log how much time they spend on a course website, automation is pervasive and conducting menial tracking and facilitating tasks in college classrooms. Automation is also collaborated with for high-order tasks such as grading student writing through applications like “Essay Grader” and “Easy Assessment”; even one program helps teachers tracks student behavior, “Teacher’s Assistant Pro” (“20 Time- Saving Grading Apps,” 2018). All of these programs and applications are designed to save teachers time by eliminating low-order tasks or by attempting to carry out high-order ones.

One example of automation’s ties to labor conditions in higher education is apparent with Turnitin’s offerings. In a video hosted on the Turnitin website in 2012 entitled, “Why Educators Love Turnitin,” several instructors suggest the program enriches their quality of life by relieving the anxiety they feel about responding to an overwhelming workload. The teachers showcased in these testimonials are deeply reliant on Turnitin, and feel as if they would not be able to manage their labor without it:

- “grading goes easier; it’s been a lifesaver”
- “I’m saving a lot of time ... and I’m not getting as anxious and upset, and it makes for happier faculty also makes for a better student”
- “especially for the amount of time that it takes away from our grading and just the load of work we have”
- “we just don’t have the budget and we will have to increase class size”
- “I really couldn’t grade and evaluate my papers without the use of Turnitin...it’s really a little money to buy a wonderful tool to help our faculty and students”

- “I can’t imagine teaching without it”

These excerpts from teachers convey a clear message, as does the rhetorical framing of teaching labor in this video: teachers’ workloads exceed their capacities to manage the number of students they are responsible for teaching. Turnitin purports to better instructors’ quality of life by easing the labor crises in which they are entrenched—a welcome, though imperfect form of relief for those who identify with this struggle. Educational technology companies often use rhetorical strategies to target administrators by using appeals to efficacy and labor reduction (Herrington & Moran, 2012). In the same Turnitin video mentioned above, teachers who provided testimonial for the program underscore Turnitin’s role in managing their grading labor and mitigating administrative budget constraints. Their statements point to the intensive workloads educators are trying to handle while also balancing myriad responsibilities (departmental service, publishing, lesson planning, possibly working at several different universities, etc.) that accompany teaching at both secondary and higher education levels.

Turnitin is alleviating the emotional labor and anxiety teachers and administrators are coping with, but only as an immediate fix. Stephanie Vie (2013b) also writes about segments from the Turnitin testimonials mentioned above, and points to the company’s use of efficiency rhetorics that align with corporate and capitalist principles that help Turnitin flourish. She highlights one professor’s claims about efficiency, wherein he suggests he “can cope with a hundred twenty students as if there were thirty students” by working with Turnitin. If led to its logical conclusion, this means one instructor could do the work of four teachers with the help of Turnitin—a worthwhile solution for administrators who are looking for ways to manage budgetary constraints. However, such logics disenfranchise and exploit the very teachers who feel dependent on the program because they enable administrators to justify mega-sections with

course caps upwards of 120 students. Thus, teachers' working conditions remain untenable and can worsen if administrators see Turnitin as an intervention that allows teachers to work with an even higher number of students in their classrooms.

Evidence of the emotional toll contingent laborers experience is prominent in testimonials showcased on educational technology websites. As teachers mentioned above, Turnitin is a "lifesaver" that instructors "can't imagine teaching without." When these testimonials center affective and pathos-ridden appeals, it highlights shared experiences among teachers who struggle with their labor loads. These similarities thus build Burkean identification, and consequently, consubstantiality between users (and potential users) of the technology (1969, pp. 20-21). Both administrators and instructional staff are allured by the promise of efficiency and streamlining workloads—a model of efficiency that impacts administrators and instructors in very different ways. While administrators benefit from finding solutions to these labor problems, they contribute to the exploitation of contingent faculty members. That is not to say administrators are not emotionally impacted by these issues, but the brunt of the consequences affects the lives of contingent faculty more forcefully and directly. Efficiency to an administrator is about departmental budgets; efficiency to a contingent laborer is about finding a way to feasibly respond to hundreds of pieces of student work while also maintaining a reasonable quality of life.

To cope with labor and budgetary constraints, many administrators have turned to automated assessment and plagiarism detection programs to fix teaching problems complicated by contingent labor (Herrington & Moran, 2001; Marsh, 2004; Vie, 2013a). Such software offers a seemingly simple, mess-free solution to pedagogical problems teachers cannot easily attend to when they are teaching a high volume of students—problems such as plagiarism (Vie, 2013a),



citation practices, constructing arguments, giving students feedback and comments for revision, and grading assignments. Automation thus responds to high-order, contextual teaching concerns that instead require a human/teacher's expertise and adaptability. Scholars in rhetoric and composition argue that when machines engage with student work in these ways, they can create more problems than they solve by flattening complexity in students' work and encouraging them to write to assessment algorithms rather than to human audiences (NCTE, 2004; Vojak et al, 2011). Additionally, they can "reinforce old practices" of writing that promote outdated, rigid values about composition that privilege grammar and language usage (Vojak et al., 2011, p.99).

While these arguments are necessary and valid, poor implementation and designs of automation in educational technology have encouraged teachers to reject different types of automation in the writing classroom. When incorporated in nuanced and appropriately designed capacities, automation has the potential to assist overburdened teachers in ways that empower them and better their pedagogy. Rather than focusing on large-scale, high-order teaching concerns, automation can instead complete bounded, low-priority tasks that require teachers' expertise to train students in interpreting the data the machine produces. Doing so centers teachers' skills and guards them from replacement, while also helping them devote more time and labor toward high-order teaching concerns.

Scholars and organizations in writing studies have a long history of condemning machine assessment of student writing (Herrington & Moran, 2001, 2012; Howard, 1999; NCTE, 2004; NCTE, 2013; Purdy, 2005; Zwagerman, 2008). Machine assessment programs can incorrectly assess students' work, undermine students' and teachers' agency, and create inimical relationships in classrooms where students are policed by teachers. Despite over two decades of scholarship and research that highlights the ethical and pedagogical pitfalls of this type of

assessment, programs such as Turnitin (which is currently adopted in over 15,000 institutions of learning across the globe) remain exceedingly popular (“Homepage,” 2016). While flawed, it is difficult to deny that such programs are praised by overworked teachers, particularly those whose content-areas are not related to writing. Some teachers in the sciences, psychology, etc, are teaching anywhere from 120-400 students per section, and in some cases, those sections require a writing component (Interview Participant 6).

### **The State of Labor in Higher Education**

Beginning in the mid-late 1970s, the academic labor force in the United States began shifting from secure, permanent tenure-track employment for instructional staff to a contingent model of hiring teaching labor (“Higher Education at a Crossroads,” 2016, p.3; Schell & Stock, 2001, p. 4). These changes reflected the larger economic sector, which demanded more “employer flexibility” and “nonstandard employment” after WWII (Champlin & Knoedler, 2017, p.232-235). Workers were expected to carry out temporary jobs to function as a cheap, expendable labor force that produced quality product (Umbach, 2007, p. 93). Contingent work in the larger U.S. economic landscape is typically categorized by “low pay and insecure work” and “insufficient education and training” (Champlin & Knoedler, 2017, p.233). The latter is not applicable to contingent workers in academia, who are—paradoxically—highly educated and work in an “industry with the highest proportion of contingent workers” in the country (p.232).

According to Eileen Schell and Patricia Lambert Stock (2001), educational policy changes during the 1960s and 1970s ushered in a wave of students who were previously barred access from the academy. Contingent laborers were hired to meet burgeoning enrollment numbers and to mitigate the loss of government funding in higher education, which provided a

model for universities and colleges to cope with staffing and budgetary constraints (Schell & Stock, 2001, p.3-5). The considerable increase in “underserved populations,” combined with a “predicted decline in student enrollments that did not materialize” necessitated a temporary solution for insufficient staffing (p.2). However, hiring contingent workers—those without long-term contracts who work on a full-time or part-time basis—has become the new normal across institutions of higher learning in the US. Although percentages vary by institution type, the overall make-up of the academic workforce in the US is populated with over 70% of teachers who are not on the tenure track. According to a recent report from the American Association of University Professors, the past four decades have shown a stark, growing reliance on contingent instructional faculty:

Over the past forty years, the proportion of the academic labor force holding full-time tenured positions has declined by 26 percent and the shareholding full-time tenure track positions has declined by an astonishing 50 percent. Conversely, there has been a 62 percent increase in full-time non-tenure-track faculty appointments and a 70 percent increase in part-time instructional faculty appointments. The majority (70 percent) of academic positions today are not only off the tenure track but also part time, with part-time instructional staff positions making up nearly 41 percent of the academic labor force and graduate teaching assistants making up almost another 13 percent (part-time tenure-track positions make up about 1 percent of the academic labor force). (2016)

Not even one-third of instructional positions are currently held by tenure-track professors.

Contingent laborers, especially those considered part-time teachers, are working in conditions marked by wages below the poverty line (on average, a part-timer “earns \$16,718 from a single employer”), little to no health or retirement benefits, limited (if any) “access” to departmental or institutional resources, and they are working across multiple campuses while teaching hundreds of students (“Higher Education at a Crossroads,” 2016, p.3; Champlin & Knoedler, 2017, p.235; Fulwiler & Marlow 2014). Issues of labor and educational technology are especially significant for scholars in the field of rhetoric in composition because nearly 93% of first-year composition

courses are taught by instructors who are not on the tenure track (Scott, "Introduction").

Such changes in the labor force have had consequences for teachers, administrators, and students alike. For students and administrators, problems with part-time contingent laborers manifest in retention difficulties and lower graduation rates, which are correlated to the employment of contingent faculty (Umbach, 2007).<sup>1</sup> According to Audrey Jaeger and Kevin Eagan's findings about contingent faculty in four-year public institutions, students are at a higher risk of dropping out of college in their first year and in their transition to year two (2011, p.511). Contingent faculty, specifically part-timers, predominantly teach first-year students, who benefit from mentoring and concentrated "interaction" with their instructors (Umbach, 2007, p.95). Unsurprisingly, contingent part-time faculty members do not engage with students as frequently as tenured professors; they are less accessible because of their strenuous workloads and lack of office space in their departments.

Jaegar and Eagan suggest these hurdles for contingent faculty and students are likely linked to issues of retention (2011, p.510). Part-time contingent laborers themselves have less time to prep for courses (both on a daily and semester-long basis), their academic freedom is restricted, they are often living in poverty, and they are emotionally strained (Fulwiler & Marlow 2014). Additionally, these faculty members have a lower level of institutional investment and little access to professional development, which affects programmatic assessment of student work (Thompson, 2003, p.43). Such overwrought conditions contribute to the appeal of automated assessment technologies, which promise to help struggling teachers and improve programmatic cohesion.

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<sup>1</sup> Doctoral institutions are the exception, but the adjuncts there had more access.

In terms of quality of teaching duties, Gray Scott and Jennifer Daley-Scott (2015) indicate assessment practices are compromised when contingent faculty members are left out of the training process for understanding program outcomes and assessment goals. They argue that excluding contingent faculty members—who overwhelmingly teach courses that are assessed—negatively impacts “student retention and lower graduation rates” because teachers are not well-attuned to programmatic outcomes (p.32). These large-scale administrative issues associated with contingent labor are affecting students, who benefit from having engaged and available teachers.

### **Historicizing Automation and Worker Replacement**

Given the stark decrease in tenure-track jobs in higher education over the past four decades, teaching jobs and labor conditions in higher education teachers are tenuous at best. It comes as no surprise that educational technology programs’ websites market time-saving, efficient labor to administrators whose staffs are stretched thin. The history of automation and worker displacement, along with how such stories are framed, obstruct possibilities for more productive and collaborative engagement between humans and machines. In actuality, “there is no economic cataclysm on a societal level due to automation” because new jobs arise with new technologies (Markoff, 2015, Kindle Location 706). However, on an individual level, automation can displace workers and families, leaving apprehension toward technology firmly intact.

Machines are often designed to either “replace” or “simulate” humans (artificial intelligence) or “augment” human ability (intelligence augmentation) (Markoff, 2015, Kindle Location 252). Automation acutely illustrates the “paradox” and “dichotomy” inherent in these approaches for technological design. While automation can be implemented to “extend” human skills, it can also “displace” us (Kindle Location 233). After all, automation can replace human

labor at a lower cost, and it frees employers from paying error-prone, unpredictable human workers (Reeves, 2016, p.153). When humans are framed in such a way, “the human is not valued for its ingenuity or creativity. Instead, when confronted with the cold efficiency of the machine, the human appears as just an organic collection of errors,” which positions humans as a detriment to employers (p.153). From needing sick days to living wages, and from breaking products to missing deadlines, humans represent a threat that can "diminish capital’s ability to produce profits”; instead, automation presents a lucrative opportunity to eliminate the uncertainty that accompanies human labor (p.153).

Early automata, created in ancient China, Greece, Egypt, Babylon and during the Islamic Golden Age, were designed to simulate humans in different capacities (Kennedy, 2016, p.120; Reeves, 2016, p.152). According to both Krista Kennedy and Joshua Reeves, these devices (such as water clocks, machine servants that offer food to guests, and a robot duck that “defecated”) both “entertained” humans and “assisted” them. Automation became problematic for humans when designers wanted their inventions to more fully “serve” humans, which resulted in a perceived threat against human workers’ livelihoods (Reeves, 2016, p.152). As Reeves recounts, the inventor of the defecating robot duck, Vaucanson,

began to design automated looms for the French silk industry. But when it became known that Vaucanson’s silk loom would replace human laborers with hydropower and beasts of burden, silk weavers destroyed his new machine and chased him out of town...eighteenth-century French workers, like the machine-smashing Luddites of the following generation, recognized the social threat posed by automated machine labor. (2016, p.152)

The attempted annihilation of Vaucanson’s loom and his subsequent ostracism illustrates human laborers’ fraught relationship with automation and its potential for displacing their jobs. An extension of this tension is evident in the “machine-breaking” Luddite movement in nineteenth

century England, which inspired wool and cotton industry workers to destroy automated machines that threatened their economic security (“Luddites”).

In more recent history, robots are largely credited with displacing auto-industry workers and manufacturers in the United States. Presently, automation has slowly, and by and large invisibly, become normalized in everyday activities. Automation is ubiquitous in the US; daily interactions with automated communicative labor include paying bills online, ordering food at kiosks, checking into airports, and so on (Reeves, 2016). Given the pervasiveness of automation, it is no surprise humans are afraid of new technological developments that could endanger their financial security and work. Even though these examples extend far beyond the writing classroom, it is important to look toward labor practices and parallels in industry to understand the trends associated with automation that may spill over into academia.

As Ron Harbour and Steve Scemama (2017) write in a recent *Forbes* article on robots and humans in manufacturing work, “The real key to developing a competitive edge in an age of evermore automation is striking the right balance between people and robots, and evidence abounds that it’s not necessarily the most automated factories or service organizations that rise to the top” (n.p.). They offer examples of a mutually beneficial relationship between humans and machines, one in which machines are assigned to methodical automotive “painting and body sho[p]” work, which entails “constant repetition and consistent quality and often present safety and ergonomic challenges” wherein humans would be working with “unhealthy chemicals.” Such work is dangerous for humans, but is ideal for machines, which are precise and systematic. Humans are still needed on assembly lines, “to handle today’s highly customized vehicles...[which] requires the flexibility of human workers who can adjust to changing needs and innovations without extensive reprogramming.” In this example, humans are assigned to

creative work, and machines are relegated to more menial, repetitive tasks. As Harbour and Scemama note, the real success here comes from developing a model in which humans and machines are assigned to tasks that suit their strengths and capabilities. Machines are not conducting work that exceeds the limits of their design, and humans are placed where their ingenuity and adaptability flourishes. In writing classrooms, what might this model look like? What are menial tasks automation can carry out to help teachers free up their time for creative, contextual work?

### **Literature Review**

Three areas of study from rhetoric and composition inform the theoretical framework for this project: rhetoric and technology, writing program administration, and composition scholarship as it relates to plagiarism detection services. Studies in rhetoric and technology offer robust literatures for interrogating questions of agency (Beck, 2018, 2016; Cooper, 2011; Eyman, 2015; Ingraham, 2013; Latour, 1999; Miller, 2007), technological determinism (Heilbroner, 1967), technology and politics (Mumford, 1934; Wiener, 1950; Winner, 1980), automation and labor (Gitelman, 1999; Huws, 2014; Markoff, 2015; Scholz, 2013; Zuboff, 1988), and ambient rhetoric (Rickert, 2013).

A key concept from this grouping first appears in Langdon Winner's foundational article, "Do Artifacts Have Politics?" (1980) in which he argues that hard technological determinism, as Leo Smith and Merritt Roe Marx (1994) would later describe it, merely examines the social effects technology has on a particular community without interrogating the social and political conditions that helped shape the technology's "invention, design, or arrangement" or its "inherent" political alignments (1980, p. 122-123). Technology is not developed in a vacuum,



and its design is suffused with human intention. Tracing the ecology out of which automated writing programs have emerged can help illuminate the political and social influences that guide humans' intentions in creating and deploying these programs. Specifically, economic and labor conditions driving the development of educational technology are crucial for understanding ethical uses and design in the future.

Winner's argument has been taken up in scholarship in many different disciplines. His work has extended to feminist studies that seek to uncover how technology designed by men has disenfranchised women (Wajcman, 1991) and it also appears in Donna Haraway's germinal "A Cyborg Manifesto" (1984). Winner's work has influenced ecological design, which builds on his argument to explore the political dimensions of how technology is used to provide basic necessities to humans (Orr, 2002). Sociologists are concerned with "the social shaping of technology' (SST) - how the design and implementation of technology are patterned by a range of 'social' and 'economic' factors as well as narrowly 'technical' considerations"—an obvious connection to Winner's work (Williams & Edge, 1996).

Winner's ideas are also related to Bruno Latour's work; the latter scholar challenges traditional anthropocentric engagements between humans and machines (1999). According to John Shinga (2007), Winner's work suggests "the politics of artifacts can be analyzed by looking to the things themselves." Shinga claims Latour diverges from this theory by arguing artifacts "are political only insofar as they set constraints on human relationships...[in ANT] the politics of artifacts should be reconceptualized to account for the actions that are routinely distributed or shifted between humans and nonhumans" (p.45). However, Winner and Latour's concepts can both be operationalized to offer a fuller understanding of how humans and nonhumans affect

each other. We can look to artifacts to understand the politics informing their design, and we can study how humans subsequently deploy technology to understand how they are constrained by it.

These concepts offer useful starting points for engaging in complex questions about how automated technologies entered writing classrooms, how the material and economic conditions in higher education have influenced their design and usage, and the ways in which humans “adapt” technology for their own ends. When considering educational technology, it is tempting to label existing programs as “bad” technology. However, what human interventions and uses of technologies may impact their consequences and effects on humans? As Winner suggests, researchers should “tak[e] technical artifacts seriously” and contextualize their political properties from the social contexts from which they arise (1980, p.123).

Latour’s analyses of human and nonhuman collaboration are of paramount importance for this dissertation project. Latour draws from established theories about science and technology to illustrate how historical narratives in both fields have obfuscated or over-simplified an object/subject dichotomy in regard to agency; this split either puts humans or artifacts in power over each other, rather than considering their collaboration or mutual shaping of each other. In *Pandora’s Hope*, Latour suggests nonhumans have a history too, and humans’ and nonhumans’ interactions with each other transforms each actant into a wholly new “hybrid actor” (1999, p.180). Consider, for instance, how authorship changes when humans collaborate with automated writing technologies. If a program like Turnitin highlights a sentence that is grammatically incorrect and a student changes her writing to reflect the suggestion the machine offers, is she then the sole author of her work? Tim McGee and Patricia Ericsson (2002) and Alex Vernon (2000) critiqued the now ubiquitous grammar checkers for how they have shaped students writing practices and influenced teachers’ pedagogy in relation to grammar. Some programs

offer students a choice to accept new suggestions, but some do not. In this case, what is human and nonhuman is obscured, and because of this interaction, a new actor is formed—a view that regards agency as being in the middle of these tensions and negotiations. Latour urges us to consider how the exchange between automated writing technologies can change teachers and students, and how teachers and students change machines. Latour’s assertion that humans and nonhumans are equal actors is a foundational and pervasive posthuman idea that is present in much of the recent scholarship in our field, but what if these relationships are less than equal?

Take, for example, Thomas Rickert’s *Ambient Rhetoric*, where he suggests that rhetorical studies has neglected objects’ and materials’ roles in rhetorical acts because humans have been at the center of the rhetorical tradition (2013). Here, a less than equal relationship manifests in which humans are underplaying the role objects and materials play in rhetorical practices. Rickert uses the concept of ambience to disrupt established theoretical frames, and argues nonhumans are agentic, active forces in rhetorical interactions. Of particular relevance is Rickert’s concept of ambience and his argument for challenging our rhetorical “commonplaces”: “[rhetoric] must diffuse outward to include the material environment, things (including the technological), our own embodiment, and a complex understanding of ecological relationality as participating in rhetorical practices and their theorization” (Kindle Locations 496-497). A view of rhetoric that accounts for the materials surrounding it “dissolves the assumed separation between what is (privileged) human doing and what is passively material” (Kindle Locations 502-503). The subject/object dichotomy typically associated with agency is then rendered unintelligible in this framework and offers a more ecological purview of rhetorical practice. Such a framework offers a way to engage labor conditions teachers work in, the material constraints they are subjected to, and the technology they are shaping and being shaped by, and how this

affects rhetorical practice. Doing so positions automated writing technologies as significant, active objects that shape how students and teachers engage with writing in their classrooms.

Continuing this theme, Scot Barnett and Casey Boyle's edited collection (2017) is comprised of essays that further interrogate how humans and things "act alongside" each other (p.1). According to the editors, "things are rhetorical"; this concept requires scholars of rhetoric to think of "things as active agents rather than passive instruments or backdrops for human activity"—a way of thinking that is challenging for those who have historically centered the human in rhetorical studies (p. 2). Rather than thinking about automated writing technologies as passive agents, the essays in this book ask readers to consider the rhetorical power these programs can possess. The editors and authors implore readers to explore rhetorical ontologies and move away from epistemology because doing so will encourage us to consider nonhumans as substantial agentive actors in rhetorical practices.

Scholarship in rhetoric and technology that more specifically relates to automation and algorithmic rhetoric is prevalent in the work of Estee Beck (2018); Kevin Brock & Dawn Shepherd (2016); Doug Eyman (2015); Chris Ingraham (2013); Liza Potts (2013); Potts and Michael Salvo (2017); Krista Kennedy (2017) and Jessica Reyman (2017). Potts' work offers a starting point for thinking about how technology is designed, and argues it often is handed down to users who receive and use it rather than participate in it (2013). In arguing for the rhetorical validity of "experience architects" (those who should test and experience the technology they help design), she claims humanists and technologists are uniquely positioned to work together to design and collaborate in this endeavor because of shared interests in "culture, use, and context" (p.20). Potts' conceptualization of experience architecture is critical for thinking about how design can create more even power dynamics and agency between humans and machines. Rather

than creating technology that users cannot adapt, designers need to think about how to build choice and collaboration into the technology humans use. To develop her concept of participatory technology, Potts invokes Latour and Actor Network Theory (ANT) to illustrate the necessity of understanding technology as an equal and mutually agentic and transformative actor to create the vision of technology she imagines (p.25). Potts insists “we must cease building antisocial software that works to instruct users on what they can and cannot do in these spaces in favor of building systems that are socially flexible, allowing participants to flourish” without the rigidity and constraints traditional software subjects users to (p.6). What might participatory technology look like in the writing classroom and how are current programs restrictive?

One example of restrictive technology is clear in the operationalization of algorithms. Brock and Shepherd explore the rhetorical strategies procedural enthymemes deploy through this type of technology. They suggest scholars of rhetoric and composition must pay attention to these systems that are often obscured and internalized (e.g., a list of Google search results that present items in a particular order) because they are shaping human actions and the arguments users make. Algorithms can, by the data they present to users, sway users’ actions and decisions about how they use information (Beck; 2018, Reyman, 2017). In some writing classrooms, algorithms and automation present students with definitive instructions about changing their writing, rather than offering strategies and suggestions to consider. For more evenly distributed agency between both humans and nonhumans, users in these scenarios should have more choices about how they use technology and those choices should not be obscured from view.

Ingraham (2013) echoes these concerns about algorithmic boundaries and argues algorithms are rhetorical because their “outcomes are not empirically inevitable, but rather the

product of a particular set of parameters designed strategically to lead toward a particular kind of result,” much like effective rhetoric compels audiences to act in particular ways (p. 63).

Algorithms are not neutral, nor are they perfect (Beck, 2018; Ingraham 2013)—an assertion that Brock and Shepherd also make. Instead, they are “motivated by quite specific epistemic standards that can radically delimit what counts as valid or meaningful” (Ingraham, 2013, p. 64).

Ingraham makes a case for understanding algorithms as rhetorical on a “macro, meso, and micro” scale as a means of interrogating notions that algorithms are free from subjectivity and human-error, and accounts for the ways in which politics and culture are embedded within their programming. Thus, Ingraham and Brock and Shepard (2016) offer a viable (and more recent) way to bridge gaps between Winner’s 1980 piece, hard technological determinism, and my current work on boundaries and limitations of algorithms and automation.

Another central piece from recent scholarship is Kennedy’s 2016 work, *Textual Curation: Authorship, Agency and Technology in Wikipedia and the Chambers’ Cyclopaedia*, which illuminates why automation and algorithms are so alluring for overburdened laborers, particularly as it relates to “immaterial labor” (Reeves, 2016) and Wikipedia bots. Humans are thought to be free of “human frailty in the form of short attention spans, error-prone-ness, and slowness,” which marks a clear opportunity for their use under the current labor crisis in higher education (p.118). As Kennedy writes, “[b]ots can handle [menial] tasks more efficiently, more consistently, and more correctly,” which allows humans to work on “higher-order concerns” (p.118). In the context of automated writing technologies, these menial, immaterial tasks are often considered to be grading, plagiarism tracking, and grammatical editing. Popular automated assessment companies often appeal to administrators by claiming these programs are more reliable and accurate at conducting communicative labor than human graders, which has

significant implications for the design of these programs and points back to the labor conditions out of which they have emerged. Bots are not objective; they are infused with “human intention” and although they are automated, they “exer[t] their own agency that is both productive and occasionally perverse” (p. 119). Kennedy argues that human engagement with design of these bots has not always been successful in meeting design goals; thus, humans need to pay more attention to the work they do, particularly upon embarking a new technological era.

These questions of automation and immaterial labor have ethical consequences for instructors in higher education. Jim Brown’s book on ethical programs and hospitality offers a framework for interrogating the ethical dimensions related to automated writing technologies (2015). Brown’s work examines what it means to be a host in a networked and highly connected world where we are largely unaware of the parties entering our lives through the networks we participate in. Much like Reyman’s 2013 piece on user data and authorship, reading Brown’s work asks readers to consider what are we giving up in order to access the networks we participate in.

Ethical programs are a response to ethical dilemmas. Brown claims “ethical decisions happen in moments of breakdown when we are no longer experts of ... our ‘microworld,’ a lived situation in which we develop a microidentity, a ‘readiness for action’” (Kindle Locations 196-198). If the university is a network to which students are trying to gain access, they must give up their rights to their intellectual property and individual privacy to participate in classrooms that use writing assessment technology that can store their work when they are asked to use plagiarism detection services. That work is then placed in another network—the program’s database—which stores their work indefinitely and uses it to check for other instances of plagiarism among students across the country (something that may not be prominently advertised

to students). Teachers are deskilled because there is an ethical labor crisis problem the machine was created to fix, or as Brown writes, teachers would “no longer [be] experts” of writing assessment or plagiarism detection because the machine is doing the labor of grading student work. Further, such deskilling is made possible by the harvesting of Big Data and surveillance capitalism, which relies on student generated data and intellectual property for profit (Beck, 2018).

Because of the various intersections of rhetoric, technology, and labor, this project considers scholarship outside of rhetoric and composition. Ursula Huws (2014) analyzes global labor structures and practices throughout four different eras post-World War II. She focuses on “political, economic, and technological developments” (Kindle Location 225) that ushered in and drastically changed labor practices across the world. In looking at these significant historical moments, Huws urges readers to learn from them and consider the potential technology and capitalism have to disrupt current labor practices. Looking to past shifts in global labor structures and technological development will ground my research about the current labor crisis in higher education.

Huws focuses on social, cultural, public labor and commodities, which point to the ecologies related to the emergence of automated writing technologies. Of particular importance is her assessment of new trends with teaching and academic labor, which she claims are succumbing to business-model tactics like “increasing intensification of work, standardization of processes, the introduction of performance indicators and targets, short-term contracts, project-based work, lengthening of working hours, and stress” (Kindle Locations 837-838). These trends are indicative of future labor practices that will affect academia and subsequently, writing technology. Huws’ arguments align with Zuboff’s (1988) claims about automation and the



laboring body. Zuboff examines several examples of how machines are fundamentally changing the nature of work and labor to either augment human capacities or replace them, which is relevant to Huws' assessment of labor practices in higher education in an age of late capitalism.

Much of the literature in the rhetoric and technology grouping urges readers to consider the political and material contexts in which technologies are developed. To better understand the contexts from which automated writing technologies emerge, scholarship from writing program administration describes the histories out of which writing studies arose and the institutional constraints that shaped it. Furthermore, literature in writing program administration attends to the current economic and material conditions in higher education. Relevant work from this area of study complements conversations about technology and politics, such as Chris Gallagher's *Reclaiming Assessment: A Better Alternative to the Accountability Agenda* (2007) and Donna Strickland's more recent (2011) *The Managerial Unconscious in the History of Composition Studies*. Strickland's work dovetails with conversations about design as she poignantly reminds readers that researchers, teachers, and administrators cannot make policy or craft pedagogy (or adopt technology) with a "professionally secure" workforce in mind.

Anne Herrington and Charles Moran's 2001 article, "What Happens When Machines Read Our Students' Writing?" examines the ways in which financial and assessment-driven agendas in higher education have paved the way for machine grading. They suggest machine assessment companies market themselves to administrators and highlight how students are changing their processes to write to a machine. These scholars point to a crucial concept first mentioned by Ken McAllister and Edward White: when human labor is in crisis, administrators turn to technology to mitigate fiduciary losses and to alleviate insufficient staffing (2012; p.220). Such practices are still evident in Nancy Welch and Tony Scott's (2016) recent edited collection,

*Composition in the Age of Austerity*, which suggests these conditions have only worsened in the past decade.

The last area of study informing the theoretical framework for this project is located in composition studies related to PDSs and AWE educational technology programs. Plagiarism detection services offer a useful site of inquiry because they have existed for nearly two decades. Scholars from the field have a rich and full history of challenging the practices PDSs promote, which offers another starting point for interrogating the potential drawbacks of automation in writing classrooms. Problems with working with PDSs often relate to ethical, labor, and pedagogical issues. Scholars like Vie (2013a & 2013b; 2017) and Bill Marsh (2004) describe the real and immediate consequences PDSs have on students and teachers, and they contextualize the emergence of PDSs in ways that align with scholarship about machine assessment of student writing in Herrington and Moran's work. Additionally, James Purdy (2005) offers an early empirical account of how these programs operate and the initial concerns scholars in the field raised about them. His assessment of PDSs will be an interesting point of comparison to the current practices these programs now adopt.

Issues of surveillance are also pertinent to algorithmic data collection in these contexts. Sean Zwagerman (2008) and Deborah Harris Moore (2013) outline the surveillance issues associated with the use of PDSs. According to Moore, a culture of plagiarism detection both "creates and maintains" the need for surveillance of student work, much like Zwagerman argues in his piece (p.102). Moore theorizes the consequences of this punitive culture in education by comparing concepts in Foucault's *Discipline and Punish: The Birth of the Prison* to practices PDSs are designed for. Ultimately, she argues that the use of this technology can have a panoptic effect that makes students fear writing because of the consequences students face if they are

labeled a “plagiarist” (p.103). Such work incites questions about technological design and surveillance, which will be considered in Chapter Five to account for the access to extensive student work both Turnitin and Eli Review possess.

## **Chapter Summaries**

Chapter Two details the methods for data collection and analysis. This chapter provides ample background information about Turnitin and Eli Review to bolster readers’ understandings of the programs before the analysis begins. I adopt Adams and Thompson’s Interviewing Objects methodology and explain the rationale for aligning human interview questions with parallel object interview questions. Chapter Two also provides a logistical overview of my methods of collecting data through a survey and interviews and details my IRB process and approval.

Thereafter, Chapter Three and Chapter Four provide an in-depth look at the findings and analyses from interviews with teachers who have used Turnitin and Eli Review. Chapter Three identifies how the design of each program affects an instructor’s ethos, their communication practices, and how ecological constraints impact human and machine collaborations. (Rickert, 2013). I invoke Latour’s (1999) concept of hybridity to highlight how human and machine collaborations change each other and alter power dynamics in the writing classroom and use Potts’ (2013) concept of antisocial software to frame my analysis.

Chapter Four highlights coded data that is relevant to teaching labor and pedagogy in relation to instructors’ responses about their use of Eli Review and/or Turnitin. The concept of hybridity is also relevant in this chapter, which details how human and machine interaction changes a teacher’s pedagogy, labor, and the machine’s functionality. To do so, analyses are

framed by work on agency (Cooper, 2011), informing (Zuboff, 1985, 1988), and augmenting human labor (Markoff, 2015).

The concluding fifth chapter overviews the most exigent findings of the study, offers recommendations for future technologies that are based on teachers' input, and suggests pathways for future work related to this dissertation project. I close the dissertation by suggesting the data I have collected from teachers with writing pedagogy backgrounds should be replicated with teachers who do not have similar training.

## Chapter Two: Methodology & Methods

### Rationale

The research design of this dissertation aims to unearth the entanglements humans and nonhumans engage in when educational and learning technologies are designed to enhance student writing. To do so, I adopt a mixed-methods approach for conducting a new materialist comparative analysis of Turnitin and Eli Review. New materialist studies aim to challenge traditional human-centered perspectives of agency by instead emphasizing how humans and nonhumans can mutually impact each other and alter power dynamics when the two intermingle (Fox & Alldred, 2015). Further, new materialist studies account for the context and ecologies out of which (in this case) technology emerges. Because of the fraught labor crisis in higher education, tracking how the human and nonhuman actors collaborate or disempower each other in teaching contexts is crucial for understanding what appropriate, collaborative, and balanced relationships might look like in the future. As educational technology companies work to replace teachers with automation, this research implores readers to consider what productive machine/human relationships are (and could be) in writing classrooms.

Turnitin and Eli Review are sites of analysis for this study because they represent two different design approaches for developing educational technology and learning technology (respectively), and they are familiar programs to writing instructors. Adopting a mixed-methods approach, the data, findings, and analyses in Chapter Three and Chapter Four materialize from a framework that considers both humans' and machines' roles in shaping and influencing each other when working with technologies that are devised to improve writing. I adopt three main methods for collecting data about human and machine engagements: Interviewing objects (Adams & Thompson, 2016), surveying instructors of composition courses who have worked

with Turnitin and/or Eli Review (Roberts, 2014), and interviewing teachers (Beitin, 2012) about their labor and experiences with these technologies in their classrooms.

In the following sections of this chapter, I first explain my sites of analysis by using Adams and Thompson's first and second heuristics (detailed below), which ask researchers to gather anecdotes about nonhuman interviewees and to "follow actors" to observe how they function in action. Then, I detail my rhetorical adaptations and adoption of their heuristics for interviewing objects and explain how they shaped my survey and human interview questions. I move to overviews of my survey methods and design, then to my approach for interviewing writing instructors, and last, I describe my coding methods.

### **Sites of Analysis**

Sites of analysis for this study include an educational technology program and a learning technology program: Turnitin and Eli Review. Turnitin offers a rich, complex history with scholars in writing studies and also has existed for over two decades. Not only is Turnitin a longstanding program, but it is also internationally popular and widely adopted at institutions of higher learning. Turnitin is a program designed to better student writing and monitor plagiarism detection through automation; the program was not predominately designed by writing studies scholars or teachers. Eli Review, though a smaller and less popular program, is fairly well-known among writing teachers because it was created by digital writing scholars. Eli Review offers an interesting point of comparison with Turnitin because it was designed by teachers and subject matter experts; it deploys automation differently than Turnitin. Where Turnitin automates data, Eli Review informs<sup>2</sup> it. Thus, seeing how teachers respond to working with these

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<sup>2</sup> A detailed explanation of informing is available in Chapter 1.

technologies in their classrooms offers a concrete and empirical account of the differences between these models. A third program, WriteLab, was also considered for analysis in this study; however, no survey respondents had worked with the program.

To understand my sites of analysis, I studied anecdotes from teacher testimony in blogs, articles from *Inside Higher Ed* and *The Chronicle of Higher Education*, YouTube videos, academic articles, human interview questions related to the technology's appearance, and videos on the Turnitin and Eli Review websites. These accounts illuminate testimonial and anecdotes about how Turnitin and Eli Review are deployed in practice. Additionally, I follow the actors in their daily routines by working with the programs to carry out their designed purposes: plagiarism detection and peer-review. I accessed Turnitin through Blackboard, my current institutional learning management system. I worked with Turnitin without having to engage participants because the program is designed to give students feedback on their work without human interference. Eli Review is so heavily user-generated (i.e., students create most of the content that populates the application) that I had to enroll in a workshop to observe the program in practice; without multiple human participants, Eli Review cannot operate fully. After contacting the Eli Review representatives, I was invited to participate in the aforementioned workshop at the Conference on College Composition and Communication (CCCC) in 2018. The Eli Representatives then established the parameters of the workshop to mimic how students would work with the program, and I experienced an authentic simulation of the program's functionality.

My analysis of Turnitin was limited to the version of the program purchased by Syracuse University; specifically, I analyzed the plagiarism detection and Feedback Studio functions (on an inactive writing course) because these were the two main features of participants most

frequently engaged with<sup>3</sup>. Additionally, I collected data from each program's official website, social media accounts, and related content to conduct object interviews. I accessed Eli Review by 1) attending a workshop presentation 2) via a separate demonstration conducted by an Eli Review team member 3) by analyzing data that emerged from the human interviews, and 4) from an extended program trial that allowed me access to the materials from the CCCC's workshop. Because Eli Review is highly dependent on user-input, enrolling in a workshop was necessary to experience the full breadth of the program with other human users who supplied writing and course content.

### Turnitin

Detailed accounts of Turnitin's history are difficult to locate on the program's website. At the bottom of the current homepage, a link to an "About Us" page leads users to a general timeline of the company's history (2018). The timeline of the company's history on its website provides a condensed, vague overview of major milestones in the company's historical narrative. According to the U.S.-based history of Turnitin, the program began in 1998 "as a peer review application" and in 2000, the website Turnitin.com was created as a "plagiarism prevention service" and has since added features to the program related to peer-review, grading, and assessment ("About Us," 2018; Vie, 2013b). Turnitin.com's history is in tension with Vie's overview of the company, which suggests plagiarism.org, the precursor site to Turnitin.com, began in 1995 (2013b).

With a history spanning approximately two decades, Turnitin's features and technology have evolved heavily; the company has tested and expanded many different tools aimed at

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<sup>3</sup> Human interviews were conducted prior to the object interviews for the explicit purpose of constraining the sites of analysis. Rather than broadly interview objects, the sites of analysis were chosen based on the instructors' most frequently used features to create a parallel structure for both sets of interviews.



bettering student writing in various ways. However, this dissertation project is focused on the plagiarism detection component along with one additional feature, Feedback Studio/GradeMark, an interface connects teachers to students' "originality" scores and reports. Feedback Studio/GradeMark allows teachers to comment on student drafts (both textually and/or with audio feedback) and offers pre-labeled stamps for issues such as improper citation, run-ons, comma splices, lack of evidence, etc. ("What We Offer," 2016). Feedback Studio also integrates "standards aligned" rubrics for "objectively and consistently" grading student papers. Through this interface, teachers may use rubrics to manually score students' displays of "evidence," "organization" and other related areas of assessment. GradeMark<sup>4</sup> appears to be the first iteration of Feedback Studio, which is now integrated into learning management systems for institutions that purchase this component of Turnitin.

More comprehensive accounts of Turnitin's emergence are visible in earlier versions of the company's website, which were retrieved via The Wayback Machine. The "about us" page on March 31, 2001, entitled "New to Turnitin," describes the program as a means of enhancing teachers' ability to safeguard academic integrity for their institutions:

Turnitin.com is currently helping high school teachers and university professors everywhere bring academic integrity back into their classrooms. Our system is already being used in almost every institution in the country, and a large number of universities all over the world. We encourage any educator who values academic honesty to help us take a stand against online cheating and become a member of the Turnitin.com educational community. ("About Us")

Turnitin's exigence arose from its creator's vision to offset "rampant cheating" in the classes he taught as a graduate assistant" at a time when the internet began changing students' approaches to their assignments (Vie, 2013b). To do so, John Barrie created a program (located at

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<sup>4</sup> The evolution of Turnitin's products is difficult to discern because of the threadbare information available on the website.

plagiarism.org) that harnessed students' work into a large database and implemented an algorithm to check their writing against existing papers, web documents, and other digitally available sources. According to Vie, Barrie's stated aims for such an expansive database were to function as a "deterrent" against plagiarism (2013b). The program itself does not "detect" plagiarism; rather, it produces a report of matched-text to other content the proprietary algorithm identifies (Canzonetta, 2018). After students submit their work to Turnitin, teachers are provided with a report that offers an overall percentage score of matched-text found in the document. Additionally, scores are available on a micro-sentence level with a link to the similarly identified text. Determining whether instances of matched-text are plagiarized passages then requires a human reader. For example, a paper with an overall 0% score of matched-text could be plagiarized and a paper with 50% matched-text could be free of plagiarism. The percentages the algorithm produces are arbitrary contextually and necessitate human readers to attune to context and the ways in which students are writing, citing, and quoting. However, because of Turnitin's widespread implementation through learning management systems, teachers are often exposed to Turnitin immediately and without opportunity to participate in training sessions, which could contribute to misinterpretation of the data Turnitin collates.

### *Eli Review*

Eli Review was founded in 2011 by scholar-teachers at Michigan State University's Writing, Rhetoric, & American Cultures department ("About Eli Review," 2018). The program emerged as a technological "writing pedagogy – and learning theory – made into software," with the aim of bettering students' processes of revision and feedback (Hart-Davidson, 2015). According to the originators of the program, Eli Review was formed as a reaction to peer-review processes that needed improvement in the creators' own composition courses ("Eli Review:

Better Feedback”). Eli was designed by writing teachers to put pedagogical theories—such as those proffered by Vygotsky, Sommers, Hawisher and Shipka<sup>5</sup> to name a few—into practice in classrooms where students are writing (“Feedback and Revision,” 2018). According to Hart-Davidson, one of the program’s creators,

Eli was engineered from the ground up by writing teachers to help learners harness the power of feedback. Eli puts a powerful set of coordination tools and reports in students’ hands. The result in a writing class: more time spent doing the things that matter most. Especially revision, review, and reflection. (2015)

The program is designed to focus instructors and students solely on three areas of writing pedagogy: writing, review, and revision. The program does not offer features such as gradebooks/grading or plagiarism detection, and it does not allow teachers to comment on student writing or review of each other’s work within the application. Teachers’ feedback is limited to “endorsing” comments and providing students with a holistic textual overview at the very end of their review processes.

These sites of analysis both provide rich opportunities for understanding how human and machine collaboration mutually transforms instructors, Eli Review, and Turnitin. Adams and Thompson’s (2016) heuristics for following objects informed the data I collected about the programs. Their heuristics offer a concrete framework for analyzing the wealth of data generated from the object and instructor interviews. Beyond that, they also influenced the questions I asked instructors and survey participants. Below, I explain their innovative and unique methods.

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<sup>5</sup> These authors are prominent scholars who have heavily influenced writing pedagogy in the field of rhetoric and composition.

## Interviewing Objects

Interviewing both humans and objects offers a qualitative point of comparison that stresses the tensions between humans and machines in respect to teaching labor. Rather than solely interviewing humans, this approach forefronts the role objects have in humans' interactions with educational and learning technologies. As Adams and Thompson assert, "things are not inert objects, but vital entities implicated in the co-constitution and becoming of our everyday worlds," and interviewing objects provides a way of showing their significance in our daily lives (Kindle Location 62). Interviewing objects thus moves away from human-centered ontologies and asks researchers to consider nonhumans as equal forces that shape the world around us. Interviewing objects is informed by ANT and phenomenology, which both aim to challenge the "neutrality" and impact things have on human activity (Kindle Locations 76-78). Since interviewing is such an anthropomorphic practice, the authors embrace it as a means of giving "voice" to objects to include them as "participants" in a study rather than passive entities to analyze (Kindle Location 65). This challenge is also taken up in rhetorical studies about technology, which often ask us to consider how machines are actively rhetorical in how they persuade users toward particular engagements (see Beck, 2018; Gallagher, 2017; Kennedy, 2016; Reyman, 2017).

What makes object interviewing useful and intriguing is the conceptualization of the interview itself in conjunction with Adams and Thompson's concrete heuristics. Their heuristics offer a systematic means of collecting data about nonhumans, and they also provide suggestions for analyzing the data that emerges from the interviews. When following actors, entanglements are messy, convoluted, and challenging to understand. Adams and Thompson's heuristics help researchers sort through the mess of the data in a methodical and purposeful way that makes

sense of human/nonhuman entanglements. Interviewing, in their framework, invokes the etymological denotation of the word, which ultimately means “to see each other, visit each other briefly, have a glimpse of,” and requires the interviewer to observe her interviewee in its natural habitat, conducting its daily routine much like the Latourian notion of following actors. Or, as the authors put it,

To interview an object or thing is...to catch insightful glimpses of it in action, as it performs and mediates the gestures and understandings of its human employer, and as it associates with others. Such object interviews entail finding opportunities to observe a thing in its everyday interactions and involvements with human beings or other nonhuman entities. Interviewing objects describes an approach for listening to things, observing them in action, discerning their co-constitutive influences, as well as relations with other entities and beings around them. (Kindle Locations 399-407)

Rather than only detailing the human perspective about Turnitin and Eli Review, object interviews, especially in my application of heuristics one and two at the beginning of this chapter, provided me with an opportunity to center each program and give both humans and nonhumans equal attention in my dissertation. Interviewing objects shapes a framework for asking teachers to think about how these technologies are at the center of their daily teaching labor and pedagogical practices. Furthermore, Adams and Thompson’s heuristics offer concrete steps and practices for collecting data about objects and analyzing it.

I applied Adams and Thompson’s methods to Turnitin and Eli Review to 1) offer a strong background about the technologies early in the project to contextualize the findings in Chapters Three and Four, and 2) to highlight the ways in which educational and learning technologies operationalize automation, the ways they differ, and to learn how teachers transform or are transformed by their collaborations. To adapt these principles to object interviewing, Adams and Thompson suggest a set of eight heuristics, split into two categories: data collection and data

analysis. The heuristics used to collect data are as follows: “1. Gathering anecdotes; 2. Following the actors; 3. Listening for the invitational quality of things; 4. Studying breakdowns” (Kindle Locations 475-480). I applied each heuristic to both Eli Review and Turnitin, which influenced how I developed human interview questions (each heuristic is described in detail below.)

I modified several heuristics to add rhetorical complexity to my new materialist analysis of both Turnitin and Eli Review. Adams and Thompson’s work—though highly relevant to rhetorical studies—does not outwardly engage with rhetorical theory on technology or digital rhetorics. For example, the exigencies for creating Turnitin and Eli were considerably significant rhetorical factors throughout gathering data for the object interviews. Adams and Thompson suggest focusing on “what happened” as objects appeared in humans’ lives rather than on why the programs were created. However, I also consider the rhetorical elements such as “why,” because the exigence and kairotic moments in which these networks assemble are tied to the economic, social, and political landscapes from which they arise. Further, there are rhetorical dimensions tied to these heuristics that relate to the restrictions and parameters associated with the design of the programs. Below, I discuss each rhetorical concept I added to Adams and Thompson’s heuristics when there was a fitting opportunity to do so.

In analyzing the data from object interviews, Adams and Thompson offer additional heuristics for analysis, which aim to disentangle “otherwise hidden aspects of our involvements with digital things.” Heuristics for data interpretation include a set of four heuristics, but I only applied one heuristic to the coding schema I used to organize and make meaning out of the data: “6. Applying the Laws of Media (‘enhancement, obsolescence, retrieval, and reversal’)” (Kindle Location 1574). This heuristic offers a systematic (yet flexible) way to trace out the connections and transformations humans and machines enter into when they collaborate. Because this project

so heavily focuses on automation, heuristic six most accurately described the categories emerging from the data, but it was modified to move away from dichotomies that limited the analysis to binaries. What follows is a full description of each heuristic I used for this dissertation project, how I modified them rhetorically, and how they were used to frame human interview questions and coding.

*Heuristic 1: Gathering Anecdotes*

According to Adams and Thompson, “posthuman anecdotes show things thinging, and nonhumans doing” (Kindle Location 675). The stories that unfold as humans “reassemble...textual description” from anecdotes highlights the ways in which things and objects are intertwined in the fabric of humans’ everyday lives. Assessing anecdotes about nonhumans—according to Adams and Thompson’s conceptualization—is not about understanding exigence or reasons “why” a thing came into being. Rather, it is focused on “what” happened when the nonhuman initially emerged. For instance, Turnitin happened to many instructors through integration in their course management systems, which answers the “what” question but neglects the exigence related to why a thing came into being (e.g., labor crisis, perceived culture of cheating, etc.). This idea also dovetails with Potts’ assertion that users are often passively handed down technology without opportunities to co-participate with them (2013).

Exigence is an important rhetorical factor throughout this dissertation project. Answering the “why” question adds another layer of rhetorical complexity to this heuristic and attunes to the social, political, and economic contexts out of which these technologies emerged for particular audiences (Rickert, 2013; Winner, 1980). Thus, both “what” happened and “why” Turnitin and Eli Review emerged are included in this modified heuristic.

*Object Interview Questions:*

- “Describe how the object or thing appeared, showed up, or was given in professional practice or everyday life. What happened?” (Adams & Thompson, 2016, Kindle Locations 645-646).

Using testimonial, websites, and anecdotes about Turnitin and Eli Review contributed to contextualizing them as sites of study earlier on in this chapter. I also used this heuristic to ask humans to discern how (and why) Turnitin and Eli Review became a part of professional practice in the instructor interviews.

*Instructor Interview Questions:*

- How/why did this technology come into your classroom?
- What was it like using this technology when you first started using it? I.e., what were some challenges and affordances you encountered when you were learning the program?
- What is your primary reason for using this technology? What features of the tech do you use most often?

Extending Adams and Thompson’s first heuristic to the human interview portion of the study ensured a variety of perspectives other than my own added a layer of experience I did not possess with both programs.

*Heuristic 2: Following the Actors*

Heuristic two is an extension of the first, which implores researchers to reverse-engineer an understanding of nonhumans’ roles in human activity through extracting stories that showcase ordinary interactions between the two. Much like the first heuristic, the second asks researchers



to consider commonplace interactions with humans and nonhumans by “following” their natural exchanges more explicitly in the contexts in which they typically operate.

I collected data for this heuristic by engaging directly with the technologies themselves as an instructor would to carry out tasks specific to Turnitin and Eli Review. I “followed” Turnitin by creating a “demo” assignment through Blackboard; I uploaded publicly available articles to the program and changed the default settings so that the works would not be stored in the database. I followed Eli Review through a workshop that mimicked a writing course peer-review session. Without engaging with other human participants, it would not be possible to follow Eli Review because it needs participants to function. After collecting data for the sites of analysis section above, I interviewed teachers and asked them questions related to the restrictions, parameters, technological functionality of Eli Review and Turnitin.

*Object Interview Question:*

- “Who-what is acting? What are they doing? Are some actors more or less powerful than others? Who-what is excluded?” (Kindle Locations 825-826).
- “How have particular assemblages of actors come to be configured this way? How have these people, objects, ideas, discourses, and events gathered? What is related to what and how?” (Kindle Locations 826-827).

*Instructor Interview Questions:*

- How much say do you have in *how* the technology is deployed in your classroom? Are there institutional or programmatic guidelines for using it?
- Is it integrated into classroom or into your pedagogy? I.e, is your pedagogy designed first and then the tool is an afterthought, or is it a critical part of your pedagogy?

These questions were designed to assure a range of responses beyond my own experience following the actors, for I was operating under a different set of constraints and parameters than my participants.

*Heuristic 3: Listening for the Invitational Quality of Things*

Adams and Thompson's third heuristic encourages researchers to look again to the implicit underpinnings of human and nonhuman interaction. In "listening for the invitational quality of things," researchers must interrogate the parameters, constraints, and enhancements humans and machines impose on each other as they intermingle (Kindle Location 479). To do so, they suggest looking to the unintended effects the two actors have on each other, how users are limited in their interactions with machines, and how "scaffolding" is coercing users to change their thought processes and perceptions (Kindle Location 754). The latter is a highly rhetorical element of analysis and uncovers how nonhumans compel users to act in particular ways.

*Object Interview Questions:*

- "What is a technology inviting (or encouraging, inciting, or even insisting) its user to do, think, or perceive?"
- "What is a technology discouraging (or constraining, or even prohibiting) its user from doing, thinking, or perceiving?"
- "What kind of scaffolding is a technology explicitly or implicitly offering to help frame thinking, intensify perception, or enhance action?" (Kindle Locations 962-967).

*Instructor Interview Questions:*

- All questions from Appendix C (the list is too long to include here).

I encouraged instructor interviewees to consider the design of both Turnitin and Eli Review to gauge the parameters and constraints they encounter. Because this heuristic is so expansive, data

is pulled from all questions in the interviews related to technology as they relate to design limitations.

*Heuristic 4: Studying Breakdowns, Accidents, and Anomalies*

Adams and Thompson's last heuristic for data collection relates to the impact nonhuman breakdowns have on humans. In the wake of a nonhuman failure, humans are confronted with their reliance on nonhumans. Addressing how one would continue to teach without Turnitin or Eli Review illuminated teachers' attachments to the programs and showed the role each program played in helping teachers manage their labor. I asked instructors how they would react if they no longer had access to Turnitin or Eli Review. Additionally, I asked them to describe an instance in which any breakdowns had affected their labor in any ways.

*Object Interview Question:*

- “What if a particular object breaks or is unexpectedly missing? What happens? In the wake of a breakdown, accident, or anomaly, what practices and things become more visible?” (Kindle Locations 1138-1139).

*Human Interview Questions:*

- How would you feel if your institution no longer subscribed to this technology? How would it impact your labor?
- What happens to your teaching labor when the tool breaks down or stops working?

The data for this section was collected solely from human interview questions, which were designed to gauge participants' visceral and affective responses to the idea of losing these programs.

*Analysis Heuristic, Heuristic 6: Applying the “Laws of Media”*

Heuristic six asks researchers to consider how data collected in the first four heuristics show how nonhuman and human engagement has diminished or enhanced humans' capacities. In developing my coding schema (mentioned in greater detail below), I used the questions Adams and Thompson developed for heuristic six to determine how machines have rendered human skills unnecessary, how they have strengthened them, and how they have augmented them.

*Object Analysis Questions:*

- “What does a technology enhance? What human capacity is extended, enhanced, or amplified when this technology is used?”
- “What does a technology render obsolete? What human capacity is diminished, attenuated, or simply forgotten when this technology is used?”

Because of the deep and complex entanglements between teachers, Eli Review, and Turnitin, these questions offered a strong basis for formulating a coding schema to interpret data.

However, the meshing and overlap between some findings required me to move away from the binaries outlined in the above questions (i.e., extend vs diminish, enhance vs attenuate, or amplify vs neglect). Ultimately, I had to modify coding categories to reflect the complexity of my data and analyses.

*Limitations:* To emphasize machines' roles in shaping and affecting teaching labor, I deployed object interviews to make visible the tensions between educational and learning technologies' intended uses and their actual application. Adams and Thompsons' heuristics are systematic and methodologically viable. However, as mentioned above, their work does not explicitly name rhetorical functions of technology. Certainly, their work is rhetorical in that it compels readers to consider the persuasive and agentive exchanges between humans and

machines, but their methods are not named to align with practices in rhetoric and composition studies. Thus, I have extended their model to account for scholarship about rhetorical theorists' work on the coercive and persuasive impacts of technology. Furthermore, in the analysis heuristic, some binaries Adams and Thompson present flatten the complexity and overlap between some categories of analysis, which can both enhance and limit teachers' work through the design constraints of Eli Review and Turnitin.

## **Survey**

To create a balanced and parallel study, I conducted a survey with qualifying teachers of college writing courses (or courses that contained a writing intensive element, with instructors who have engaged with received principles of writing pedagogy). Before I recruited participants, Syracuse University's Institutional Review Board granted me full permission and "exempt" status for the survey and subsequent instructor interviews (see Appendix A: Exempt Authorization 18-051). I surveyed and interviewed voluntary, anonymous instructors who are familiar with writing pedagogy—including 49 survey respondents and 9 interviewees—to limit the scope of the project and to learn about human/nonhuman collaboration from writing teachers who have practical, hands-on experience dealing with Turnitin or Eli Review. The survey's main purposes were twofold: 1) to get a preliminary sense of what questions I needed to ask instructors in our one-on-one interviews and 2) to find volunteers for them who met specific criteria for participation.

This dissertation project situates this work in writing studies, with teachers who are highly connected to student writing, pedagogy, and the teaching labor that accompanies it. I adopted snowball sampling measures as a means of only contacting instructors with writing

pedagogy experience. The survey is not statistically viable nor was it meant to be; the aim of the survey was to provide logistical information about respondents' backgrounds and experiences with writing technologies to help me refine my interview questions. Additionally, I used the survey to find voluntary interview participants across the country rather than limiting the study to my geographical location and institutional parameters.

### Survey Design

I constructed the survey as a non-probability sampling measure (snowball sampling) to understand teachers' initial responses to questions about their labor and use of Turnitin, WriteLab or Eli Review in writing classrooms. Because the survey was circulated via "snowball" sampling, it was not intended to be a quantitative measure, but instead is interpreted qualitatively. In the snowball sampling method, a type of convenience sampling, researchers encourage participants to circulate the call for survey takers on their own social media networks (Roberts, 2014). Using a snowball sampling approach gives researchers quick, direct access to participants; the data from such surveys are not meant to be generalizable or representative. For the purposes of this study, the survey operates as a qualitative overview of how a limited group of instructors approach educational and learning technologies in their writing courses. The survey led me to viable interview participants and helped me hone final questions to ask human interviewees. The data I used from the survey is mainly to provide information about how my interview participants qualify for the human interviews and how I could improve questions for a one-on-one interview. Ultimately, the survey was designed to gauge preliminary understandings of how writing instructors who had worked with these programs viewed their relationship with the technologies and to understand their own priorities and understandings of their teaching labor. If instructors could answer these questions, they would be able to respond to more

challenging ones about their technological use in thoughtful and concise ways. Thus, volunteers who provided insightful responses were among the first people I contacted to request interviews.

### *Survey Recruitment & Deployment*

I administered the survey through Syracuse University's subscription to Qualtrics; participants were not asked for any identifiable information and remained anonymous. However, if participants wished to be considered for the interview phase of the project, they voluntarily supplied their email information in a text-box at the start of the survey. Survey participants were offered incentive to participate in the interviews in exchange for a \$20.00 Amazon Gift Card as compensation for their time and labor. In the IRB statement at the beginning of the survey, interviewees were informed that their identities would remain anonymous in the analysis of the study and their emails will be deleted after 12 months after interviews are completed (to leave room for follow-up questions.)

I distributed the survey to several prominent listservs in the field of rhetoric and composition to directly contact college writing teachers. Because the expertise of the participants was so crucial for the dissertation project, I contacted the Writing Program Administration listserv, Association of Teachers of Technical Writing listserv, Online Writing Instructors listserv, and College Conference on Composition and Communication Labor Caucus group after receiving approval from listserv administrators. I completed a second round of promoting the survey by circulating it on social media to carry out a snowball sampling approach (Roberts, 2014); teachers and scholars in the field of rhetoric and composition are highly connected through outlets like Twitter and Facebook. The survey was circulated on both social media platforms during the week of the CCCC conference in 2018. The survey gained traction during this time and was retweeted by the NCTE official twitter handle, Eli Review, WriteLab, and

other scholars, teachers, and researchers who were searching the #4c19 hashtag. Additionally, instructors who expressed interest in this topic (in-person) were directed to the original tweet containing the survey link.

In the last phase of promoting the survey, I contacted representatives from both Eli Review and Turnitin to ask for their cooperation in sending the survey to their listservs of active subscribers. Eli Review responded by agreeing to host a blog post about the dissertation research, welcoming subscribers to participate in the study if they met the qualifications for doing so. Eli Review's Director of Professional Development—Melissa Meeks—created the blog post and also circulated it on Eli Review's Twitter account. Turnitin's representative, Elijah Mayfield (Vice President of New Technologies), who had previously corresponded with me in response to my inquiries related to Turnitin in the past, did not respond to a request to promote the survey amongst Turnitin subscribers. I reached out to representatives from both companies in an attempt to provide a parallel and ethical research model. However, Turnitin did not respond and the survey results had already accounted for numerous respondents in the survey (far more than Eli Review, mentioned in greater detail below). Thus, I made no further attempt to contact the company's representatives.

The survey first prompted basic questions about participant demographics. Then, instructors were asked questions about the most labor-intensive components of their teaching and the most and least important components of their pedagogy. All participants were required to answer questions about teaching labor and pedagogical priorities; thereafter, they were only asked questions based on the specific technologies they accessed in their classrooms. These questions related to the number and type of writing courses teachers were instructing when they



collaborated with Turnitin or Eli Review. Questions in this section were also framed around affordances and constraints Turnitin and Eli Review impose on teaching labor and pedagogy.

### Participant Selection & Response

I established several criteria to ensure participants 1) had familiarity with writing pedagogy and had taught writing in some capacity, 2) that they had worked with one of the programs listed in the survey, and 3) that they were teaching in higher education. If instructors did not indicate they taught a form of writing in college courses, or if they had not worked with any of the listed technologies, their answers were omitted from the survey. For example, one participant adopted Eli Review to teach a college lacrosse team how to understand playbooks. Other deleted responses included those who commented on Turnitin without ever having worked with the program in their courses. Additionally, I also discarded responses and surveys that were abandoned or blank. Thus, the overall number of surveys dropped from 62 usable responses to 49.

The survey participants were a robust group with varied institutional and teaching backgrounds; however, demographically, one area that lacked in diversity was ethnicity—nearly 92% of respondents identified as “Non-Hispanic White or Euro-American.” There were 39 respondents who had worked with Turnitin and 14 who worked with Eli Review. While there were only 49 total usable responses, some of these participants worked with both programs and answered both sets of questions. The following demographics are listed separately for Turnitin and Eli Review to note differences among them.

### Turnitin

Participants who engaged with Turnitin came from a wide range of institution types, with four-year public institutions accounting for 40% of respondents, and two-year community colleges and four-year private intuitions each comprising approximately 20% of the responses. Of these, another 20% of instructors come from graduate degree awarding institutions (Figure 1). Instructors also represent varied levels of experience working with Turnitin, ranging from 5% of respondents only engaging with the program for one semester to nearly half of the participants collaborating with the program for ten years or over. It is also worth noting 50% of instructors work with Turnitin in the first- and second-year writing and rhetoric courses, with only 8% doing so in graduate level courses.

In terms of labor demographics, instructors' course load breakdown is fairly evenly distributed. Nearly 30% of instructors are teaching four courses or two courses each semester, with approximately 10% teaching five courses, 5% teaching 6+ courses or only one course (after combining the two categories), and 21% teaching three courses. Instructors' academic contracts in Figure 2 are dispersed predominately in the one-year renewable contract

Institution Type for Turnitin Instructors

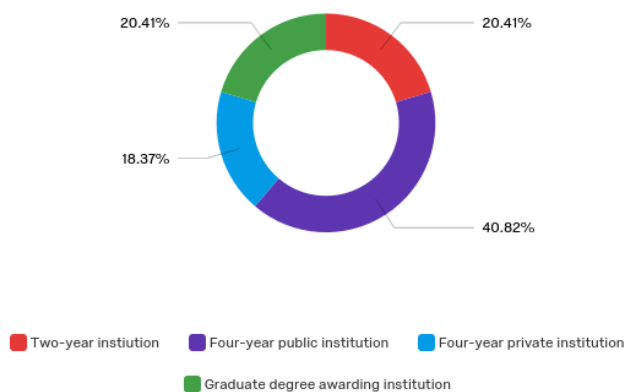


Figure 1 Institution Type, Turnitin

Yearly Contract for Turnitin Instructors

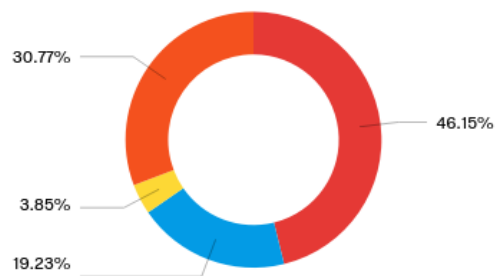


Figure 2 Yearly Contract for Turnitin Instructors

category, with 30% of instructors working on the tenure track and nearly 25% working on three-year or five-year contracts.

### Eli Review

Before relaying demographic information for Eli Review, it is important to reiterate that there were fewer respondents than the outcome for Turnitin related survey questions. Of the 14 Eli Review respondents (Figure 3), nearly 42% of instructors work at graduate degree awarding institutions, with four-year public universities making

Institution Type (Eli Review)

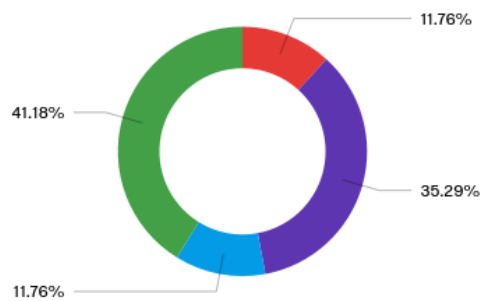


Figure 3 Institution Type, Eli Review

up 35% and private and community colleges accounting for approximately 12% each. Instructors have various levels of experience with Eli Review: because the program is younger than Turnitin, half of instructors from the survey have worked with the program from 1-3 years, while about 21% have worked with it 4-6 years, and some novice Eli Review users (28%) were working with the program for the first time. The majority (nearly 70%) of Eli Review users adopt the program for first and second year composition courses, while 25% use it in upper level rhetoric and writing courses, with only 6% working with the program in graduate level courses. Eli Review differs from Turnitin in that no respondents collaborated with the program to teach English literature courses.

In terms of labor demographics, instructors' course loads are not as evenly distributed as with Turnitin instructors (Figure 4). Half of the Eli Review respondents are only teaching two courses a semester, while 21% are teaching at least five courses, 15% are teaching four courses, 7% are teaching three courses, and 7% are teaching only one course a semester. Instructors' academic contracts in Figure 4 are located predominately in the tenure-track contract category (46%), with 30% of instructors working on a one-year renewable contract, and the remaining instructors working on a three-year (15%) or five-year (7%) basis.

Yearly Contract (Eli Review)

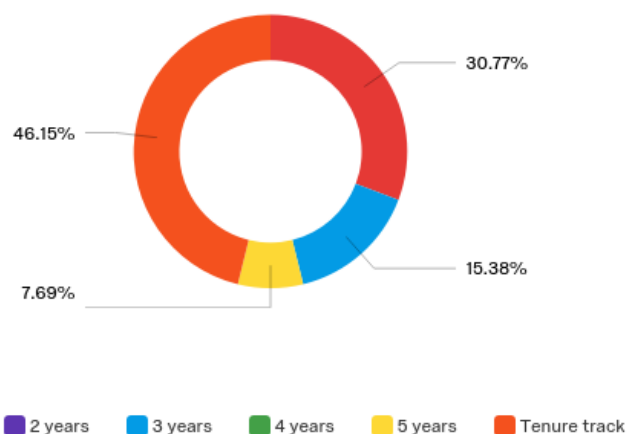


Figure 4 Yearly Contract, Eli Review

### Limitations

The survey is also limited in regard to replicability because listserv members are constantly adding and dropping users. In a similar vein, the purview of the study is narrow and difficult to reproduce because social media circulation is unpredictable; users who retweeted or shared a post about the study had access to different friends and followers. However, these methods of circulation were chosen because of immediate access to writing teachers, who are highly networked on social media and through popular listservs in the field of rhetoric and composition.

## **Human Interviews**

### *Interview Design*

I designed the instructor interviews to align with object interview questions asked in Adams and Thompson's work, with modified questions and additional inquiries about teaching labor. Interviews provided an opportunity for a more in-depth, qualitative inquiry about teachers' individualized experiences with Turnitin or Eli Review. If survey respondents chose to participate in the interview, they were contacted for a follow-up interview if they fully answered the survey questions. Of the 49 survey participants, 17 volunteered for interviews and all were contacted for participation. After scheduling dilemmas and cancellations, I interviewed 9 total instructors, totaling five interviews for Eli Review and five for Turnitin because one participant had collaborated with both programs. According to Beitin (2012), researchers have often disagreed about a consistent approach for determining sample size for interviews in a given study. He suggests outlining the rationale for the intended number of interviewees and offering an explanation of the final sample size. Due to limited responses and an imbalance between the number of instructors who had worked with Eli Review and Turnitin, I conducted and analyzed five interviews for each program for the final findings to have the same number of interviews for each.

### *Protocol*

I recorded interviews with Evernote and an iPhone application called "Voice Recorder"; no sessions exceeded 60 minutes. All interviews took place within two months of the interviewees' participation in the survey; I completed the nine human interviews within one month after contacting participants. If interviewees did not express verbal objection to the IRB Consent Statement (Appendix B) that I read aloud at the start of the session, interviews

proceeded via Skype audio, video, and cellular phone calls (the medium through which the interviews were conducted depended on interviewees' access to technology and preference). Interviewees were asked if they had questions about the project and were informed that they were free to withdraw from the study at any point if they felt uncomfortable with the interview. To protect interviewees' privacy and identities, I deleted the interviews from the cellular device on which they were recorded and uploaded to a private Google Drive for storage.

The order in which I asked interviewees questions was dependent on whether they had touched on several questions in one response. If so, questions were asked in an order that naturally mirrored the themes interviewees were reflecting on. During interviews, I took notes to categorize data into codes that represented common themes and outliers among the interviewees' answers. Thereafter, a third party created transcripts of the interviews to the fullest extent possible; due to technological difficulties and recording problems, some words were rendered indiscernible.

### Participants

In the initial round of interviewee recruitment, I prioritized contingent faculty who taught from five-six or more courses a semester on a yearly renewable contract over other participants. These survey respondents taught the highest number of classes per semester and therefore had the highest teaching loads. While some of these respondents offered qualitative insight about their labor and use of Turnitin in a text-box at the close of the survey, none responded to two separate inquiries about interviewing with me. Instead, four non-tenure track full-time instructors,<sup>6</sup> three tenure-track professors, and two graduate students<sup>7</sup> volunteered for

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<sup>6</sup> One participant is now a graduate student, but he focused most of his comments on his experiences as a non-tenure track full-time instructor and is still teaching a high number of courses.

<sup>7</sup> One graduate student was also teaching as an adjunct at several institutions and another was on fellowship.

the interviewing process. Among this group, the fewest number of courses taught per semester was one, and the highest was six; additionally, some participants were balancing teaching with administrative labor, publication demands, and graduate courses. Several participants had inhabited more than one title or type of teaching position within their careers. For example, some graduate students were also part-time instructors for several institutions or had been a non-tenure track full-time instructor for years before returning to graduate school. Some instructors in this group had only collaborated with the educational or learning technology for a few weeks, and some had been working with the programs for over ten years (Survey Data). Educational training in writing studies was also varied, as some teachers were trained in literature (and in one case, ecology), but all had familiarity with writing pedagogy and writing instruction.

#### *Extending Object Interviews Rhetorically*

The following section outlines adaptations made to Adams and Thompson's object interviews to account for rhetorical scholarship relevant to this project. Listed below are groupings of questions with explanations and rationale for adding rhetorical dimensions to object interviewing.

#### *Group 1: Agency, Persuasive Design*

1. How/why did this technology come into your classroom? What was it like using this technology when you first started using it? I.e., What were some challenges and affordances you encountered when you were learning the program?
2. What is your primary reason for using this technology? What features of the tech do you use most often?
3. How does this technology affect your teaching labor? Does it help or limit you in any ways?

4. How much say do you have in how the technology is deployed in your classroom? Are there institutional or programmatic guidelines for using it?
5. Is it integrated into classroom or into your pedagogy? I.e, is your pedagogy designed first and then the tool is an afterthought, or is it a critical part of your pedagogy?

*Rationale:* Question one is modified to account for exigence and to look toward a more ecological, ambient view (Rickert, 2013) of how Turnitin and Eli Review came into teacher's classrooms or if the programs were passed down to them by larger institutional bodies.

Question two, while not directly about algorithms, relates to Brock and Shepherd's (2016) work on hidden and persuasive technological systems that, through their design, may coerce users into particular actions. Question three is true to the spirit of ANT Adams and Thompson invoke, and asks instructors to consider how technology is enhancing or constraining them. Questions 4 is directly related to agency and the institutional, technological, or other factors that influence teachers' collaboration with Turnitin and Eli Review (Rickert, 2013). Last in this grouping, question five asks instructors to consider whether technology was passively handed down to them (Potts, 2013) or whether it is an integral, active part of their courses.

*Group 2: Automation & Deskillling*

6. What happens to your teaching labor when the tool breaks down or stops working?
7. How would you feel if your institution no longer subscribed to this technology? How would it impact your labor?
8. Has the technology replaced or strengthened any of your teaching skills?



9. Would this technology work without a teacher or does it require your skillset/input to operate?
10. Does this technology change how you or your students view your expertise?
11. Would you make any changes to the technology in terms of how it could help manage your labor?
12. Do you think educational technology should be used to help teachers manage their labor?

*Rationale:* Question number six remains unchanged from Adams and Thompson's heuristic about machine failure or breakdown—this question is designed to learn about teachers' reliance on technology. Questions 7-10 are related to a mixture of rhetorical and technological scholarship on automation and its impact on workers. These questions are designed to align with Adams and Thompson's work, but also mirror Markoff's (2015) and Zuboff's (1988) distinctions between automation that augments human capacity or replaces it and deskills workers. Additionally, questions 7-10 aim to elucidate whether teachers are working with technology to conduct menial, low-order tasks or if automation is carrying out high-order tasks (Kennedy, 2016). Last in this section, questions 11 and 12 invokes Potts (2013) to think about how teachers are engaging technology in their classrooms and what (if any) suggestions they have for making their classroom technologies more responsive and flexible.

### **Coding Schema**

I conducted assessment of the interview data based on Saldana's conceptualizations of holistic and provisional coding. In the first round of coding, I searched transcripts for similar words and actions interviewees had responded with. After noting common phrases and topics among the respondents, I copied the transcripts and holistically color-coded them according to thematic

similarities. In the second round, I coded data provisionally, which entailed using language from Adams & Thompson's object interviews to determine categories for coded data. My analysis addresses the discrepancies and similarities between interviewees' responses and postulates why tensions and alignments between them are significant.

*Limitations:* The lack of part-time contingent faculty member interviews limits this study to teachers who hold full-time positions at their institutions and may feel more secure in their work than part-time colleagues. Part-time contingent faculty members strenuous workloads, shorter contracts, and fewer benefits than full-time faculty. In some cases, graduate students have more security than part-time instructional staff because they are guaranteed funding at their programs for several years at a time and can sometimes access benefits. However, participants were not asked about their benefits and labor conditions; thus, it is difficult to distinguish if security or workplace treatment impacted graduate students or part-time teachers in their responses. Another limitation of this study is the degree to which two of the graduate students responded. Teachers who have been working longer have perhaps had more experience in reflecting about teaching practices and technological use. Instructors' positionalities also factored in as a limitation of the study. For instance, tenure-track participants were teaching no more than two classes a semester, which can, if they did not explicitly address their workload, affect the generalizations they were making about technological use and teaching (Survey Data). While these constraints do limit the purview of this study, they also offer a rich qualitative look into how writing instructors from different backgrounds perceive their engagements with educational and learning technologies in their classrooms.

## **Closing**

These three methods were intended to highlight the tensions and productive collaborations between humans and machines in writing classrooms where Turnitin and Eli Review are adopted. In the analysis that follows, Chapter three relays coded analysis from all three methods as it relates to design and technology. Chapter four then offers a coded analysis of data from each of the three methods as they relate to teaching labor and pedagogy. The data from these methods features the complex assemblages and entanglements that emerge when humans and machines work together on writing pedagogy, teaching labor, and administrative labor.

## Chapter Three: Hybridity & Design Implications of Turnitin and Eli Review

### Introduction

Several prominent themes about the technological design of Turnitin and Eli Review emerged from the coded data of the object interviews and human interviews: integration of the technology, design features that enhance, design features that limit, implementation of technology and user training, and technological breakdown impacts. It is important to note that while integration and implementation have overlap, they differ in two considerable ways. Integration is tied to ecology and how teachers were introduced to the programs; implementation is concerned with how teachers were trained to work with them, and subsequently, how they frame the programs to their students. The consequences of human and machine collaboration in these contexts results in complicated hybrid actors who mutually shape and change each other's purpose and communication practices throughout their exchanges (Latour, 1999, p. 180). Further, collaborations between human and machine change students' sense of an instructor's ethos when they work with programs such as Eli Review and Turnitin. While the categories from the data appear steadfast and tidy, there is an inherent messiness to tracing out human and machine entanglements. Thus, overlap, duality, at times binaries, and muddled boundaries between human and machine are simultaneously present in the analysis that follows. Readers should expect a degree of meshing and obscurity between the interactions among Turnitin, Eli Review, and instructors.

The first data category I analyze is broken down into two subcategories: proactive and passive integration. These subcategories illustrate the difference between actively requesting access to technology versus intuitional mandates or course design that automatically populates technology in an instructor's learning management system. This adds a layer of complexity to

conversations about human agency (Miller, 2007; Cooper, 2011), wherein humans are forced to work with machines because of ecological constraints (Rickert, 2013), which are tied to their status as non-tenure track employees.

The data also points to the beneficial and restrictive design features (Potts, 2013) Turnitin and Eli Review pose on instructors; analysis in this section highlights the productive uses of automation and the adaptations teachers deploy for particular design features. Additionally, the last category overviews how instructors spoke about the impact technological breakdowns have on their labor, which reveals the significant roles both tools inhabit in classrooms (Adams & Thompson, 2016).

### **Integration**

Before learning about Turnitin and Eli Review's technological design, I asked participants how the programs were introduced into their professional lives. All five instructors who use Turnitin have access to the program through their course management systems. Of those five, three instructors are required to submit student work through Turnitin because their institution or course design demands it. One participant's department requires her to use Turnitin, so she must do so regardless of her preference through Blackboard. Two other participants who were required to use Turnitin did so because they taught pre-designed writing courses that already integrated Turnitin for the course writing assignments. Both were graduate students, though one was working as an adjunct instructor and teaching an online course, while the other participant was working as a teaching assistant in a face-to-face class.

Of the five Turnitin participants, only P2<sup>8</sup> actively urged his administrators to grant him access to Turnitin at his previous institution several years ago; others simply had access to the program through their learning management systems. He initially “agitated” his previous department for a license to use the program because of his high labor load of five classes each semester. Since then, his new institution has moved to Canvas, which can also integrate Turnitin into courses with relative ease. Another Turnitin user, P7, noticed Turnitin through Blackboard and decided to recommend the program to his department as a means of creating coherency in light of strenuous labor situations he contended with as a writing program administrator.

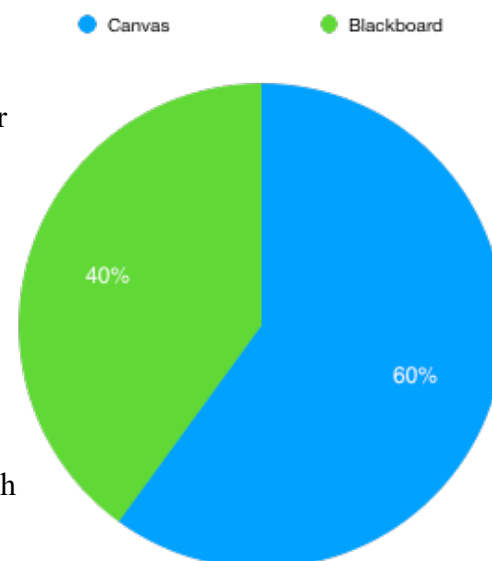


Figure 5 Learning Management System

Eli Review differs from Turnitin in that it does not automatically populate within learning management systems unless an institution requests this type of access. Similar to P2’s exigence for asking for access to Turnitin, Eli Review users actively look for help with managing peer-review in their courses. As is noted in great detail in Chapter Two, when I asked instructors how Eli Review came into their professional lives, participants answered that they tended to tap into their professional networks to crowdsource strategies for managing peer review in their courses, such as using social media or professional conferences to ask colleagues for solutions to peer-review pedagogical problems. Other participants were introduced to Eli Review when representatives of the program contacted them with trial offers, or through institutional

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<sup>8</sup> Participants are represented by the letter “P” and their corresponding interview number. Transcript excerpts and survey data are available by contacting me directly at [jncanzon@syr.edu](mailto:jncanzon@syr.edu); raw data is kept private to ensure participants’ anonymity in case of any identifying information that emerges from the data.

affiliations with Michigan State University where the program was created. While Eli Review can be integrated into learning management systems, users mainly access the program by requiring their students to pay for subscriptions or through special licensing through departmental or institutional resources. Eli Review's elective integration in teachers' courses is a significant difference from the way Turnitin is incorporated in writing classrooms. Rather than being forced to use the program or having access to it through a learning management system, teachers actively seek out Eli Review and want to work with it. The following section highlights the similarities and differences between the two programs when considering access and integration into classrooms.

Turnitin predominantly "happened" to instructors through integration with corporate learning management systems and through departmental or institutional mandates. P1, who uses both Turnitin and Eli Review, indicated that Turnitin is compulsory in her department; even if students are turning in hardcopies of their work, they must also upload a digital copy to Turnitin to check for plagiarism. She learned about Turnitin when she started working at her current institution and is collaborating with the program to grade student work through a rubric feature since submission through the program is already required. P3 also indicated she works with Turnitin in her courses (at two separate universities) where the program is required for all classes that are taught asynchronously. P8 was first introduced to the program as a graduate assistant, where the first composition course she taught was "already set up for [graduate assistants] in Canvas, and it's required Turnitin...for the first two semesters that I taught it was required...[and] automatically set up for me." P7 also indicated he began working with the program for convenience, as it was "embedded" in Blackboard, which is how he learned about the program. When compared to Eli Review, most instructors who work with Turnitin are

passively interested in the program because it appears in their learning management system, or they are required to use it by their departments.

One participant, the individual who “agitated” administrators for Turnitin, came to the program differently than other interviewees. He saw a need for the program when he was collecting papers in hard copy when he was teaching “about 120-130 students a semester.” P2 was teaching a “5-5 load at a community college,” and he expressed that he was more frequently running into cases of clear plagiarism and some submissions that “just smelled funny,” leading him to suspect plagiarism. He describes his process of checking for plagiarism without Turnitin, which he expressed was arduous with such a high volume of students each semester:

I was accepting everything on paper, and I... would have to type things into the search engine and find it. It was really cumbersome, which led me to taking all electronic submissions...I think I was one of the agitators at my school to get Turnitin brought in and eventually we started using Blackboard, and it was enfolded into that. Um, so it’s basically been part of my experience I guess for about the last 12 continuous years and, it did arise out of just having a need.

P2’s overwhelming course load necessitated a “need” for Turnitin, a program he felt helped him manage the teaching labor associated with digitally searching for plagiarism in student work.

On a larger, programmatic scale, P7 spoke about Turnitin being a means of supporting his department’s integrity in light of inconsistencies that come with hiring adjunct labor:

So, we have the problem that a lot of large first-year writing programs have... there’s a lot of people who are not really that well-prepared to teach first-year writing both in general and in particular institutional contexts [who] end up doing so because of the pressures to put people in front of students... you end up doing things...hiring people the week before classes start. I had one, I actually had to hire someone the day before classes started. So you had these large programs that have curricula that are somewhat unified...So, what ends up happening is teachers end up giving the same assignments, and [sic] the director or someone in an administrative role, I wanted to be sure I was... doing similar things that some of the faculty were doing... And so Turnitin you know, my perception was that this was an easy way to ensure at least against [plagiarism], in terms of program integrity.



The demand to put teachers in front of classrooms prompted P7 to consider Turnitin as a potential tool, which he happened to stumble upon in Blackboard, for mediating issues related to a common curriculum and uneven hiring practices, which can lead to plagiarism when students share assignments.

Unlike Turnitin, Eli Review is not typically pre-populated into course management systems, although it can be integrated in some cases if an institutional representative contacts the Eli Team and requests inclusion in the learning management system. In most cases, teachers or writing program administrators appear to actively search for a program that helps teachers manage peer-review. Some instructors found out about Eli Review through Facebook, conferences, departmental trials or promotions of the program, or through programmatic access to the program (e.g., P9 finished his graduate program at MSU where the program was created). Regardless of how they came to Eli Review, instructors from the human interviews were looking for a solution to the teaching labor or difficulty associated with facilitating peer review in productive ways. Commonly, instructors would describe peer review before working with Eli Review as “generic,” as students would not engage with each other’s work because they only cared about the instructor’s comments. Thus, teachers sought a means of facilitating more meaningful and productive human-to-human interaction in peer-reviews.

One interviewee learned about Eli Review after inquiring how other instructors managed responses to students in their courses because she wanted to give more “efficient” feedback (P1). Through Facebook, her colleague suggested Eli Review and then connected her to an Eli Review team member, who helped her enroll in an “online mini workshop” and in a semester-long free trial of the program. P4 echoed this sentiment and wanted to find a way to provide sufficient feedback in a class of 40 graduate students. She explained she needed “a way to also reduce the

labor of the peer-review and also the grading that would happen as part of the course... not only for myself but for also the graders”; thus, she decided to try Eli Review for peer-reviewing. Additionally, she wanted her students to focus on revising small chunks of writing frequently throughout her graduate-level technical writing course, which she noted is built into Eli Review’s software.

P5 was also interested in finding a program that would help her manage her teaching labor and promoting better feedback in peer-review. One of Eli Review’s team members contacted the writing director at P5’s institution for a professional development seminar on the program. P5 participated in this seminar and decided to try Eli Review in her humanities course. Because she was transitioning from directing her department back into teaching, she was interested in Eli Review because “after running students through four full...reviews...[she] was just flat out exhausted...” and she felt that students were not taking peer-review seriously. P5 wanted her students to become “independent writers” through peer-review, but believed students were disregarding their peers’ comments in order to wait for the “real” comments she would supply on their work. Despite a “carefully scaffolded” pedagogical framework for peer-review, students were not buying into the process or trusting feedback from their peers; thus, she decided to trial the program.

One participant gestured toward the writing across the curriculum scenarios for which she sought out Eli Review. P6 works in a biology department and is highly attuned to writing pedagogy and is well-versed in composition scholarship, which is why she was also considered for this dissertation project. Currently, she is working on a National Science Foundation project that aims to find technology that would allow instructors to manage writing in mega-sections of classes upwards of “400” students. After researching different technologies, her research group

became interested in Eli Review because peer-reviewing pedagogy is built into the program<sup>9</sup>, and her team wanted to make sure they were not “creat[ing] an additional grading burden for faculty” but instead ensuring a “high quality” tool for writing in science courses. The purpose of P6’s search for such a tool is to have students write to learn and synthesize the course content they learn to help them perform better on tests.

P1 had participated in an online workshop with an Eli team member prior to working with the tool in her course. Eli Review’s direct access to team members was mentioned frequently throughout interviews. Because P4 scheduled an “instructional Skype session” with an Eli representative before she worked with the program, she noted how “surprised” she was “to learn how intuitive and easy to use the program was,” even though she had seen the program in its first iterations and believed it was overly complicated.

The integration of Turnitin and Eli Review in writing classrooms is fairly stark in contrast: Turnitin primarily “happens” to teachers through its automatic integration in learning management systems. Teachers have a mild interest or curiosity about Turnitin because it is automatically integrated into their learning management systems or instructors are forced to work with the program. Only one instructor came to Turnitin in a similar way that instructors found Eli Review; these instructors actively seek out Eli Review by asking about pedagogical queries through professional networks. While P2 sought out Turnitin, he initially did so because his intensive labor load required him to search for algorithmic support.

*Analysis:* Rickert’s concept of ambience is particularly relevant to these findings.

Ambience relates to non-tenure track laborers’ embodied experiences given their lack of autonomy in deciding what technologies they want to work with at their institutions. Turnitin is

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<sup>9</sup> Both Turnitin and Eli Review offer different kinds of pedagogies that are built into the design of each program.

not “passively material” even though the program tends to happen to teachers by creeping into their learning management systems or in some cases, without their explicit consent. Its required use can be enforced by employers, which can challenge instructors’ agency as pedagogical designers and classroom decision-makers. Turnitin actively alters the ways instructors respond to their students’ work, as does Eli Review; these tools are not static, passive objects (Rickert, 2013, Kindle Locations 502-503). They play significant roles in crafting students’ relationships with teachers, how classroom pedagogy is impacted, and how student work is assessed. Thus, when teachers are forced to collaborate with particular educational technologies in their classrooms, they still have to cope with the consequences and changes these programs incite. While teachers may be able to exercise agency by avoiding programs that creep into learning management systems, students may have exposure to them in other courses, which affects how teachers will have to frame writing to students in their own classes.

Being required to use a program versus actively wanting to use it for an instructional purpose adds a layer of complexity to how hybrids form and how teachers orient to the technology. For instance, one instructor from the human interviews who sought out Turnitin has a very different perspective of the tool than do the instructors who were forced to use the program. He is forming an elective hybrid with Turnitin rather than a coerced one. Participants who collaborated with Turnitin because it was required of them were not excited or enthusiastic about the program, and they did not articulate their uses of the machine in ways that related to scholarship about teaching. P2, however, reiterated that he works with Turnitin to see how students’ writing aligns with scholarship in the field of rhetoric and composition that is based on students’ research practices from The Citation Project ([citationproject.net](http://citationproject.net)). Although he describes the tool as ancillary in his classrooms, it appears to be a central part of his pedagogical

practices, and he feels strongly that he needs the tool to continue prioritizing plagiarism and citation practices in his courses. His enthusiasm for the program is tied to how it came into being in his professional life, with his consent and for a pedagogical purpose that is important to his teaching goals.

### **Implementation and User-Training**

In addition to teachers' experiences in working with Turnitin or Eli Review for the first time, how they frame and implement the programs significantly shapes how hybrids form. Implementation is tied to teachers' understandings of the programs and the training they received for collaborating with them. Turnitin instructors often have little opportunity for training from other humans. They must decide how to use the program and interpret the data it produces on their own if they do not leave the application to visit the program's website. There are tutorials for working with Turnitin on the program's support tab, blog, and FAQs, and sometimes supplemental information on navigating Turnitin is available through an institution's library or technical support offices. However, these resources are limited to librarians' or IT workers' understandings of how Turnitin works. Their guidelines for collaborating with Turnitin are shaped by their disciplinary and technical understandings of plagiarism and technology, which vary widely across different curricula. For instance, institutional guidelines for working with PDSs can encourage readers to rely on the matching-text percentages to determine if plagiarism is occurring in a student writing (Canzonetta, 2014). However, establishing thresholds for plagiarism in this way is arbitrary; as I mentioned earlier, a paper with a 0% match can still be plagiarized.

Because the program is mandated for some instructors who teach pre-designed courses, teachers are working with the program from the onset of class without a chance to learn about it. In order to contact Turnitin representatives, users must fill out forms on the website. Eli Review's professional team offers easy access to team representatives through a direct email address that connects users to a human respondent who will discuss training options with Eli users. Typically, training in Eli Review occurs through free monthly workshops, team members visiting an instructors' institution, and through textual guides and tutorials that link instructors to composition pedagogy in the program's interface. This direct access to human representatives could be due to Eli Review's smaller number of participants, which manages 60 institutions and serves over 25,000 students ("Not So Random Facts," 2018).

As participants 1, 2, 3, and 8 suggested, teachers felt as if there was little to no training available for working with Turnitin, even if the program was implemented mandatorily in their courses. As P2 indicated, learning how to use the program can be intimidating because of the initial "data dump" teachers must learn how to interpret. P1 echoed P2 in indicating the program had an initial learning curve: "just navigating [Turnitin] and trying to figure out how to do the things...was the biggest challenge" when she first started working with the program. The same was true for P1 and P5 when they started working with Eli Review; regardless of the model of technology, teachers typically undergo an adjustment period or calibration before they acclimate to collaborations with new programs.

When asked about challenges and affordances when working with Turnitin, most instructors had difficulty remembering what issues and benefits arose initially, because they have worked with the program for several years.<sup>10</sup> P2 suggested that he needed to learn "that Turnitin

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<sup>10</sup> Parallel information is not available for Eli Review because the program is newer, and most participants have only worked with the program for a few years at most.

can't tell you who plagiarized” and that similarity percentages do not always equate to plagiarism. He also suggested there is a learning curve to engaging with the program, which he described as a “total data dump” that he had to learn how to interpret even after working with the program several times. P3 extended this sentiment as well, indicating that she self-taught herself how to understand the program without any training. P8 also thought the learning curve was difficult for her students, who were afraid that they were plagiarizing because of the data the program produced.

Although there are no institutional or departmental guidelines for interviewees who work with Eli Review, training and trials of the program are, according to participants, highly accessible. Workshops for understanding the program are offered every month, and trial periods can be extended for those who request more time to work with the program. Additionally, Eli Review’s website and interface link to scholarship that informs the design of the program. Thus, instructors have access to instruction and guidance for setting up the program and interpreting the data it generates from student work. If they understand why the design of the program was crafted in specific ways, it makes the purpose and capabilities of the program more legible.

In fact, P9 was looking for a means of “creating some kind of programmatic coherence,” and Eli Review allowed him to “insinuate” curricular goals to users because by imparting professional development to them. The use of the word “insinuate” is pointed; because Eli Review’s pedagogy is so overt, it imparts pedagogical lessons to teachers and coerces them into a deploying a particular kind of pedagogy. The design of the program forces teachers to reconfigure their writing pedagogy strategies and also allows them to upload and share assignments with other teachers. Eli Review offered a means of training people while remaining on budget because it offered a shared space or “library” for assignments faculty members in his

department had developed. Eli Review reinforces the idea that writing is a process because the program itself breaks writing down into small pieces. Thus, instructors were influenced to work with the program in a way that fortified this concept. Unlike Turnitin, which has also worked as a mechanism for aiding programmatic coherency, Eli Review can offer training to instructors because pedagogy is built into the software. As P9 mentioned, he hoped Turnitin would operate as a means of “globally” checking for plagiarism because teachers in his program were using similar assignments, and he wanted to make sure students were not sharing work across classes. Turnitin does insinuate a pedagogy, too, but it does so more implicitly and because the program focuses on assessing the product of students’ work than their improving their processes. Put simply, Turnitin is designed to focus attention on product, not process.

*Analysis:* The differences between Turnitin and Eli Review, both in terms of how they come into instructors’ professional lives and how they are taught to use them, illustrates a complex web of agency, in which teachers, as Cooper (2011) suggests, are put in a position of having agency (or not) by others rather than having arrived at agency on their own. When instructors are forced to use Turnitin, the program has an added level of agency from the administrators or educational technology designers who integrate the program into instructors’ lives. Administrators set policies that mandate collaboration with educational technologies, which are often designed without consulting content specialists. Cooper also suggests that individuals can change “their structure” and how they engage with their surroundings to enact responsible rhetorical agency. In this case, teachers who do not have access to training teach themselves how to use Turnitin and undermine the proprietary algorithm’s purpose. Rather than working with the program to catch plagiarists, participants restructured the tool to fit their own pedagogical needs and negotiate their agency by making the tool work for them. They decided



how to interpret the reports the program produces on their own, which may not have happened if Turnitin actually did offer training.

For Eli Review, Cooper's notions of agency more aptly fit how students negotiated agency as writers when learning with the program. Their teachers determined how they would engage with the program, and the design of Eli Review positioned students to assert themselves as equals with their peers. Because Eli Review's design limits the instructor's ability to comment on students' reviews, students must work with each other through the program; automation functions to encourage more human-human interaction, wherein students cannot re-structure or undermine the program because it simply does not work without students writing to and with each other. These design features limit students for the better, but there are also drawbacks to the approach, as I will discuss below in the section on hybridity and ethos.

### **Design Features that Limit (for Better and for Worse)**

Before explaining the design enhancements Turnitin and Eli Review instructors identified, I offer a brief overview of each program's restrictive design features. In the case of Turnitin, numerous human and nonhuman actors form a complex, layered assemblage—a “mishmash human and nonhuman, animate and non-animate, actor and network” (Adams & Thompson, 2016, Kindle Locations 350-351). Actors include students, teachers, Turnitin's interface, pre-populated comments, proprietary algorithms, Turnitin's database of student work, learning management systems, computers and hardware, Google Docs, Dropbox, and reports on student work.

When teachers require students to submit their work through Turnitin, they typically begin by creating an assignment through Turnitin via the learning management system offered at their institution. At the onset of assignment creation, Turnitin's default settings set the

parameters around student assignments and algorithmic function. These settings may vary by learning management system, but unless teachers are familiar with the program and change the initial settings, the reports are generated according to predetermined boundaries. If instructors click on “Optional Settings,” they may determine what the “similarity” reports will track, whether students are “allowed” to see their similarity reports, and whether they want to give students an option to determine which repository to assign papers to.

If an instructor is trying to learn how to use the program and interpret the reports it generates, she may not know how parameters in the default settings are limiting her students and her view of their work. For Turnitin, these parameters are related to whether a teacher wants a “similarity report,” whether to include or exclude references, “quotes,” and “small sources” from the overall percentage number, whether students are able to view their originality scores, and how their options for submitting work to a repository will be presented. While there are options to minimize the overall originality score once in Feedback Studio, the interface prohibits a user from removing it entirely, unless she has opted out of similarity reporting and changed her default settings. These settings determine how the program produces a report from student work. The results are then delivered to teachers, who are viewing them through the lens of the limitations Turnitin has placed around their work.

After Turnitin assignments appear in the learning management systems, students may then upload their assignments through files on their computers, or through Dropbox or Google Drive documents. Thereafter, a report is generated from student data. Unless teachers change default settings, students will not be able to see their similarity reports until after their work is graded, nor do students have any continuous interaction or input with the machine. Much like Turnitin “happens” to teachers, the similarity reports “happen” to students, with little say about

how automation will frame their work. The machine limits both students and teachers, because if teachers are not familiar with the program, they may not understand the default or optional settings. Further, if teachers are untrained in interpreting Similarity Reports, which several instructor interviews revealed is often the case, students can be falsely accused of plagiarism. Additionally, the standardized QuickMarks teachers may use to comment on student work may encourage students to focus on low-order grammatical issues over high-order content priorities. These standardized comments are pre-populated in the platform, and teachers themselves did not create them; however, there is an option for teachers to create their own set of drop and drag common comments to drop into students' papers, but this is not the default setting. Turnitin's interface and tool features can then compel users to assess student work in particular ways, which echoes Brock and Shepherd's (2016) assertions about algorithms persuading users into particular engagements without their explicit knowledge. This type of corporate, top-down standardization has the potential to disenfranchise instructors; embracing such standardized writing and grading practices paves the way for automation to thrive and displace human workers.

Turnitin's originality report, Feedback Studio, and integration into learning management systems establish a set of constraints and priorities for teachers before they even begin collaborating with the program. Even though teachers can change default settings (to a degree), lack of training about how the program operates can prohibit users from framing the settings to suit their own pedagogical needs, or it can require them to deploy workarounds to restructure and negotiate the algorithmic output.

In Eli Review, teachers, students, computer hardware, analytic reports, the Eli Interface, "endorsements," and scales intermingle to facilitate human-to-human interaction. Eli review is

highly dependent on human users; algorithms are designed to “informate” rather than to automate teaching labor. Automation facilitates high volumes of peer review interactions between students (“Eli Review”). The program must be set up by an instructor, who will create one of only three tasks (“writing,” “review” and “revision”) for students. Teachers may add different layers of complexity to these tasks by adding scaffolded questions that orient students to the “traits” they should look for in a peer’s piece of writing. This may include a Likert scale, a trait identification “tick” mark section, or a rating scale (“Eli Review”). Thereafter, students are responsible for submitting their writing to Eli Review, reviewing peers’ work, and generating a revision plan designed completely by students themselves (all of which is prompted through the application). After their assignments are completed, students may review the feedback they received from classmates; they then rate the reviewer’s response on a five-star scaled system. Teachers can publicly endorse comments with a “thumbs up,” and students have the option to add and prioritize their peer reviewers’ comments in a revision plan.

In contrast with the top-down pre-populated QuickMarks Turnitin deploys, the majority of the writing that happens within Eli Review is generated by students, and automation engages them with peers’ work by encouraging them to rate, comment on, and revise their writing. Eli Review’s main function for automation is not to produce an overall assessment about students’ peer-reviewing. Though analytic functions are auxiliary features of the program, the interface encourages students to intermingle with each other through its interactive approach for engaging students with writing, rather than seeing a report as the definitive assessment of their work. Rather than emphasizing product over process and producing a static, pre-populated report, Eli Review shows students how they have responded to each other and enables further engagement with peer reviews. Instead of reading and receive judgments a machine has made about their

work, they are collaborating with other humans as a result of the automation Eli Review facilitates.

Eli Review constrains teachers by limiting their capacity to comment on student work; only when students reach the “revision plan” stage (the last stage) of students’ peer-review process are teachers able to offer a holistic comment about students plans for revising their writing. Until students reach this point, the program only allows teachers to endorse peer-reviews, which serve as models of exemplary comments students can learn from because endorsements are often public for the entire class to see. It is important to note that instructors can only endorse reviewer comments in the “review” tasks, nor is there an option for them to comment on student writing itself. Teachers may only provide textual feedback in a textbox in the final stages of the students’ revision plans and guide them about whether their priorities appear to be on task. Several participants commented on Eli’s lack of record-keeping and commenting constraints; however, they ultimately decided that these limitations encourage them to stay focused on high-order tasks rather than getting caught up in proofreading student work.

In a founding document about Eli Review, the creators of the application are clear about what the program “isn’t” and the intentional restrictions of the its design:

While Eli may integrate with learning management platforms or other technologies that support many necessary classroom functions, Eli is dedicated to supporting its three primary activities—writing, reviewing, and revising—and doing so elegantly. Any future functionality incorporated into Eli will support those activities, so it won’t include features like a gradebook, a communications system, a mind-mapping tool, a plagiarism detector, or peer editing software. (WhitePaper 2012).

Because Eli Review limits users to three main tasks, it focuses teachers’ attention in directive and purposeful ways. Rather than allowing instructors to comment on papers and copy-edit students’ work, Eli forces users to conduct high-order tasks in alignment with the pedagogy upon

which the program was designed, the consequences of which are described in greater detail in Chapter Four. Such tasks involve development of scaffolded projects and trait identification (e.g., rubrics about peers' work). Eli Review's design reiterates the importance of process in writing pedagogy because the program's output does not assess student writing; rather, it informs it and shows teachers where students need more help in class.

*Reconfiguring algorithmic purpose*

In terms of teachers' perceptions of Turnitin, four participants indicated there was potential to castigate students when teachers aim to police them for plagiarism. For example, P8 indicates that her students are anxious about the program, which appears to make them fear her. This suggests an element of trepidation associated with the program's rhetorical implications and design consequences. For P1, who works with both Eli Review and Turnitin, she views the latter as "just another version of the red pen," even though she uses the program in nuanced ways. She does not punish her students for missing citations or accidental plagiarism but uses the program to teach students about citation. For P2, Turnitin operates as a "deterrent, but also as a teaching tool," which highlights the complexity of human-machine engagement with plagiarism detection software. While the program can add an element of authority to a teacher's ethos, that construct is based on fear of punishment, which can hinder students' writing and risk-taking processes, especially for English language learners (Introna & Hayes, 2011).

However, Turnitin can also help instructors identify where students are struggling with citations practices in class, which leads to lessons about nuanced ways of integrating others' work into their own (P1, P2, P3, P7, P8). P2 acknowledges Turnitin's potential to operate as a tool for punishment but suggests doing so does not benefit student learning because it can work as "a paddle to spank them" rather than a means of teaching them. Instead, P2 developed his own

nuanced, pedagogical way to adapt Turnitin's text-matching software. He uses it both as a mechanism that "filters" egregious episodes of plagiarism (e.g., when students buy or share papers) and as a way to make students' research processes visible to him. He aligns his research with findings from the Citation Project<sup>11</sup> (citationproject.net), which suggests students often do not look beyond the first page of their search engine results or beyond the first page of academic articles to find data for their arguments. The data Turnitin provides corroborates this assertion, and it encourages P2 to devote attention to how students are using their sources, which can then help him teach them how to improve their research practices. Combined with the Citation Project, Turnitin's features have concretely altered how he teaches "about source use, about summary, [and] about how [he] actually builds assignments," and has thus repurposed the text-matching features of the software to match his pedagogical needs.

P7 described a similar mentality but expanded on P2's acknowledgment about the potential the program has to encourage punishment of students, particularly in writing across the disciplines contexts. P7 sometimes works with Turnitin to check for students who buy papers from papermill services or turn in someone else's work. Because he is trained in writing studies and works closely with student writing, he developed strategies that mirror P2's approach for teaching students about plagiarism when Turnitin is involved in the equation. However, he does express anxiety about teachers who use the program who have no training in rhetoric and composition: "in writing across the curriculum contexts I think there does need to be some institutional training before you use Turnitin because people see it as like plagiarism checker first," which implies he believes people with composition training understand that it is a citation

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<sup>11</sup> A project from the field of rhetoric and composition that relates to how students conduct research for writing classes by analyzing hundreds of pieces of student work to see how students integrate sources into their own work.

tool first. P7's concern brings up an important question—while all of the participants in this study are working with Turnitin in responsible ways, will other teachers who do not have expertise in writing studies understand how to nuance the program's reports? And to that note, how long does it take instructors to understand Turnitin's limitations and what consequences might their learning curves have on students?

For Eli Review, one limitation of the program design is related to interpreting quantitative information from student data. P5 initially found it challenging to think about how data could inform her work as a teacher and is still working through understanding quantitative data as “useful.” Eli Review offers various quantitative overviews of student work (mentioned in Chapter Two), so learning how to integrate large-scale, big picture data into her daily pedagogy is challenging. However, P5 considers this to be beneficial, as the quantitative data is pushing her out of her comfort zone and encouraging her to think about her teaching methods in new ways.

Another limitation of Eli Review's design is also considered a benefit as it relates to focusing teachers on holistic, high-order comments. P1 contemplated how her orientations toward commenting on student work had changed since collaborating with the program. This instance of transformation and hybridity is detailed in the next chapter. She considered what it would mean for Eli Review to enable teachers to add contextual comments to student work outside of the revision plan, the only place where teachers can comment textually in the application. Ultimately, she decided “if I wrote contextual comments then in terms of my labor, I would just get in the weeds picking apart the tiny things about their paper”—this language suggests Eli Review helps her focus her labor on high-order revision plan commenting rather than low-order grammar or sentence structure comments. Thus, the deliberate design restrictions help focus her grading labor – a common sentiment among Eli Review participants.



While P1 and P6 suggest Eli Review focuses their attention on students' struggles and keeps their own commenting focused, P9 suggests Eli Review narrowed his approach for designing peer reviews. Rather than asking students to work on "big comprehensive reviews where you're looking at every piece of everything," Eli Review encourages reviews of small pieces of student work. This reorientation focuses instructors and students on "two elements of a text" for each review or assignment students complete. In this instance, deliberative design restrictions in the Eli Review platform actually enhance teachers' and students' work. Design limitations augment teachers' pedagogy and help focus them on substance over breadth of course content.

*Analysis:* Potts (2013) argues that technology is handed down to users who receive and use it rather than participate in it. She urges readers to stop "building antisocial software that works to instruct users on what they can and cannot do in... favor of building systems that are socially flexible, allowing participants to flourish" (p.6). Rather than building rigid software that users and participants cannot change, she suggests technology should not be restrictive and it needs to allow space for more human creativity, engagement, and flexibility. For programs that teachers are required to adopt in their classrooms, flexibility within technological design is key to helping instructors negotiate their agency in the existing structures (Cooper 2011).

While Turnitin does allow teachers to change some default settings, their options for doing so are limited and difficult to find. More limiting still is the originality report, which simply hands down automated data to users without allowing them to write within it. The Feedback Studio interface does allow a degree of flexibility for teachers, who can write comments on a student's paper, leave audio feedback, and drag and drop standardized comments (to name a few features). Teachers can also add their own version of standardized quick marks,

which allows them to drag and drop their own comments on students' work. Students have the option to click on their matched text to see where the report found instances of similarity, and the program will link students to an external website, [plagiarism.org](http://plagiarism.org). In this model, students are mainly interacting with machines. Depending on an instructor's approach for working with Turnitin, students may receive information from their teachers on the interface, but they may not respond back to them.

Though Turnitin offers PeerMark, a peer-reviewing feature that shares some overlap with Eli Review (they both offer rating scales), students comment on each other's full papers rather than in small and frequent doses. Therefore, they do not communicate as often, and the interface does not encourage peer-review beyond the standard and generic model students typically engage in. Additionally, the PeerMark interface allows students to comment on each other's grammar and punctuation, thus encouraging them to write with a machine by using the standardized drag and drop comments, which does not contribute to focusing students on high-order contextual concerns.

Eli Review's interface allows students to interact with each other's work and rate it, respond to it frequently, and create a revision plan from peer reviews. Students are actively working with Eli Review often, with each other, and with their teachers to make meaningful revisions with other humans. This structure helps students formulate and prioritize their plans for revising their work, and it encourages them to write to classmates and their instructors. Eli Review is not functional without a teacher who designs frequent and unique writing prompts for students, nor can it operate without students writing to each other. Students have a range of options for interacting with each other, and instructors can scaffold assignments however they choose within the parameters of Eli's Features, which include adding Likert scales, rating scales,

etc. Teachers design the curriculum with nudges from Eli Review, and students use data about their work (ratings and endorsements) to make decisions about how to revise their work.

### **Enhancements and Transformations**

While the design constraints described above limit users (sometimes intentionally and beneficially), instructors perceived several aspects of Turnitin and Eli Review's design as enhancements. They include ease of use, transforming teachers' ethos positively and negatively, and facilitating more human-to-human interaction. As Latour (1999) suggests in *Pandora's Hope*, humans and nonhumans transform each other, and in this case, nonhumans have an impact in reshaping (perceptions of) human ethos and communication practices.

#### *Ease of Use*

Turnitin's design is appealing to teachers in many ways. P2 suggests Turnitin offers both a physical and immaterial convenience. Not only did checking plagiarism become easier with electronic integration into a learning management system, but it also allowed P2 to avoid carrying a "pile of papers, and spill coffee on them, and lose things," which he perceived as an added benefit to working with Turnitin. Interestingly, P3 indicated she would not use Turnitin in a "brick and mortar traditional class...in those environments you can work with the students in conference"; in this case, Turnitin may act as an integrity insurance policy for teachers who never meet their students in-person.

Only one participant relied heavily on Turnitin in his classrooms, and when he does find instances of plagiarism or missed citations, he uses the reports to teach students about proper attribution (P2). He also teaches students about plagiarism and devotes time to explaining how the Turnitin report works in his classrooms. Other instructors also indicated they use Turnitin as

a tool to initiate conversations about plagiarism and use the data from reports to teach students when citation practices need adjustment or clarification.

Because Turnitin can arrive prepackaged in a teacher's course, instructors may be compelled to use the program to grade student work in Feedback Studio because it is convenient to keep student papers and grades in one place. For those who are required to use Turnitin, it would create extra labor for teachers to download each paper and grade it through a separate platform. For some who elect to use the program, Turnitin's interface compels instructors to work with the program for streamlined grading pedagogies such as audio response. P7 only uses the program in his own classes for its audio-response technology and occasionally to make sure students are not submitting each other's papers. He creates unique assignments that arise from the "class culture," which would be very unlikely for students to plagiarize. Predominantly, he uses Turnitin for its seamlessly integrated audio response. Turnitin's grading interface aligns with P7's pedagogy for responding to student work with multimodal comments on their writing. He says of the program's convenience, "Turnitin's ability to embed that right within Blackboard made it really easy for students [to hear audio response]... it's actually become like a kind of response support for me; it's how I use it now." Audio-response is a central component of P7's pedagogy; Turnitin streamlines this process and delivers comments to students in a central location. Further, because the audio-response function limits him to three minutes of speaking, he keeps his comments focused and restricts his grading labor to a short amount of time (as opposed to how long he would typically spend giving students written feedback, which he claims is more time-consuming).

Eli Review does not offer as much convenience as Turnitin, but its design features do include an option to aggregate students' comments about each other's work in one convenient

location. Interviewees suggested seeing students' responses in close proximity to each other helps them quickly identify where students have problems with particular concept in class. Other design features within the tool aggregate data about the entire class on a quantitative level and offer easily accessible downloads of the information to help teachers process and interpret quantitative information about their students' work.

### *Perceived Ethos & Transformations*

Eli Review has an overt impact on how students view their teachers, as does Turnitin. First, I will start with Eli Review, which changes perceptions of teachers' ethos in classrooms by engaging them as writing "coaches" rather than the only source of writing knowledge in the classroom. P1 describes Eli as a way "to get [students] to self-sufficiency," which helps her focus on high-order tasks in her classroom. She also feels as though Eli Review prompts her students to view her as "a person who writes rather than just a teacher," which has a significant impact in how students perceive her ethos. This is a significant divergence from collaborating with Turnitin, which one participant suggested encouraged her students to fear her. Eli Review prompts teachers to reconfigure their classroom hierarchy and power dynamics; when students feel as if they are legitimate writers with smart critiques to offer their peers, they begin to understand that they know about writing too. A teacher is not the only source of writing knowledge in the classroom, and students gain confidence in their own writing abilities the more they engage in review with their peers. However, there are also instances in which students have viewed Eli Review as a teacher's way of unfairly shifting the labor of commenting on student work to other students in the class. As P4 noted, she ran into a problem where one of her students was angry with her and upset because he only wanted her comments on his work. While labor does shift for instructors, they are still committing intensive time and attention to reading

students' revision plans and comments to each other. However, students may not understand this calculated pedagogical move, and may view their teachers as lazy or disinterested in their writing.

Turnitin also impacts instructor ethos regarding self-sufficient students. Instructors such as P2 and P7 want students to use the Turnitin reports to teach themselves where they may have issues with citation and attribution practices. This approach frames teachers as guides and as instructors who trust their students to use the report responsibly and not to game the algorithm, which presents an interesting tension considering the program is often critiqued for creating a policing environment. In fact, for one participant, Turnitin transforms how her students perceive her ethos by bolstering her authority as a serious teacher (P8). P8 feels that because she predominately teaches online, she needs Turnitin to back up her status as an enforcer at the head of the classroom, and she embraces the transformations in ethos the machine encourages her students to perceive about her, even if that means they may be a little scared of her.

#### *Human-to-human communication*

Both programs also impact human-to-human interaction in writing classrooms. Eli Review and Turnitin encourage more teacher-to-student interaction based on the data each program automates about student work. This takes shape by focusing conversations on solving problems that are based on issues students encounter in their own writing. Rather than spending time trying to understand where students need help, the informed data the programs produce points teachers directly to areas where students are struggling with course content. Teachers can then use students' own writing to help them learn where they are having difficulty and what some specific approaches may help them. Doing so makes space for a dialog about student work

that is grounded in students' writing and encourages human communication between instructor and students.

Eli Review also fosters more student-to-student interaction in writing classrooms. Because the program is so heavily reliant on user-generated data, students must engage with each other rather than with assessment algorithms; they create the content that is populated within the platform. Automation in Eli Review is designed to help students scaffold their revision processes with each other, and by extension encourages students to place high value on each other's work. By modeling from each other, endorsing strong comments, and helping each other determine revision plans, students collaborate on writing together and the machine facilitates and makes their interactions possible.

*Analysis:* Although these enhancements and transformations may not be visible to instructors, they are both changing and being changed by their interactions with Turnitin and Eli Review. Both programs offer design features that are easy for teachers to use, which helps them conduct their classroom labor more quickly. In addition to creating hybrids that alter students' perceptions of instructors' ethos, these programs also impact human-to-human interaction. Eli Review's design requires humans to engage with each other; automation facilitates peer collaboration. Turnitin's design does not inherently lend itself to encouraging humans to communicate with each other. Typically, students would write to the algorithm when working with this program; however, teachers are transforming the algorithm's purpose and are instead using the data the machine generates to talk to students about their citation and attribution practices.

Further, Eli Review and Turnitin impact instructors' ethos and how their students perceive them, which can affect how students learn (or do not learn) in their courses. Instructors

who work with Turnitin become hybrids with new ethos. Several hybrids and a possible combination of two hybrids in one emerged from the human interview data:

- a) A teacher with Turnitin is an enforcer who is not to be tested or cheated
- b) A teacher with Turnitin trusts her students to interpret similarity reports without using them to game their instructors
- c) A teacher with Turnitin is (confusingly) an enforcer or policing figure who also trusts her students

While options A and B are clear, C presents the most counterintuitive hybrid. Both instructors who allow students to see their similarity reports indicate that they sometimes work with Turnitin to see “knuckleheaded” attempts at plagiarism, where students will use a fraternity brother’s old term paper or purchase one from a papermill. However, they are also undermining these claims by allowing students to potentially plagiarize in class by looking at their originality scores and changing their writing if their text-matching reports imply that they plagiarized. This presents an interesting tension that shifts agency and restructures the power dynamics in class, giving students the opportunity and power to actively cheat if they want to.

The consequences for student learning from these hybrids could also result in students who are afraid to write and take risks. Plagiarism is a topic that constantly confounds students, and it has dire consequences for them in their academic and professional careers. This is especially true for students who are trying to learn how to write in a new language in new educational contexts (Introna & Hayes 2011). Implementing plagiarism detection services can actively stymie student learning. Not only are students afraid of committing an act of plagiarism, but they could also be afraid of talking to their teachers if these programs are deployed to make a teacher’s ethos one that students fear. Even though teachers from this dissertation project worked



with Turnitin to start conversations with their students, students may not want to make the first move to initiate conversation. While a teacher's collaboration with Turnitin can encourage students to take her seriously, it may also lead to conflicts if the program's presence keeps students from feeling comfortable and safe in their classrooms.

Eli Review's teacher hybrids are strikingly dissimilar from Turnitin's teacher hybrids in regard to ethos. For classes that work with Eli Review, teachers are perceived by students in the following ways:

- a) A teacher with Eli Review is a writing coach or partner for students
- b) A teacher with Eli Review is lazy and is not taken seriously because she wants students to do her work for her

Eli Review's design does not lend itself to the authoritarian-driven hybrid that emerges from machine/human collaboration in the Turnitin model. This is a double-edged sword because some students are uncomfortable with teachers who aim to decenter their authority in classrooms, and as a consequence may not take them seriously. However, if students do buy into this hybrid model, they can grow as independent writers and learn how to consistently revise their written work, which can free up instructors' time for high-order classroom concerns (P1, P4).

### **Technological Breakdowns**

To understand teachers' reliance on Turnitin and Eli Review, I asked them how they respond to the technological breakdowns they experience with the programs. Further, they were encouraged to think about how their classes would operate if the tools were no longer available to them. Four out of five interviewees who use Turnitin would be mildly inconvenienced, and one instructor indicated he would not know how to manage teaching without the program.

However, none indicated their pedagogy would be compromised; Turnitin is an auxiliary tool and an afterthought rather than an extension of instructors' pedagogy. In contrast, four out of five Eli Review interviewees would not be able to conduct peer review the ways they currently do and would have to change their pedagogical processes to accommodate the loss.

### Turnitin

Among the five interviewees who collaborated with Turnitin, each instructor stated they would be disappointed if they no longer had access to the program. Four out of five instructors noted that the loss of Turnitin would impact their labor in minor and major ways. P1, who uses both Turnitin and Eli Review, suggested losing access to Turnitin would be a minimal inconvenience because access to the program would not change the way she teaches. She did, however, mention that not having Turnitin would “make more work for her” if she came across a “suspicious” student paper, because she would not have access to the similarity reports the program produces. P3 suggested the loss of Turnitin would be more of an “annoyance” because the plagiarism detection software cuts back on the time she spends grading papers, particularly in her online courses. P7 also gestures toward a minor impact on his labor load because he relies on Turnitin predominately for audio response and rarely checks the plagiarism reports. P8, too, indicated a minor annoyance if the program were inaccessible to her because she relies on it to tell her where students have copied and pasted work, and she would have to “scramble” to find an equivalent tool.

P2, because of his intense work load, had the strongest, most negative response to the prospect of losing Turnitin—such that he would purchase his own subscription to a plagiarism detection program. When asked why losing Turnitin would affect him, he responded:

I have seen what not having that tool is like. I know how much that can potentially impact my workload to the negative...I currently teach a 4-4 load but in many ways I'm

busier than when I taught a 5-5 load. So, to lose this thing that even though it only simplifies, you know a quarter of my job which is itself a single quarter of my life... it would mean work time not spent on other things but spent on [plagiarism detection]. Which means that work time has to be made up somewhere. Which means family time is gonna get messed up or self-care time gets messed up and [groan] I don't think I could go back to that.

On top of teaching a 4-4 load, P2 is also currently a graduate student who is writing his dissertation. P2 has a family and acknowledges his human needs for self-care in light of his labor load. Technology, in this instance, allows P2 to live a life that is not solely about work—a familiar concept that is reminiscent of the promises automation proffered to deliver in the early 18<sup>th</sup> century, many of which still resound today. Humans, with the help of machines, can ease their workloads and live more fully if we embrace machines in the workplace.

Much like the teacher testimonials from Turnitin's website mentioned in Ch.1, P7 feels as though his quality of life is tied to his grading labor, and by extension, his reliance on Turnitin, which he acknowledges is one fourth of the time he spends in his daily life. P7 uses Turnitin in pedagogically responsible ways; he understands the program's limitations and does not use the tool as a way to punish and reprimand students. Instead, he uses it as a careful and measured way to teach students about appropriate citation practices and source integration. Framing Turnitin as a teaching tool, rather than a plagiarism detection service, allows him to spend time with his family and take breaks from grading. Teachers who are using the program in this way are using the data from the reports to informate their work. Their attention to the reports and interpretation of students' source use helps them identify where students struggle. However, this is a select group of composition professionals. Who is to say other professors do not use the program to automate their work and punish students for missed citations? Several interviewees and survey takers raised concern about others framing the program as a policing tool.

As I have mentioned before, Turnitin is an ancillary tool teachers from the human interviews considered to be an afterthought. Respondents suggested pedagogy is first created and then Turnitin is considered as a tool thereafter:

- “My pedagogy is my pedagogy and [Turnitin’s] just a tool for doing it” (P2)
- “Courses were designed first and foremost...I guess once plagiarism had become a problem then the institution decided to put [Turnitin] in, but because I didn't design the courses you know I'm just kinda there as a person to run them” (P3)
- “I use Turnitin because it helps me get response to students, but that's kind of the end of it. It does not structure to how I teach” (P7)

These excerpts highlight an interesting tension in findings. While teachers may not see Turnitin as a significant factor in shaping their pedagogy, it certainly can transform how they interact with students, how their students view them, and they themselves try to adapt the tool to suit their pedagogical needs, as is mentioned above and in greater detail in the next chapter. What is most important to note among all participants is their nuanced, pedagogical way for approaching Turnitin reports in their classrooms, regardless of how important the tool is in their classrooms. Because of their expertise in writing, they do not use the programs to police students, but repurpose it to teach students about proper citation practices.

In terms of breakdowns, most interviewees could not recall any major issues with Turnitin. Typically, they mentioned the “Blackboard ate my homework” type of problem related to high traffic on learning management systems. P8 mentioned students’ fear of the machine and how their inability to interpret percentages of similarity scores impacted her. She had to spend time answering frantic emails and explaining to students that she knew they did not plagiarize. This low order concern took away time she could have spent on other teaching tasks. Similarly,

P2 has experienced several breakdowns with Turnitin as Canvas' integration with the program created problems. When this happens, P2 spends considerable amounts of time being a technological expert for students. He feels as though it is his job to "de-Freshmanize" first-year writing students who are often new at working with learning management systems. Becoming a classroom technical guru takes away time P2 could reallocate to teaching more high-order priority lessons in his classroom. He describes these minor glitches as, "eating up class time that I had already allotted to something else that I really needed to cover, which then puts us behind in the rest of the semester. So, these episodes [of breakdown] are kind of sporadic...But when they do, man, they can really derail the process."

### *Eli Review*

When asked how losing access to Eli Review would impact teaching labor, participants responded with a range of expressions. One teacher, P5, said she would be disappointed at the loss of Eli because she had only been working with the program for two weeks. Others were more heavily impacted by the thought of losing the program. For instance, P1 suggested she would still continue to teach the way Eli had encouraged her to conduct peer-review. She feels strongly that Eli has impacted her pedagogy and tells her colleagues, "I know that Eli is working because I would do the same things even if I didn't have it." However, she would have to "replicate a lot of the material in an analog fashion..." if she couldn't find a replacement, which would be time-consuming. She also insists that losing access to Eli would render students' progress invisible because she wouldn't be able to "quickly assess student process and...I wouldn't be able to see the things that I can see when I have all of those peer reviews right in front of me." This issue is both about how Eli Review aggregates students' reviews and localizes it in one central space for teachers. The "informed" data the program produces also helps her

quickly spot areas where students are struggling and who needs help. Much like P4 and P9, P1 suggests Eli helped her focus her pedagogy on small, concentrated writing tasks rather than full drafts all at once. Eli Review encourages instructors, like P4, to scaffold their assignments and engage with their writing process. P4 believes losing Eli would impact her teaching and would fight to have continued access to the program for her courses.

I do find that students, if they're under this model, that they write in small chunks and they get feedback on the small chunks that they're dispersing their overall labor over a period instead of trying to binge write over a weekend to try to do some larger paper. And I find that because of this model of ... the writing revising, I've noticed that their writing is much stronger once they received the peer feedback. So, if for some reason the institution... said that I would not be able to use the tool...I would fight to have the tool in the classroom. I think that the tool has actually even made me think about writing and revising so much so that I want to integrate into every course I teach...because I find that it is a learning tool. It is there to help students to think about writing and revising in a way that perhaps they haven't encountered before. I would probably throw my hands up in the air...I would throw a fit if I wouldn't be able to use it in the classroom.

P4's strong support of Eli Review shows her commitment to the program's imbedded pedagogy. The "learning" tool works on two levels: both to teach instructors about their students and to teach students about writing and revision processes.

One instructor, P9, is currently switching institutions and is confronting the idea of working without Eli Review. He has begun to experiment with other technologies, such as Qualtrics, to informate and keep records in similar ways that Eli does. However, doing so is not as seamless as working with Eli Review, and not all of the features are able to be carried out in this way. He is committed to using the program and is searching for ways for his new institution to purchase a license for the program.

P6 has a different perspective because she teaches a small number of students for her ecology class and feels as though she could replicate "online peer review in a piecemeal way that

I would patch it together,” but she does not see a way where large- scale courses could have a writing component without a technological intervention like Eli Review. She notes,

It would be absolutely impossible to do this on a large scale and the thing that I would miss the most would be the learning analytics. Because um—and I’m just really learning how to use them more effectively as teaching tools. So, after this semester ended, I really worked with um Melissa at Eli...she helped me understand how to use the learning analytics...this one of the things that I’m going to be doing with my team, we’re going to be thinking about ‘how do you get those like that just in time information for faculty that then helps you target the students you want to help’...I couldn’t replicate that easily or at all [chortle] I think, and so that would be a real loss.

In terms of breakdown, participants had trouble thinking of how to make up for the loss of Eli Review. Although P1 hasn’t ever experienced any trouble with breakdowns, if Eli Review were to fail, she would not know how to compensate for the loss because it is such an integral part of her weekly pedagogy:

I would have to redesign probably the entire week around an outage...because there's some days that I just give feedback on student drafts, so they turn in a revision plan. Usually two days out of the week I’m just commenting on revision plans the whole day, so I would lose the ability to do that.

P4 experienced a breakdown wherein students were unable to “copy and paste into Eli Review,” which substantially impacts their ability to finish assignments if they write in a separate document and then copy their information over to textboxes. According to P4, the Eli Review representatives immediately identified the problem and provided an alternative solution for students. P4 noted that “the team was incredibly responsive for the fix” and did not derail students’ progress. The Eli Review Team’s responsiveness is tied to ecological factors; because they serve fewer students, they are likely more apt and able to respond to them personally.

The last participant who experienced instances of breakdowns with the program was P9, who needed the Eli Team to develop a workaround for an institutional licensing issue. He noticed discrepancies between the data that relates to the program’s rating functions one

semester, and he also is unable to get the “batch download” feature to work. However, like P4, he indicated the Eli Review customer support is “fairly responsive” and directly helped him work through the breakdowns. However, unlike P1, breakdowns have not affected his pedagogy because he has developed workarounds for when the program malfunctions.

### **Implications**

The design implications of Eli Review and Turnitin compel users to adapt their pedagogy and the tools’ purposes in particular ways. Because of the limitations in design (or because of the ease of use for particular features), teachers are encouraged to transform their teaching practices to either align with these tools or to repurpose them. How teachers collaborate with the tools largely depends on their training for the programs and how the tool came into their professional lives. When instructors are forced to work with Turnitin, they are resistant or unenthusiastic about its features, and thus deploy workarounds to collaborate with the text-matching software and form coerced hybrids. Both human and machine are interpolated into roles that are determined by factors outside of themselves (Cooper, 2011). As Latour argues, “each artifact has its script, its potential to take hold of passersby and force them to play roles in its story,” but teachers who work with these artifacts are rewriting the script and reconfiguring their roles (1999, p.177). For instance, when teachers are interested in working with Turnitin, they form elective hybrids and align its features with scholarship in the field of rhetoric and composition that relates to their teaching practices. Doing so encourages students to see the program as an actual tool for learning citation practices rather than a policing apparatus. Instructors who are interested in working with Eli Review are engaging with flexible and social software that upends the notion humans are users of technology rather than active participants with it (Potts 2013).



The results of instructors' collaborations with machines and the implications of their design has consequences for teachers' ethos and their communication practices with students. Flexible, social software like Eli Review encourages humans to interact with each other while automation facilitates their collaborations. Although Turnitin is less social than Eli Review and more restrictive, teachers optimize the data the program generates to start conversations with their students. Teachers, in this instance, modify the tool and interpret data to teach their students.

The most significant findings from this chapter are tied to hybridity and ethos. When instructors work with Eli Review and Turnitin, students' understandings of them have the potential to both positively and negatively impact their writing processes. Writing is a vulnerable act about which many students are insecure; thus, a teacher's ethos plays a significant role in how students learn. When teachers collaborate with Turnitin, their status as the authority figure of the classroom is bolstered, and students' levels of trust in the instructor are complicated. Depending on how the instructor allows students to work with the programs, they can either work with Turnitin to undermine the teacher, learn from the tool and gain self-confidence, or they may become fearful and avoid taking risks with their compositions. Eli Review encourages teachers to decenter their ethos in the classroom, which can make some students uncomfortable, it can encourage them to become more confident and self-sufficient in their writing, it can increase their risk-taking, or it can keep them from respecting their teachers. While these categories seem to conflict with each other, they do accurately reflect how complex human/machine interaction is. Ethos is merely one component that is impacted by human/machine collaboration. The next chapter begins with an overview of how hybrids directly impact and change a teacher's pedagogy and labor practices.

## **Chapter Four: Implications for Human/Machine Collaboration on Teaching Labor and Pedagogy**

While elective and coerced hybridity plays a significant role in shaping teachers' ethos to students, hybrids also impact instructors' pedagogy and labor. This chapter overviews the entanglements, transformations, and effects collaborating with Turnitin and Eli Review has on teachers and vice versa. Specifically, I use Zuboff (1985, 1988), Markoff (2015), and Latour (1999) to outline how these programs are augmenting human capacity, interpreting automated data, and transforming human and machine when the two engage with each other. Latour's concept of hybridity (mentioned at the onset of Chapter Three) remains relevant in this chapter as well. Rather than focusing on how communication and ethos are affected by elective and coerced hybrids, I focus now on how hybrids enhance or limit teaching labor and pedagogy.

I also turn to Zuboff, who is discussed in Chapter One, to develop a framework for interpreting how teachers engage with informed data. Technology, Zuboff claims, is frequently

used only to automate production and thus reduce [human] skill and labor requirements. But its potential to inform organizational members about the work process and thus improve operations and increase innovation is the aspect of technology that will be most important to long-term organizational success (1985, p.5).

For automated data to qualify as "informed," it must engage teachers or students in improving their work or increasing innovation in the writing classroom. If automated data is used to assess student work or make a judgment call about its quality rather than helping students enrich their writing, it remains automated. Informing simply provides humans with the information they need to make analyses about what actions to take in their classrooms, while automated data suggests the actions to them without requiring them to do as much intellectual labor. For instance, if automation is used to assess student work well and assign grades to students, it does

not qualify as informed work because it reduces human skill (i.e., a teacher's expertise) and intellectual labor. While it could qualify as "innovation" in the writing classroom, it does not meet the criteria for informing because it reduces teachers' skills. Put another way, automation is tied to assessing product, whereas informing is related to both the process of arriving at the product and the product itself. Interpreting the process component of students' work requires teachers' skills and encourages innovation because instructors must develop creative and nuanced ways of working with informed data in their classrooms.

Informed data is also tied to how human designers shape technological design to "augment" or "extend human capabilities, rather than to mimic or replace them" (Markoff, 2015, Kindle Location 277). Automation often falls into the category of displacing human workers through efficiency, while informing can both augment humans, shift their labor, or potentially replace them (Kindle Location 5326). Markoff suggests humans are still a part of the process of developing machines, and that conversations about displacing humans and augmenting them are complicated not always clear cut. Humans remain "in the loop" of design because machines are still (for the time being) created by human designers. Below, I outline how these dynamics and interchanges unfold and what design implications emerge from the human interviews. The findings in this chapter indicate that teaching labor is often tied to ideas that convey convenience, efficiency, management, and time spent reviewing student work. Overall, when describing how pedagogy is impacted when teachers use Turnitin or Eli Review, interviewees were concerned with students' self-sufficiency, focus, and interpretation of the data each tool produced.

## **Pedagogy**

### *Informating and Visibility*

Visibility is a term or idea teachers often used to describe how “informed” data about student work impacts their pedagogy and teaching labor. As automation becomes even more integrated into higher education, Zuboff’s assertions about working with automation to innovate will ring true for educators and other communicative laborers who conduct immaterial labor in the 21<sup>st</sup> century (Reeves, 2016). While Eli Review’s team explicitly designed the program to informate teaching pedagogy, instructors also used Turnitin data in similar ways and repurposed the tool’s output to suit their pedagogical needs. Rather than using autogenerated data to assess student work, Turnitin teachers used data to quickly find areas in which students struggled with citation practices. In doing so, both Eli Review and Turnitin teachers use the tools to teach students more about writing rather than to castigate them for errors. Data, thus, is providing teachers a way to informate teaching labor because it provides quick and targeted information about where students struggle individually and as a group. With this information, teachers are innovative because they design specified lesson plans that are based on students’ real problems in class, rather than guessing about where they need help.

For one instructor, Eli Review’s simple design approach for collating all student comments and reviews helps her understand the common threads or issues students are dealing with in class. As she remarks, “looking at the comments [students] write has given me clues to the things that they’re struggling with,” which is particularly true when those comments are easily comparable because appear next to each other. P2, who uses Turnitin, indicates a like perspective and asserts the program helps him “flag major things” or areas where students struggle, especially concerning patchwriting, paraphrasing and summarizing. Further, he believes

the software has “made him pay more attention to how [his] students use sources,” where their information comes from, and how they use research in their writing.

P2 is careful not to assess student work based on the findings the machine produces. P7 also has to resist requests from teachers or administrators who want a clear and definitive “threshold” similarity index number that indicates if a student has plagiarized. P2 notes that Turnitin’s “similarity index” cannot accurately find plagiarism and can in some cases miss it. In one case, he received a student paper with “88% matched text] that wasn't plagiarized... [and] a case of plagiarism with a similarity index of 11%.” Instead, he uses similarity scores to signal where he needs to “check” student work to see if they need additional help. Similarly, for P6, Eli Review helps her target not only where students are “struggling,” but also how she, a human teacher with subject matter expertise, can help them through modelling responses with peers.

On a larger, organizational level, both tools enhance visibility through interface and they ways in which automated data is presented. For P3, Turnitin quickly helps her see where students are getting information for their research papers; it is “easy” for her to locate where their cited information comes from because of the color coding and convenient pathway it offers to the original source. For P9, Eli Review’s features and interface allow him to “document” student writing over the course of a semester, which illuminates “all of the work that goes into a [student’s] writing process,” thus saving him time on the low-order managerial task of collecting those materials himself.

*Analysis:* Teaching alongside these technologies so closely both means instructors are working with machines to develop new pedagogical approaches while also functioning as check and balance between the machine and students. The instructors from the human interviews in this dissertation project have writing pedagogy background and experience. As teachers, they

mediate between the programs' design, pedagogical outcomes, and student learning to align with their goals for students and restructure their roles and relationships with the machines, shifting their agency and negotiating it (Cooper, 2011). Instructors with experience teaching writing have a fluid approach to working with technology because they understand the impacts certain design features can have on students. Rather than letting programs like Eli Review and Turnitin completely determine their pedagogy, they find ways to work with the programs, and they decide which aspects of the technology will change the ways in which they teach.

### **Implementation and Framing Informed Data to Students**

Across the board, teachers adapt Turnitin and Eli Review to suit their pedagogical needs. Rather than collaborating with Turnitin as a tool to punish students who may or may not have plagiarized, instructors repurpose the program's original functionality and use it as a tool that informs their pedagogy. As P2 notes, "you have to learn the most advantageous way to use [Turnitin] ... to get better results. And to treat it as a tool for learning... rather than... a paddle to spank [students] with...when they mess up." P2 recognizes Turnitin's limitations and adapts his approach for implementing the program. In his classes, he implements Turnitin as way of enriching his teaching and learning more about students' research practices because he understands the program cannot definitively tell him if students plagiarized.

P2 underscores the value of the "human element" that interprets context from student writing. Further, he insists to students the program is fallible, and that high similarity indexes are permissible in certain writing situations. He stresses the importance of a human reader to his students and affirms that Turnitin can only help him identify student error, but it cannot tell students how to fix or understand errors, which is an unintentional design limitation within the Turnitin interface that safeguards writing teachers' expertise. However, what is most significant

is his framing of the tool as a means of “finding a way to make [student error] something that enables learning.” Not only does P2 have a nuanced and thoughtful approach to working with Turnitin in his classroom, but he also frames the tool as a teaching apparatus and manipulates it to help teach students about their research writing practices.

As discussed in Chapter Three, some instructors from the study (P3, P8, P7) did use Turnitin as a means of catching copy and paste plagiarism or as a way to bolster their ethos, but they still worked with it to teach students. P7 primarily uses Turnitin for the audio commenting function in the grading interface, but he wants Turnitin to show him overt instances of plagiarism where students have shared papers with each other or purchased them from papermill companies. He, like P2, uses Turnitin as a safety net for students and as a teaching tool for citation practices. This approach for working with Turnitin complicates dynamics with students, especially when the program causes them anxiety and fear (P8). To mitigate such affective responses to the program, P7 allows his students to see their drafts and Turnitin scores before they submit their work to alleviate their unease about working with the program.

Much of technology’s impact on teaching labor and pedagogy comes down to how teachers are framing the program to their students and how they implement the tool in their classes. P7 and P2 overtly discuss with their students how Turnitin works and what pedagogical purpose it serves for enhancing their writing. When adopting Turnitin for an assignment in his class, P7 explains to students:

‘[Using Turnitin] isn't that I suddenly—I'm suspicious of you... I haven't grown suspicious of you, but I just think that the response functions here are better’, and I said ‘you're welcome to turn in your paper multiple times...I'm not here like looking over your shoulder to make sure you're not cheating; that's not why I'm using this.’

The idea of self-sufficiency returns in this excerpt as P7, along with his colleagues who work with Eli Review, is transparent in talking to students about why they are working with technology and to what end. P7 allows students to interpret the automated data from their own work before they turn in their final assignments to lighten their angst about plagiarism. As Danielle DeVoss and Annette C. Rosati (2002) note, anxiety and uncertainty about plagiarism is prevalent among undergraduates. After realizing some of her students had purchased paper mill papers in one of her classes, Rosati told her entire class the three plagiarists needed to come to her office hours, or they would fail the class. She was surprised to find fourteen students in line for her office hours; they were scared that they had plagiarized because they did not fully understand the concept (p.192).

*Analysis:* Teachers who use Eli Review are also explicit about wanting students to use the program as a means of bolstering their confidence and becoming more independent writers, which may help students feel more at ease when sharing their work publicly with each other and opening themselves up for critique. Is it possible to ethically use Turnitin to promote students' abilities to become self-sufficient while they are fearful of the program? It may not be ethical due to the intellectual property practices the program deploys, but there are certainly varying degrees of responsible collaboration with which teachers can engage. Rather than failing students or immediately reporting them to the institution, P8 and P3 talk to students about their errors and use the data from Turnitin as a way to start a conversation about suitable appropriation practices. P2 and P7 allow students to engage with the Turnitin reports before they submit their final papers in class as a transparent way of transforming the tool into a teaching mechanism rather than a "gotcha" tool. Much like in Chapter Three, teachers are working with Turnitin to make the antisocial software more social and flexible for students by encouraging them to participate with



the program rather than being users of it (Potts, 2013). Furthermore, it helps focus students and teachers on particular and specific components of their compositions, which manifests in multiple ways with both Eli Review and Turnitin.

*Focus & Prioritizing Small Bits of Writing*

Focus is perhaps the most notable category that emerged from coding related to pedagogy. Teachers who use Turnitin and Eli Review indicate the tools help them hone their pedagogy and focus on aspects of student writing that they would not normally prioritize. Whether encouraging instructors to think about all of their course assignments in the preparatory stage of designing pedagogy, or helping instructors focus on creating smaller and more frequent tasks throughout the entire course, both Eli Review and Turnitin urge instructors to think about what is most important for their teaching goals in their writing classes.

For example, P9 suggests that Eli Review helps him frontload his teaching labor at the start of the semester because he will “spend a lot more time...thinking about what...review should actually entail” than he did before working with the program. Eli Review increases his workload at the start of the semester because of the intellectual labor he focuses on planning courses and reviews. The program compels him to act in this way because its design encourages instructors to consider their course objectives from the beginning of the class and makes them reframe how they conduct peer-review. Teachers work with Eli Review to populate the interface with writing tasks and reviews for students. Without teacher input, the program does not work, and the interface would essentially look vacant to students. Teachers must think about how they want the tool to work with their students from the onset of class. Eli Review encourages multiple peer-reviews with small scopes throughout each writing course, which may be different than how

peer-review is typically carried out (usually once before a major assignment is due in each course unit).

Brock & Shepherd (2016), Reyman (2017), and Ingram (2013) argue algorithms are rhetorical because the implicit and often hidden parameters through which they function persuade users toward particular engagements and actions. Rhetorical implications are evident in Eli Review's design because the program is actively shaping how P9 delivers content. It persuades him to prioritize writing tasks for his students in smaller, more frequent assignments that are scaffolded and build on each other throughout the semester. In Eli Review, algorithms serve as conduits that collect and disseminate information to students and teachers. Instructors, therefore, must decide what it is they want to learn from student writers and how they should get to that information through the peer-reviews. From ratings to Likert scales and everything in between, peer-reviews are constructed and displayed to students through algorithmic functions, which are decided by the teacher. Because Eli Review is a social software, teachers have more freedom in determining what the output of the program will look like and how their students will engage with assignments. As P9 progresses through the semester, Eli collates the informed data from the program's algorithms to help him understand who wrote what, how much they wrote, where they struggled, and how they engaged with peer review. Without the program, he would spend time trying to determine these elements of the student writing process manually, which took up time he could have spent on higher priority classroom tasks.

The focusing element of Eli Review's design also encouraged P1 to reconsider what classroom objectives she prioritized. P1 described how Eli Review changed her pedagogy by saying it helped her hone her instruction:

I'm much better at focusing my class around objectives because of Eli...I'm much better at simplifying my instruction... I used to try to do too many things in the

class, and I would have too many objectives...Eli has gotten me to rethink the number of things that I'm teaching so that I go for depth with a smaller number of objectives than with trying to hit every objective that I might possibly hit.

Eli Review encourages P1 to break her assignments down into smaller and more focused writing exercises like P9, which also allows her students to write and revise more frequently. Focusing on depth and breadth enhances P1's pedagogy and helps her manage her course objectives in more realistic ways. Rather than picking student writing apart and copyediting it, Eli Review encourages her to "focus on larger global issues of revision" in each of her classes. P4 also expresses a similar sentiment, in which she asserts Eli Review is drastically improving student writing by forcing students to write in "small chunks" over an extended length of time rather than "binge" writing one long paper over a weekend. Thus, Eli Review focuses how P4 crafts assignments in small, purposeful units, which also concentrates her students on writing through one task at a time rather than writing an entire paper all at once.

Beyond centering and prioritizing instruction on smaller writing goals, Eli Review also encouraged P4 to "tighten how [she] see[s] collaboration" and has changed how she teaches students about professional collaboration and review. Through modelling and pointing to strong examples of peer review in her class, P4 is able to focus instruction about collaborative practices on responsible and productive critique. She explains, "if [students] are able to give generous and kind feedback that's constructive, then they've learned it as a result of [Eli Review]...it has only helped me to fine-tune the way that I see collaboration and peer review," and helps her refine her pedagogy and lessons about useful peer collaboration.

*Analysis:* The design of Eli Review and the way it forces teachers to reconceptualize their pedagogy is tied to the Latourian notion of the hybrid actor (1999, p.180). Together, a teacher and Eli Review form a new hybrid actor that mutually transforms each other and the pedagogy

that students receive. Eli Review requires a teacher to have a base understanding of writing pedagogy, which she then tailors to fit into the program's design. Eli Review changes the way the instructor delivers her pedagogy and how she prioritizes tasks in her classrooms, making the program a part of what she does and who she is as a teacher. P1 would not have prioritized her work in new ways without Eli Review, and Eli Review needs her to input her lesson and peer-review assignments. Without a teacher, Eli Review is empty.

Turnitin, however, can still operate without an instructor because it is integrated into course management systems and the software is "antisocial" (Potts, 2013); it does not require a human to work, nor can humans change much about the interface. Once an assignment is created by an administrator, who does not need content-knowledge to do so, Turnitin's algorithms operate in the same way they would with or without a teacher. They still search the internet and Turnitin databases for matched-text and produce a report based on the findings. What is important, though, is how the hybrid takes shape when instructors work with the program to teach students citation practices that are based on the data the algorithms produce. For example, Turnitin helps P2 focus his pedagogy because their collaboration keeps plagiarism and citation at the center of his instruction rather than letting it become a secondary concern. While the design of the program is static and inflexible, teachers still form hybrids with Turnitin because of the program's focus on text-matching services. A teacher who works with Turnitin has the potential to form a hybrid that responsibly engages students in conversations and practices of attribution in their own work rather than a teacher who does not have data or evidence to show students how to engage with abstract lessons about citation.

*Co-Constructing Pedagogical Design & Hybridity*

Not only have Turnitin and Eli Review transformed instructors' teaching and labor practices, but they have also contributed to co-constructing instructors' pedagogies. While this is a bold assertion, the data supports the idea that Turnitin and Eli Review are driving instructors to consider design changes in their pedagogy. For P1, Eli Review is a central part of her pedagogy, and it has transformed her teaching practices by encouraging her to design her course curriculum in alignment with the program and the support materials located on the program's website. P1 even goes as far to say Eli Review "drives the pedagogy in the class" and that her collaboration with the tool strengthened her teaching because her students are stronger and more independent writers. When P1 begins the labor of course preparation, she designs her curriculum and course goals by thinking "about what [she's] going to do in Eli at least as much as [she's] thinking about the content" she wants to discuss in class. Thus, she has changed her pedagogy to reflect Eli Review's influence by focusing her teaching around small, narrow assignments that encourage students to delve deeply into the revision process instead of providing generic responses to their peers.

P4 has a slightly different approach: Eli Review actually aligned with P4's pedagogical goals before she worked with the program in her course. In her graduate-level professional writing course, she wants students "to be in the practice of writing and revising and [she doesn't] want them to write the traditional seminar paper that happens at the end of a course." Instead, she encourages her students to write frequently and to more targeted writing prompts throughout the semester. In fact, P4 would rather have her students submitting "unfinished final work but have the kind of underlying skill of knowing that writing is revising and it's constant revising." Eli Review is the platform that engages and helps teachers facilitate this kind of writing pedagogy,

which in turn makes her course goals and pedagogical understanding more legible to students because the design of the program puts this method of teaching into action for students. Instead of manually collecting this work from students or trying to facilitate the same course goals through a learning management system that is not designed for it, Eli Review streamlines the process and forces students to engage with each other in meaningful peer reviews.

P9's pedagogy was changed by the tool in that it focused his pedagogy and "encouraged" him to "do less [in the classroom... to try and focus a little bit more, do a little bit less...to go for a I guess depth rather than breadth in the reviews." Similar to P4's conceptualization of binge-writing, P9 does not want students to write reviews or papers in one fell swoop. He prefers for students to engage in more meaningful and deeper learning by focusing students on one task at a time rather than an entire paper at once. He claims that as a result of working with Eli Review, his pedagogy is "more writing about writing than it has ever been... before I might have been trying to fit everything into like 1 or 2 days that kind of unfolds over a few weeks," and he looks at student writing more "strategically" because of the program.

Turnitin's role in co-constructing pedagogical design is not as overt as instances with Eli Review. All instructors from the human interviews who worked with the program suggested it was an ancillary component of their pedagogy. For some, that statement holds true because they either ignore the program or only work alongside it if they suspect a student has plagiarized or needs help with learning how to cite information. However, this is at odds with how one instructor describes his relationship with Turnitin, which he suggests constructs pedagogy that aligns with the program's features. P2 suggests teaching students about plagiarism and attribution is at the top of his pedagogical priorities. He teaches a 4/4 load, and Turnitin allows him to spend "a quarter of his life" focusing on self-care and family time because it simplifies his

instruction and how he has constructed his pedagogy. Before he adopted Turnitin in his classroom, teaching citation and attribution was more abstract to students because they looked to examples that were not based in their own writing.

P2 now encourages his students to work with Turnitin to see where they need help with citation practices; he plans his lessons on citation and his approach to teaching it based on the text-matching feature Turnitin provides. Although he describes Turnitin as an ancillary tool and suggests he crafts his pedagogy first and adds Turnitin to the mix thereafter, his actions imply otherwise. This points to an interesting tension, where P2 may not be comfortable admitting how much sway Turnitin has in his classroom, or he might not realize the significant role it plays in his planning his pedagogy.

*Analysis:* Instructors who collaborate with Eli Review are transparent and aware of the ways in which the program has contributed to reconfiguring their pedagogy. Eli Review's design requires instructors to plan their pedagogy at the onset of the course because it urges them to consider how to break down their instruction into smaller and more frequent writing tasks and peer reviews. The program incites such noticeable reorientations to writing pedagogy that it is difficult to miss how much instructors change their practices to work with the technology. Turnitin's role in changing an instructor's pedagogy is more implicit because citation practices and lessons on plagiarism are often a part of a teacher's existing pedagogy, and the tool can easily be repurposed to fit within current curricula. The key implications of the differences between overtly and implicitly noticing the changes these programs bring about in pedagogy lies in an instructor's ability to restructure the programs to fit their classroom needs.

## Labor

### *Convenience and Low-Order Teaching Priorities*

What teachers do tend to notice across the board is how both Eli Review and Turnitin affect their labor. In terms of teaching labor, convenience is by far the most common way in which instructors describe how Turnitin or Eli Review impacts their labor. Convenience is framed both in terms of time saved on organizational labor, time saved on finding pedagogical problems students are having, and as a means of simplifying low-order teaching tasks that are associated with the managerial component of running a writing course. The managerial layer of teaching writing, Strickland (2011) argues, is often underrepresented in scholarship and has negative connotations; thus, it follows that managerial labor is low-priority for writing instructors. Automation has a longstanding history of being framed as a means of saving employers time and offering convenience and efficiency, which appeals to managers who are trying to maximize labor. From the Jacquard Loom in the age of the British Industrial Protest to the auto industry in this century, automation expedites labor efficiently and without human error.

For teachers who adopt Turnitin in their classrooms, the platform is a way for instructors to “easily” distinguish when students have purchased papers, passed their work along to other students, or copied and pasted entire articles as their own work (P1, P2, P3, P7, P8). Rather than manually typing out passages students may have plagiarized (or copying and pasting text) into a search engine to scour the internet for copied words, Turnitin’s algorithms cut out the middleman and do the labor of searching for teachers. P1 describes this process as a convenience that saves her time; prior to Turnitin, she “used to spend an hour on a suspicious essay” which she indicated was a task with Kennedy’s assessment of automation’s capacities to “handle [menial] tasks more efficiently, more consistently, and more correctly,” which allows humans to work on “higher-



order concerns” (2016, p.118). The program helps P1 “confirm whether plagiarism has taken place pretty quickly” without requiring her to investigate student work on her own. Determining plagiarism is not one of P1’s main concerns in her classroom; it is a low-order task that Turnitin’s algorithms can help her manage so that she can spend time on commenting on students’ revision plans, which is a critical part of her pedagogy. All of the other writing instructors who worked with Turnitin expressed a similar sentiment, suggesting that Turnitin is an ancillary tool that helps teachers locate the “knucklehead” attempts at plagiarism quickly (P2, P3, P7, P8).

Another instructor also pointed to an unexpected convenience Turnitin offers, which supports his administrative labor when he must document academic integrity breaches at his institution. In any case of student-based academic integrity infractions, instructors must submit proof to the institution of plagiarism. Thus, he prints the Turnitin report as corroboration of student plagiarism. He remarks,

I’ve joked (not really) that the student commits the plagiarism and I get punished because the amount of paperwork it generates is absolutely insane. We also have to meet with the student; it’s very time consuming. But what Turnitin does for me is it simplifies a lot of that. What I’ve even resorted to doing is printing off a copy of the Turnitin report, marking anything that is clearly out of line...So it does save me labor on that end.

Clearly, this type of administrative management is a low priority for P2, and it takes away time he could be spending on other pedagogical priorities in his classrooms. It is important to note that framing Turnitin reports as hard “proof” of plagiarism, even though they are fallible, legitimizes the tool to administrators. P2 is vocal about understanding the limitations of Turnitin and notes that it cannot actually catch plagiarism because a human must do that contextual interpretation. Although he has a nuanced understanding of the tool’s functionality and has transformed it to work for his pedagogical aims, this does create tension because it validates

Turnitin as a tool that provides undeniable “proof” of plagiarism to people who may not understand the program on a pedagogical level.

Teachers who are working with Turnitin to conduct low-order administrative tasks or low-level pedagogical undertakings are doing so not because of the design of the tool, but because they have adapted and repurposed the tool for their own pedagogical needs and aims. This interchange of humans transforming the tool and nonhumans transforming human uses is tied to hybridity and collaboration. Teachers are adapting the program, which infiltrates their teaching and imposes a top-down, corporation’s vision of pedagogy on them and their students. Because they are forming forced hybrids rather than elective ones, teachers’ opportunities for negotiating agency in their classrooms is dependent on how they force the program to work with and for their students. Even if teachers are successfully repurposing the algorithmic functions to serve a pedagogical aim, the Turnitin company still stores students’ intellectual property and surveils them. Collaborations between teachers and Turnitin are complicated because they are layered and have implications within institutional and corporate settings. Rather than working with Turnitin to monitor and punish all potential student plagiarists, which is what the program was initially designed to do, they adapt it to find severe instances of plagiarism in their courses and talk to students about it. All instructors who engaged Turnitin noted that their main goals are not to punish students, but to teach them about proper attribution. In some cases, institutional mandates, as is evident with the example P2 describes above, may take precedent over teachers’ pedagogy and course aims.

Instructors who collaborated with Eli Review share similar responses about convenience: Eli helps them conduct low-order administrative or managerial labor that saves them time. For P9, Eli Review allows him to “archive” previous assignments that he has fine-tuned and

developed for his students. The application allows him to “reuse” them and carries out low-order managerial tasks by “doing some really efficient things like assigning the same activity to two different classes or assigning the same activity to 100 different classes.” This shortcut allows P9 to save his energy and decreases his “intellectual labor” for old assignments, which enables him to spend more time focusing on individual students. P5 expresses a similar perspective, where she claims Eli Review helps her search and log student work to “keep track of all the pieces” of the writing process in her courses.

P1 suggests the program helps her facilitate organizational labor, but the labor she conducts in her classroom is modeled from the pedagogy that is suggested through Eli Review’s design. Put another way, P9 and P5 view Eli Review as centralizing and streamlining elements of their organizational labor that can be done with other tools. Blackboard offers similar functionality, but it is more difficult to use and is less efficacious than Eli Review (or as P5 put it, using Blackboard for organizational labor is “a bloody mess.”). P1’s perception of Eli Review is such that she feels as if she would struggle with her time and labor if she did not have access to the program:

If I were to replicate the things I do on Eli on paper, the workload would be enormous. It would be huge; it would be so huge that I wouldn't do it. Which was probably why...I wasn't doing those things before...Eli just makes some of those good teaching activities just so much easier and faster, and instantaneous...Instead of reading through 30 sheets of paper I can just pull up the screen and I can see things within 30 seconds. Um, so maybe it's made some of the brain work - the brain labor a little bit easier.

P1 suggests Eli Review helps her save time and energy, which makes high-priority teaching tasks and intellectual labor “easier” for her. Further, Eli Review altered P1’s pedagogy; she models her lesson plans and classroom activities on the program; thus, it logically follows that her workload would intensify without the tool. Now that Eli Review has prompted changes in her

pedagogy, she is more tied to the program and reliant on it. Without the program, her labor load would increase, and she might have to sacrifice other high-priority teaching tasks to accommodate her workload.

On a departmental administrative level, the ability to house assignments in a library through Eli Review allows individual instructors to access pedagogy developed by other writing instructors, which functioned as a solution to a professional development problem P9 experienced at his last institution. He was not able to pay for instructor training and did not have access to departmental resources to distribute paper copies of numerous lesson plans. Eli Review offered a simple platform for instructors to share work and assignments crafted in alignment with the departmental curriculum without incurring financial burden.

*Analysis:* These low-order administrative and managerial tasks Turnitin and Eli Review carry out, both on a classroom and departmental level, are appropriate and balanced uses of automation in writing classrooms because they are not conducting assessments of students' grades. Machines, as of now, cannot account for context and cannot adequately assign grades to student writing because they cannot respond to information outside of their algorithmic parameters. Further, language is complicated and fickle; machines cannot capture meaning, tone, or arguments that students are making in their writing; they only work to standardize and reinforce low-order priorities such as grammar and spelling (Vojak et al, 2011). Although Turnitin is not specifically designed for the ways in which teachers are adapting the program, they are modifying the tool's algorithmic purpose to work best for them and their pedagogical goals. Teachers are undermining the program and asserting their roles in the classroom by restructuring the algorithm's function. Eli Review is more intentionally designed to carry out low-level managerial tasks for teachers in their classrooms but has the added benefit of

enhancing professional development on a larger departmental level. Turnitin does help one instructor document “proof” of plagiarism for his institution and it saves him time, but it is also fraught with the power dynamics his administration imposed on him.

*Increased labor*

Of the five instructors who use Turnitin, none indicate that the program increases their teaching labor. Instructors from the human interviews often viewed Turnitin as an ancillary tool rather than one that requires teachers to rethink their pedagogy or classroom strategies. Eli Review increases instructors’ labor as they begin to learn the program because it requires them to reframe their pedagogy, and teachers have to learn how to use the quantitative data the program generates.

Because she was the only person collaborating with Eli Review at her institution, P1 had to learn how to use the program through “trial and error,” but now feels as though she is “dialed in” on the pedagogical changes she made that were inspired by Eli Review’s design. Now, she feels strongly about the pedagogy that is built into Eli Review and claims it has “revolutionized” how she teaches. Such claims are evident in her insistence on continuing to carry out the pedagogical design the program encourages, even if she did not have access to Eli Review. After working with the program for several semesters, she insists that her labor load would increase without the tool because she would want to replicate its functionality manually:

If I didn't have access to Eli, it would obviously change the way that my class was actually executed, so we wouldn't have the tool anymore so I would have to come up with a replacement. But one thing that I said to my colleagues is that you know, I know that Eli is working because I would do the same things even if I didn't have it...If I didn't have the tool, I would be missing [it], but I would be able to replicate a lot of the material in an analog fashion. It just wouldn't be as visible to me as an instructor. I wouldn't be able to as quickly assess student process, and I wouldn't be able to see the things that I can't see when I have all of those peer reviews right in front of me.

Although there was a learning curve when she first adopted the tool, she is now attuned to the pedagogical design of the program and values the quantitative data and insights the tool makes visible to her. It is important to note, too, that P1 reached out to the Eli Review team and worked closely with human support to help her navigate the tool, and they responded by including her in workshops and by personally walking her through ways to interpret informed data. However, it was difficult for her to work in isolation without other instructors nearby to converse and brainstorm with about how to use the program.

Another participant indicates Eli Review was “more labor intensive” for her because she is looking at student writing more frequently since the tool requires her to have students writing constantly and in smaller chunks. Further, she has to manage her labor in reading students’ responses to each other to endorse comments she wants other students to model, which requires more reading than she was typically used to when she taught without the tool (P4). P4’s increased labor is due to the higher volume of human-to-human interaction both she and her students are exposed to in her classrooms when they collaborate with Eli Review.

P4 indicates that she also provides additional comments to students, which must be written outside of the tool due to its design limitations. She believes this is due to her student population, which is largely comprised of international graduate students, who “ten[d] to think that they are weak in their writing skills,” though that is not the case. Much of her labor is geared toward “dispelling” students’ preconceived ideas about their writing; thus, she has to be more hands on with student feedback. In that way, P4 claims that her labor “has doubled” by working with Eli Review, but she is open to additional labor because her students are improving so drastically when they engage with the reviews she assigns through the tool. She describes Eli Review as a means of aiding how she “deliver[s] learning” and indicates that “if...technology

creates a little bit more of a burden of labor, but that the students are producing through process and then also product...and it's enhancing their learning, and that they're becoming stronger writers," she is happy to undertake an increased labor load. P4 also notes that in a tenure track position with a 2/2 teaching load, she is able and willing to absorb additional labor, but that if she were teaching a 4/4, she is not sure if would be able to do so. Human/machine collaboration in this scenario is enabled because of P4's privileged workload. P1, by contrast, teaches a 4/4 load and still works alongside Eli Review, but she also experienced an initial increase in labor when she first learned how to work with the program.

Because P4 has only been working with Eli Review for one semester, she may be experiencing the same learning curve P1 described when she first began collaborating with the tool. However, she is also working with a different student population that requires more attention to reframing how students see themselves as writers. Regardless of increased labor, both teachers were adamant about continuing to use Eli Review because of the benefits and changes they saw in their students' writing. Thus, Eli Review is collaborating with humans to enhance their pedagogy and to "augment" their capabilities (Markoff, 2015).

*Analysis:* Although the program has increased labor for instructors at some point throughout their use, all seasoned Eli instructors agree that the program augments their teaching and enhances their pedagogy, which Markoff suggests is a productive use of human and machine interaction. As discussed at the beginning of the chapter, instead of supplanting the human with a machine, Markoff argues augmentation is crafted by human designers to strengthen human capacity (2015, Kindle Location 277), which informing does in the Eli Review model. Rather than replacing instructors, informing keeps them at the center of their classrooms and relies on their expertise to help students and respond to them flexibility and formatively. Informed data

extends human capacity by offering an insightful quantitative overview of student work and quickly points to areas where they struggle, thus helping a teacher quickly identify pedagogical needs in the classroom. Eli Review augments human labor rather than replacing it because the program requires a teacher's expertise to make sense of the data it produces. Further, it requires an expert teacher to co-plan with the machine and the design of the pedagogy Eli Review insinuates for the course, and it needs a human to input what types of reviews students will do in class.

### *Self-sufficiency*

Teachers are not the only humans whose labor is augmented by Eli Review; students' capacities are also "augmented" in that their collaboration with Eli Review helps them gain confidence as writers and encourages them to be more self-sufficient. The idea of working with technology to help students strengthen their independence echoes throughout the interview data, which is illustrated in several passages below. Instructors' objectives for more "self-sufficiency" among students was twofold: self-sufficiency functions both as a means of reducing teaching labor and as a pedagogical imperative (P1). Overwhelmingly, instructors wanted students to cultivate more confidence in their writing, and they wanted to help students learn from each other to mitigate the labor of low-order teaching tasks (P1, P2, P4, P5, P6).

For instance, P2 asserts that part of his teaching labor as a first-year writing teacher is to "de-freshmanize" students by acting as both instructor and "counselor" to students. He feels that part of his labor is devoted to teaching students how to participate in the university, which constrains the time he devotes to higher order pedagogical aims:

knock[ing] off the naivete and...you know, happy clueless shine and just sort of integrat[ing] them into the university...their biology class isn't going to do that, their history class isn't going to do that... And that's frustrating because... that's never a planned thing...which means eating up class time that I had already



allotted to something else that I really needed to cover, which then puts us behind in the rest of the semester.

If students were more self-sufficient, P2 could spend more time on his lesson plans and in-class content. P2 expresses frustration with the unintended labor he feels responsible for in his classroom. Because nearly all students must meet curricular requirements for first-year writing, writing instructors are typically students' first point of connection with their university, and must also teach students how to navigate transitions from high school to higher education. Such labor detracts from the course content P2 wants to teach and puts his classes behind schedule. For him, Turnitin offers a means of "knocking off the naiveté" first-year students bring to his classroom because it helps them learn how to be responsible for their own academic integrity and frees up some of his time.

Another instructor mentions students' self-sufficiency as it relates to 1) their "independence" as writers and 2) to her own labor of commenting on student work quickly enough for students to revise it while their work is fresh in their minds. P5 sought out Eli Review because she was worried that students were too reliant on her and were dismissive of peer comments. She mentions,

it felt like [students] were disregarding the peer review...they would get the peer review from their classmates [and] not really take it all that seriously...I got the impression they're waiting for the comments from me. For the REAL comments that they would respond to, so there was no movement from their initial drafting... You have one instructor, 22 students in a class; it takes a long time for them to get that feedback and ...they're not responding to that initial timely feedback that we want them getting.

In working with Eli Review as a lever to shift some of the labor of reviewing student work to students, P5 hopes students will become more confident in their writing, both as they learn how to provide strong feedback and as they frequently revise their work. Doing so frees up time for P5 to focus on higher order teaching tasks by eliminating the repetitiveness she writes in her

feedback to students. For instance, rather than repeating how to address a common mistake or problem many students have in their writing (P5 uses the example of student issues with MLA formatting), P5 wants students to “self-evaluate” and use Eli Review to create accountability among peers. She notes that, “the structure of the peer review and the revision plan puts that burden on the students” because students have access to seeing each other’s comments and the instructor’s endorsements, which helps them model strong peer review and keeps P5 from having to repeat her comments frequently. The paradox Markoff refers to regarding machines replacing humans or augmenting them could be applied to Eli Review in this capacity (2015, Kindle Location 232). Does augmenting students’ capacity for self-sufficiency replace the work teachers do in writing classrooms? I would argue no; students still need instructors’ input in Eli Review to model the kind of peer-reviewing they should strive to achieve. Eli Review enhances their ability to become self-sufficient because a teacher’s formative feedback for one student can be seen by all students, thus strengthening their ability to determine strong practices for revision. Doing so frees up instructors’ time on commenting on students’ peer revisions so they can work on other teaching priorities. The implications of this elective hybridity result in students’ bolstered sense of confidence and collaborative abilities, which positions the teacher as a coach or guide rather than an authority figure in the classroom.

P6 offers an interesting perspective on both pedagogy and teaching labor when considering why she wants students to be self-sufficient. Because she and her research team are focused on working with Eli Review to help students comprehend course content in science classes with hundreds of students, Eli Review is a conduit for helping students learn “sticky concepts,” and it also shifts the labor of reviewing student writing from instructor to peers. As P6 notes, “the barrier for doing writing in these large [science] classes is well, who’s gonna read all

that?” to which she answers, students will. P6 and her research team do not want to teach students how to write; they are piloting Eli Review because they know writing is a “high impact practice” that helps students learn course content. In her own classroom, she suggests Eli Review helps her identify students who are struggling to understand course concepts because “if you're not a good peer reviewer, it's often because you don't know what to say,” which signals where students need more help in class. Similar to P1, P2, and P5, P6 suggests Eli Review makes students' work visible to classmates; strong student reviews can thus be modeled to help students become more independent:

maybe seeing models of peer review of ‘here's the kinds of things you look for,’ [students] develop that sense of self-efficacy where they can ask- they can ask those questions without feeling like they have to be expert...it certainly has helped me target them more efficiently.

*Analysis:* As the instructors from this study indicate, students' self-sufficiency is highly tied to how Eli Review and Turnitin make information about student writing accessible and visible to students and teachers. Transparency is an important factor in encouraging students to have beneficial partnerships with machines. Modeling student work and having such unprecedented insight into each component of their writing process gives teachers the opportunity to formulate responses to student work, but it can also mean teachers have access to every facet of student writing. In the wrong hands, this could mean a teacher could monitor students work. However, when worked with appropriately, students develop stronger senses of confidence and independence when the machines show them where they need help, which targets and focuses students' attempts at modeling successful reviews. This visibility helps sharpen teachers' pedagogy because it makes students' struggles more prominent and obvious. Thus, technology augments both teachers and students' in helping students become more self-reliant

because students gain confidence in their writing and teachers are able to target the kind of feedback they need.

### **Implications**

Collaborations with Eli Review and Turnitin have several labor and pedagogical implications for teachers. In regard to pedagogy, when instructors work closely with these technologies, they appear to act as buffers between student and machine, reworking, undermining, or collaborating with algorithms to ensure students are benefitting from working with the programs. Although teachers have various levels of control over the types of technologies that enter their classrooms, whether programs are mandatory or voluntary, teachers choose the components of the technology their students work with. Turnitin is not designed to informate data about student work; however, some teachers allow students to submit multiple drafts of their work to learn from text-matching algorithms to revise the data they produce about student work. For Eli Review, teachers choose the components of the program they want students to engage with by determining how to scaffold peer reviews and what features to add to each writing assignment (Likert scales, ratings, etc). Even though there are design constraints for both programs, teachers manipulate the algorithmic functions to best suit their students' needs or their own classroom objectives.

For many instructors, these programs offer a viable means of promoting self-sufficiency among their students. Eli Review encourages students to collaborate with their peers, and the program's endorsements and modeling functions make visible strong instances of writing, which encourages students to follow each other's examples rather than following a machine's example. Turnitin also makes students' citation needs more visible because the program signals where

students may be struggling. There are, of course, implications to having such intimate access to students' work. Collaborating with machines to gather insights into students' writing processes also means the designers of the programs have access to the same data. While Eli Review requires IRB approval for the studies they conduct based on student work, Turnitin is not beholden to the same standards because it does not have ties to a particular educational institution. Thus, there are no ethical checks or balances for the work Turnitin generates about student users, which is all the more complicated by their intellectual property practices. On a smaller level, surveillance of student work can also encourage teachers to micro-manage their work and get too bogged down in the quantitative data about their writing processes, which could lead them to spend more time "in the weeds" of student writing rather than focusing on high-order teaching concerns related to content. Based on the data from this dissertation project, teachers do not appear to get distracted by this information and they tend to use the programs in social ways that include students in interpreting extensive data about their work. However, to find out if this occurs in practice, user-tests that monitor instructors' going through the process of collaborating with the machines could provide further clarity about this theoretical concern.

On a more positive note, though, both Eli Review and Turnitin seem to help teachers focus and prioritize specific aspects of their pedagogy that are tied to the machines' design. As discussed earlier, Turnitin and Eli Review's algorithms are rhetorical because of the boundaries they set around producing data about student writing. What is most significant about Eli Review is how overtly it changes teachers' pedagogy; teachers consider the program when they begin their course prep and have redesigned their pedagogy based on the tool's design constraints, which emphasizes small and deep engagement in frequent writing tasks. One instructor goes as far to say she would "throw a fit" if she were unable to access the program because it makes her

a better teacher and encourages significant growth in her student writers (P4). Turnitin's role in the classroom and instructors' reliance on the program is more implicit, but the program is such a pervasive educational technology that instructors may not realize their longtime collaboration with the program has made them dependent on it, or that it has shaped their pedagogy. This suggests power dynamics between instructors and machine may not be at the forefront of teachers' concerns in the writing classroom, though they are implicitly changing and altering how they work with the program.

Labor and pedagogy are often tied to each other in this analysis; however, there were a few distinctions between the two categories that emerged in the analysis. Labor and machines were often discussed in terms of convenience and managerial labor associated with running a writing classroom. Instructors collaborated with Turnitin and Eli Review not to assess student work, but to use information as a means of signaling where students struggled, which saved them time<sup>12</sup>. Instead of trying to discover where students needed help by sorting through papers and collating themes or categories that emerged, the informed data eliminated an extra step for instructors and conducted the labor of locating information. Working closely with machines in this context helps instructors because it allows them more time to tailor specific lesson plans that address the issues students are having difficulty understanding.

Eli Review requires instructors to frontload their labor at the beginning of their courses and as they are experiencing the learning curve for working with the program. Regardless of their teaching loads, instructors accept the additional labor that sometimes accompanies working with Eli Review because they see such a significant pay off for their students. Eli Review augments student writers and teachers' instruction by extending human capacity rather than

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<sup>12</sup> Current models of machine assessment of student writing are not useful or beneficial for students, but that does mean they cannot be in the future.

automating teaching labor to expedite the writing process. Turnitin is described as a moderate convenience for teachers who engage with the program, but there are tradeoffs for some teachers, who worry about how other instructors may collaborate with Turnitin to punish students.

The implications described here raise questions about what it means for teachers to mediate interactions between students and the machines they adopt in their classrooms. The action of mediating between the two agents has a ripple effect on teachers' pedagogy because it alters their teacher practices both consciously and implicitly when they plan their courses or adjust to the machine's output as class progresses. These adjustments typically include learning how to identify signals where students need help by finding ways to interpret the informed data. Doing so determines the ways in which students can engage with it to become more self-sufficient in class. In Turnitin, this is enacted when teachers allow their students to see their originality reports; if students' matching-text percentages do not align with what they expected to see in terms of their originality, they know they need to revise their work and paraphrase more or check their citations. In Eli Review, students are able to see how their peers have rated their reviews and how their instructors have endorsed them. This visibility that informs data allows students to model their responses to peers on the strongest reviews in class. Visibility, however, is a double-edged sword because while it extends students' abilities to gain confidence in their writing and it helps focus teachers on their top priorities in class, it becomes easier to surveil students and micro-manage their writing processes, which can also impact design decisions in future iterations of the programs. Visibility also lends itself to two distinctive conceptualizations of human/machine collaboration: efficiency and augmentation. While these two ideas are not necessarily mutually exclusive, efficiency does lend itself to standardization and by extension, replacement.

## Chapter Five: Conclusion

*“Indeed, attempting to reduce human behavior, performance, and potential to algorithms is no easy job.”*  
– Cathy O’Neil, *Weapons of Math Destruction*

### Argument

Since I began writing my dissertation, broad topics about automation, human labor, and algorithms have continued to circulate in popular media; this topic only grows in importance as artificial intelligence infiltrates higher education. I started this project from the premise that there were productive and useful collaborations humans and machines could engage in in the writing classroom. The evidence from my data supports this notion but also complicates it. The constraints and affordances that design limitations impose on human/machine collaboration are intertwined and enmeshed in the ecological contexts from which they emerge (Rickert, 2013). The entanglements humans engage in with Turnitin and Eli Review often do not fit into the binary categorizations of affordance versus constraint. In fact, design constraints can encourage productive teaching practices when teachers form elective hybrids with machines of their choosing. Tensions between human and machine are fraught, however, when instructors are forced to work with programs, which can complicate the ways in which they can productively collaborate. The complexity and messiness of human and machine collaboration is tied to institutional constraints imposed on teachers by their administrators or by their learning management systems. How humans and machines collaborate on educational or learning technologies is linked to instructors’ labor loads and whether they are forced (or elect) to work with certain programs.

Regardless of how Turnitin or Eli Review came into instructors’ professional lives, teachers negotiate agency with each program by aligning the software with their pedagogical goals for students, by undermining or embracing the programs’ algorithmic functions, or by



repurposing different features available within the interfaces. Teachers' current practices can inform guidelines for appropriate divisions of labor between human and machine because instructors have shared experiences that highlight productive and useful methods for restructuring the roles they are meant to inhabit when they collaborate with Eli Review and Turnitin. Instructors challenge and embrace the "scripts" they are to play out in their collaboration with both programs (Latour, 1999), but they tailor them to present an ethos to their students that is based on the decisions and choices they make within the constraints of each program.

Based on the data from this dissertation project, I also argue machines and humans can work in productive, ethical ways with humans to inform data about student work, but I will amend my original argument to add that in some cases, ethical relationships are not possible because of the intellectual property and surveillance components that are fundamental to Turnitin's functionality. Because Eli Review is accountable to IRB for the studies its researchers conduct based on data from student work, teachers can ethically work with the program, but they must be careful and diligent about the unprecedented level of access they have to students' writing processes. In addition to my first amendment, I also now exclude the word "automate" from the language I crafted in my third research question, which initially asked how automation could work ethically in the writing classroom. The data and theoretical frameworks invoked in this dissertation project suggest automation standardizes teaching practices and assessment of student work in ways that can deskill teachers and disenfranchise students.

Although informing is essentially automation, informing requires a fundamental shift in how automated data is interpreted and it acknowledges the limitations of data collection mechanisms. For instance, if a teacher does not understand how to interpret a Turnitin originality

report, she can incorrectly assess alleged instances of plagiarism; in this model, data about student work is automated. However, if applying the data the Turnitin algorithms generate as information that “improves” teaching and allows for “innovation,” this conceptual reframing engages data not as a static outcome of algorithms, but as an interactive method for adapting and bettering pedagogy (Zuboff, 1985).

Data interpretation is one way in which we can level the power dynamics between humans and machines; rather than using automated data to provide assessments about student work, we can make data work for us and for students. We can also make power dynamics and relationships between human and machine more visible by encouraging instructors to critically engage with the technologies they work with in their classrooms. Doing so requires instructors to consider how they form hybrids with programs such as Eli Review and Turnitin. Instructors from the human interviews who work with Eli Review were overtly aware of how they altered their pedagogy to accommodate and collaborate with the design of the program. For the one instructor who heavily relied on Turnitin, he did not realize how much the program had become a central part of his pedagogy. Calling attention to how these types of programs change teaching practices is a step toward understanding the coercive and dynamic interplay teachers engage in with educational and learning technologies.

## **Major Findings**

### *Hybrids: Elective and Forced*

While there are productive collaborations between humans and machines in the writing classroom, several ecological factors can impact power dynamics and hybridity. For instance, findings from human interviews indicated some instructors were required by their institutions to

use Turnitin. Such constraints undermine teachers' authority in their classrooms and shift their dynamics with students. Turnitin can impact teachers' ethos to students, and it can prompt instructors to form hybrids by deploying workarounds that undermine Turnitin's algorithmic purposes, which assumes a human instructor who is familiar with writing pedagogy. Instructors who were required to work with the program found ways to transform or shift its main purpose and tailored it to their own goals in the classroom, which centered around teaching students how to properly cite and attribute sources in their own writing. Although writing teachers are finding ways to maintain productive collaboration with machines in their classrooms, the material constraints and administrative mandates they are sometimes working under are not ideal conditions to foster strong partnerships between humans and machines.

Additionally, when teachers do not volunteer to use a program like Turnitin, writing instructors tended to use the technology in ways that only mildly impacted their pedagogy. Perhaps this is due to the teachers' ambivalence toward a program they are required to use, but these instructors either saw Turnitin as a secondary tool to check for overt cases of plagiarism and rarely looked at reports, to bolster their ethos, or to create dialog with students about citation practices (which were not pedagogical priorities for these teachers based on survey data). The two instructors who use the program voluntarily have clear-cut pedagogical aims for the program, and one instructor describes teaching citation practices and plagiarism as one of his high-order priorities in his classrooms.

This is in stark contrast with Eli Review; all teachers from the interviews were engaged with the program because they wanted to work with the program. They had enrolled in workshops, trials, or had heard presentations about the program. They had a point of human contact before adopting the program or had the option to speak to a human representative before

doing so. Of the five instructors who implemented Eli Review in their classrooms, four of them describe the program as having an important role in their classrooms in terms of designing their pedagogy, improving it, and they worked with the tool on a weekly basis. One instructor who did not fall into this category had just started working with the program, but she was hoping it would become a more central part of her instruction as she learned how to understand it. While some of the disconnect from Turnitin could be a result of critiques about the program, or because the program has so many features it is difficult to determine which ones best suit an instructors' needs, it is important to consider why so many instructors collaborate with the tool if they are not invested in it.

#### *Restructuring Roles and Reconfiguring Ethos*

Another major finding is related to how instructors shift their dynamics and reconfigure their roles with Turnitin and Eli Review. The design of Turnitin, regardless of what the marketing team claims, is and always has been about catching plagiarists (refer back to Chapter One for further details). Teachers who understand writing pedagogy, however, know that plagiarism is an intricate and layered topic that students struggle to understand (DeVoss & Rosati, 2002; Howard, 1999). Definitions of plagiarism vary across disciplines, as do acceptable citation and attribution practices. Some instructors from this study work with Turnitin to determine “knuckle-headed” instances of plagiarism that include students sharing papers with each other, copying and pasting them from the internet, or purchasing them from papermill companies. Predominately, though, instructors collaborate with Turnitin to develop opportunities for students to learn more about plagiarism and citation. Instead of embracing the script they are meant to play out as punisher and enforcer, all of the instructors from the human interviews reconfigured the program's algorithmic purpose and instead worked with data to informate their

teaching practices. If students were plagiarizing unintentionally or if they were struggling to learn how to paraphrase or properly attribute research, teachers pointed to the data from the originality reports to show students grounded examples of how their own writing could be revised. Instructors negotiating and reconfiguring their roles are not without complication, however. Regardless of how instructors restructure their positions within this context, Turnitin's features can still reinforce teachers' ethos as the enforcer who polices students, despite assurances from P2 and P7 that students can trust them.

Eli Review's collaboration with teachers results in a different restructuring in the writing classroom, one that instructors tended to embrace without undermining the program's design. Eli Review collaborates with teachers to decenter their classroom status as the enforcer or authoritarian of the classroom. The teacher who works with Eli Review in her classroom emerges as an instructor who decenters her authority and positions herself as a guide or coach of writing (or in some cases, she can appear disinterested in students' work). Of course, this is also complicated because teachers ultimately assign course grades to students. However, the design of the platform encourages students to look to each other for modeling strong writing practices as the teacher signals what strong revision looks like by endorsing student work. Teachers roles and ethos are reconfigured because the program signals to students that their writing is important as is their peer's feedback on their revision processes. Doing so decenters the instructor's authority and encourages students to rely on each other as they revise their work.

#### *Co-constructing Pedagogical Design, Focus, & Hybridity*

Such shifts in instructor ethos also relate to how Turnitin and Eli Review co-construct the pedagogical design of a writing course. Eli Review requires teachers to reorient how they conduct peer reviews in their classes. Typically, peer reviews happen about 3-4 for times per

semester right before a major assignment is due; students read each other's full drafts in class and give generic comments about their peers' work. In a classroom that collaborates with Eli Review students are carrying out peer reviews at least twice a week, but rather than reading entire drafts of each other's compositions, they read small bits of writing that build up and scaffold into larger assignments over the course of several weeks. Doing so focuses teachers on their priorities and helps them engage students in "depth over breadth" in regard to how deeply they engage in peer review (P9). That is, instead of trying to review an entire research paper in one 50-minute period of class time, reviewing more purposeful and scaffolded peer reviews in frequent and smaller doses allows students to produce more meaningful feedback to peers. Clearly, this is a considerable shift students make in their writing processes, which one participant describes as a move away from standard practices that entail "binge" writing the night before an assignment is due. It logically follows, then, that teachers must also reconfigure their pedagogical approaches to develop smaller and more frequent writing prompts for students, which Eli Review helps facilitate. Further still, this reorientation also requires instructors to consider how they will work with Eli Review just as much as they consider what content they will craft for their courses. Eli Review, thus, co-constructs and helps teachers plan their classroom pedagogy at the onset of class and frontloads a great deal of a teacher's intellectual labor in the course planning stages.

Although Turnitin is often described as a secondary or ancillary tool in the writing classroom, instructors are still modifying their pedagogy around citation practices to align with the data the text-matching software yields for their students. While the pedagogical changes Eli Review inspires from instructors is more explicit because it demands such substantial pedagogical rethinking, Turnitin also impacts and alters how teachers engage with teaching

students how to cite (whether they realize it or not). None of the instructors from the human interviews viewed Turnitin as a central part of their pedagogy. It is perhaps for this reason that they do not give full consideration to how the program compels them to change or transform certain aspects of their pedagogy, no matter how big or small. When teachers make small adjustments in their pedagogical practices, they are less noticeable, though just as important, as the shifts teachers make to work with programs such as Eli Review.

### *Self-sufficiency*

One common thread between the pedagogical shifts teachers made in adjusting to working with both Eli Review and Turnitin is that they wanted to collaborate with the programs to help students become more self-sufficient in their classes. If students are more self-motivated and confident about different aspects of their writing, it shifts some of the labor of responding to student work to actual students, which frees up teachers' time to focus on high-order concerns in their classrooms. For Eli Review, instructors wanted students to rely on peers to understand how to engage in the revision process. Peer review is a genre itself, and one that instructors suggested is prominent in students' academic careers and professional trajectories (P5). Students will have to respond to their peers in courses outside of their writing classrooms, and they will also have to give colleagues written feedback in many of their workplaces. Shifting the labor of peer review to students is not just about freeing up teachers' time for other tasks; it is also meant to prepare them for writing when they do not have a teacher to guide them through the process.

Instructors who worked with Turnitin expressed similar ideas about teaching students how to work with the text-matching software so they would understand how it functions if other teachers require students to collaborate with the program. Turnitin helps teachers and students focus on plagiarism instruction and signals to students where they are struggling with citation.

When instructors allow students to see their originality reports before they submit final assignments, students are able to interpret the informed data the machine produces to learn where they may need to cite more often or paraphrase rather than quoting information.

*Informating, Visibility & Focus*

Informating is a productive and ethical byproduct of human collaboration with machines. In the context of writing classes in higher education, informed data (as opposed to automated data that makes assessments about student writing) protects teachers' expertise in and makes their work less susceptible to machine replacement. Informed data requires a human to tap into her expertise to interpret meaning in particular contexts, and it signals to teachers where students may need additional help in class. Informating improves writing pedagogy because it makes visible students' struggles, and encourages teachers to improve their instruction in targeted, focused ways that are based on students' actual writing. Eli Review was designed to informate data about student writing; it offers analytics that show how engaged students are with their writing prompts, how they were rated, etc. Students peer reviews are also placed side-by-side in the Eli Review interface, which allows instructors to quickly overview students comments to understand how the class engaged with a particular writing prompt. This kind of visibility helps teachers quickly identify problems in class, which frees up their time to craft lessons that benefit students. Turnitin was not designed to informate data about student work, but teachers engage the originality reports as an opportunity to do so. Text-matching software produces a number of original text in a students' writing, which teachers can view and determine whether students need to paraphrase more often or learn how to correctly cite information.



## Implications

Such visibility and insight into the student writing process can also have negative implications for students if teachers use information about their work in harmful ways. On a classroom level, teachers may be tempted to micro-manage students when they have such unprecedented access to their writing processes. This can have implications for students as they write and try to take risks if they feel monitored by their instructors, and it can also increase teachers' labor by encouraging them to get caught up in the low-order minutia of student writing. On a larger scale, both Eli Review and Turnitin are collecting data (and in Turnitin's case, Big Data) about student writing. The designers and administrators of both programs have access to this information and can frame assessments of student work on large scales. Eli Review is accountable to an institutional review board when they conduct research about student work; however, Turnitin is not and they have access to over 929 million student papers.

While students are encouraged to engage with the data about their work to become more independent in their writing processes, the trade-off is the potential for surveillance of their work. Signals and markers of areas where students are struggling are helpful for teachers as they try to quickly understand where students need guidance. Teachers must decide how to interpret the information the programs provide and develop guidelines for protecting students' intellectual property rights within their own classrooms. Teachers' responses to students and their engagement with both programs may also be surveilled; thus they must consider what they are giving up to access these technologies and if Eli Review and Turnitin are ethically and responsibly engaging with the data they collect from human and machine engagements.

Beyond surveillance of student work, there are also interesting implications when teachers co-construct pedagogical design and form hybrids with Turnitin and Eli Review. What

is most striking from the findings of this dissertation project relates to how unaware teachers may be about the engagements and negotiations they participate in when they work with Turnitin. Eli Review constantly requires teachers to think about their intellectual labor, their pedagogy, and how they want to negotiate their engagement with the program. Teachers are explicitly aware of how the program persuades them to reconfigure their teaching practices. While teachers may not think of these exchanges in terms of agency, they are at least able to acknowledge that the program is inspiring changes in their standard teaching practices. Moreover, teachers are also aware of the implications their collaboration with Eli Review has on their ethos; they understand and embrace the ethos the program projects to students—one of partnership and coaching, or in some cases, a lazy and uninvolved teacher. When instructors work with Turnitin, they are able to clearly articulate the way in which they undermine or repurpose the algorithmic function of the tool, but they appear to be less cognizant of the changes they are making to accommodate the features of the program. Without acknowledging the full impact of how Turnitin changes ethos and pedagogy in their courses, teachers may be subjecting students to unintended pedagogical consequences. Thus, it is important to urge teachers to think about how the technologies they work with in their classrooms are coercing them to act in particular ways.

Finally, I will once more reiterate the importance of the differences between elective and coerced hybrids that form when looking at teachers who use programs because they want to and those who use it because they are forced to. Three teachers who have no control over working with Turnitin view it as an ancillary tool, often do not pay attention to it, and have to learn on their own how to modify the program for use in their writing classrooms. The two teachers who elect to use the program have a strong sense of how they want it to work for the pedagogical

aims and know the program's limitations. P2 uses Turnitin to show students where they struggle with citation practices and teaches them how to engage with the tool to address these issues in their writing; Turnitin serves an important pedagogical function in his classrooms. P7, the only tenure-track professor who uses the tool, predominately deploys the program in his classrooms because of one feature the interface offers for distributing audio feedback to students, which is his primary method of responding to student writing.

In comparison to Eli Review, all instructors who use this program do so because they choose to, and they actively seek out Eli Review to target a specific issue in their classrooms: peer review. Teachers tend to use this technology in their classrooms to help students become strong reviewers—a difficult concept in many writing classrooms because students crave instructors' feedback, struggle to see themselves as legitimate writers and reviewers, and have trouble decentering their reliance on instructors. The key differences between Turnitin and Eli Review here are twofold: 1) Turnitin is prepopulated or available within an instructor's LMS easily, and instructors can use it without fully understanding it and have little to no training for adopting the program 2) Eli Review is actually deployed for its designed purpose, while Turnitin is worked with in ways its origin design<sup>13</sup> did not account for (especially when teachers who use it have knowledge of writing pedagogy).

### **Recommendations and Takeaways from Teachers**

Instructors need to be a part of technological design conversations when it comes to the software and programs they use in their classrooms (Carter, 2016). Technology for technology's sake, to quote an interviewee, serves no pedagogical imperative. Having expert content

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<sup>13</sup> I reject Turnitin's claims about not being about plagiarism because the rhetoric on their website is counter to this.

specialists in on the ground floor of design can help safeguard teachers' labor, students' intellectual property, and their learning experiences. I am not suggesting all scholars or instructors in rhetoric and composition should begin to design software, but it is important for all teachers to understand the implications of the technology they use in their classrooms. Rather than having teachers designing software, researchers who are interested in collaborating with developers can study user trends, needs, and conduct user-tests with instructors who teach writing courses. Making early interventions throughout iterative design stages will help keep instructors' voices present and help keep their expertise an integral part of the classroom. And who better to ask than teachers who are in the trenches with students in writing classrooms? Interviewing teachers, surveying them, and asking them to be user-testers throughout all stages of the design process would be a start for developing useful technology that serves real pedagogical purposes in writing classrooms.

In my own work on this project, teachers' insights about technology were pivotal in unveiling the affordances and constraints of the technological designs of Eli Review and Turnitin. When asked about whether educational technology should help teachers manage their labor, teachers who were interviewed for this project responded with nuanced and thoughtful suggestions. First, P1 argued that technology should help teachers manage their labor, but that students needed to benefit from human and machine collaborations, too. She indicated,

you shouldn't use technology just for technology's sake...I want to say yes that they should use it to reduce labor, but I think that optimally it should have some kind of other objective too that's tied to pedagogy. Like, ideally, I wouldn't want it to just reduce my labor... otherwise it seems like it's not necessarily in the interest of students, it's only in the interest of me.

For technology to truly be useful for teachers, it has to also be useful for students. For this instructor, who works on a non-tenure track basis with a 4/4 workload, reciprocity is key to good

uses of automation and she believes Eli Review mutually benefits her and her students.

However, for P4, who works on a tenure-track basis with a 2/2 teaching load, reciprocity is not as important because she is willing to absorb additional labor that good technology creates in her classrooms. P4 uses Eli Review and because she can see “dramatically different” improvements in her students’ ability to peer-review in classes that are working with Eli Reviewed compared to those that are not. To her, technology in writing classrooms should be “about student’s growth and it’s about the skills that they’re going to pick up as a result of what they have used in the course. So, technology there is to facilitate how I deliver learning,” regardless of the added labor she conducts to engage with students’ writing.

Other instructors indicated that managing labor was an important consideration for the technologies they deployed in their classrooms. For P3 she impresses how critical it is for adjuncts or graduate students to find support wherever they can, especially through summer when they are not on contract. She noted,

I know for adjuncts or for graduate students, I think it's important to use technology or to use things that help us manage time... We might be teaching...picking up a class when we can in addition to our own work. You know, during the summer teaching a lot just to try and make money to save up for the next year. So, I don't think there's anything wrong with that. I think that at the end of the day, we have to **protect our sanity**. (emphasis added)

Much like when P2 indicated that he needed to use Turnitin to give him more time with his family and more time on self-care, P3 also used language that related to mental health to describe the need for automated technologies in writing classrooms. Graduate student instructors and contingent laborers teach over 90% of first-year composition (Scott, n.d.). Many will seek to teach extra classes to supplement low base incomes, which results in instructors teaching too many students while taking several graduate level courses, or non-tenure track faculty teaching multiple classes across several institutions (Fulwiler & Marlow, 2014). Thus, the educational

technologies they adopt in their classrooms cannot add additional labor to their workloads; they must in some way help ease low-order priority teaching tasks for instructors.

P7, the WPA I interviewed, echoed this sentiment and highlighted the physical constraints contingent laborers cope with. He writes, “if you write all your [student] response out, carpal tunnel syndrome it’s not a myth, it’s a real-life thing and, you know, we have technology that can ease our physical labor, not to mention our intellectual labor.” P7 is a strong supporter of audio-response; as a WPA, he wanted to encourage other faculty members in his department to try verbal response to student work to save teachers time and because adjuncts in his department do not have offices. Audio-response, he implies, is a way to mitigate the lack of physical space part-time instructors have to give students personalized, one-on-one attention that feels like a conference.

Working with technology to manage teaching labor (not to simply reduce it) was a commonly agreed upon among participants. This is especially true of P6, who is working with Eli Review to see if the program would work well on a larger classroom scale of up to 400 students. P6 notes that,

If you're going to scale [writing] up to these large classes, it would be absolutely impossible just from a workload perspective for faculty to do that work and so...so yes absolutely [technology] should help with that. It’s not replacing what the teachers do...If we implement it and faculty are completely hands off, [and] if they don't invest in it, they don't care about it... I don't think it'll be as successful.

Without teacher investment in Eli Review, P6 believes the program will fail to support the comprehension work she and her team are hoping the program can co-facilitate with instructors. However, teachers will not feasibly be able to support writing work in classes with hundreds of students without some sort of technological support.

## Future Work

Much of the critique about educational writing technologies in the field of rhetoric and composition argues that students write to assessment algorithms rather than machine audiences (NCTE 2013a & 2013b). However, students are increasingly writing to and with machines in their daily lives and in their professional careers after they graduate; this warrants a reorientation to how we view what educational writing technologies should do for students and teachers in writing classrooms. What we must also account for is the ways in which educational technologies may persuade teachers to evaluate and teach writing in ways that can contribute to standardized assessment. Further standardizing pedagogy and assessment practices makes teachers more vulnerable to deskilling: the less complex skilled labor is, the more susceptible it is to machine replacement.

Educators have to think about the costs of efficiency in these contexts. What is lost to efficiency with our teaching labor? What are the ethical and material implications of our collaboration with machines in the writing classroom and in higher education? How can we safeguard years and years of training and expertise when, as Jeff Grabill noted in his 2016 keynote speech at Computers & Writing, educational technology companies are out to replace teachers? When we access technology, we are often asked to give up our intellectual property rights (Reyman, 2013) and personal privacy to do so (Beck, 2018). How might we use automation ethically and productively given the ubiquity of these violations? One design feature to demand from the technology in our classrooms is informing rather than automating data about student work. Informing places high value on teacher expertise as a data interpreter. It informs pedagogy to show teachers where students struggle and what they need help with.

Teachers have the flexibility and ingenuity to respond to all different kinds of student needs in ways that machines cannot yet do.

As I move into my professional career, I want to look at how human and machine interaction creates hybrid actors when the teachers who work with writing programs have little to no training in writing pedagogy. Will they deploy the same workarounds as teachers from this study? Will the transformations be the same? How will agency and ethos transform in comparison to the instructors from this study? I'm interested in this idea because of two things I learned from my participants. First, the former WPA was working from the assumption that everyone in his department had familiarity with writing pedagogy, and that without explicit training, they would know how to adapt Turnitin to make it a pedagogical tool. Do folks outside of writing studies or English departments know how to do the same? He does not believe so: "In writing across the curriculum contexts, I think there does need to be some institutional training before you use Turnitin because people see it as like plagiarism checker first." Often, P7 talked about how instructors would ask him for a hard and true percentage number from Turnitin that would infallibly indicate a student had plagiarized. Other teachers also indicated they were fearful of others working with the program in harmful ways; I am interested in finding out where these fears stem from and if the answer lies in writing across the curriculum contexts.

My interest in replicating this study with instructors who have little to no training in writing pedagogy also comes from P6's research interest in "scaling up" how many students Eli Review can operate with. As the labor crisis in higher education worsens, I want to consider how scale might impact these human and nonhuman transformations as course caps increase across disciplines. In my future research, I'm hoping to replicate my current study with a new and



interdisciplinary audience to see how differently transformations form and what the differences (if there are any) will mean for teaching labor, ethos, and for student writers.

I end now, with Latour, who reminds us that “each artifact has its script, its potential to take hold of passersby and force them to play roles in its story” (177). As artificial intelligence changes the landscape of labor in the 21<sup>st</sup> century, how will we participate in our roles with nonhumans in our writing classrooms? Human and artifacts are not in power over each other, rather they collaborate and mutually shape each other. Simply put, artifacts compel us to act in certain ways, and I hope to contribute to scholarship that can inform the shape these collaborations take in the future.

## Appendix A: Exempt Authorization 18-051

SYRACUSE UNIVERSITY



INSTITUTIONAL REVIEW BOARD  
MEMORANDUM

**TO:** Krista Kennedy  
**DATE:** March 1, 2018  
**SUBJECT:** Determination of Exemption from Regulations  
**IRB #:** 18-051  
**TITLE:** *Unearthing Entanglements: A Posthuman Analysis of WriteLab and Eli Review*

The above referenced application, submitted for consideration as exempt from federal regulations as defined in 45 C.F.R. 46, has been evaluated by the Institutional Review Board (IRB) for the following:

1. determination that it falls within the one or more of the five exempt categories allowed by the organization;
2. determination that the research meets the organization's ethical standards.

It has been determined by the IRB this protocol qualifies for exemption and has been assigned to category 2. This authorization will remain active for a period of five years from **March 1, 2018** until **February 28, 2023**.

**CHANGES TO PROTOCOL:** Proposed changes to this protocol during the period for which IRB authorization has already been given, cannot be initiated without additional IRB review. If there is a change in your research, you should notify the IRB immediately to determine whether your research protocol continues to qualify for exemption or if submission of an expedited or full board IRB protocol is required. Information about the University's human participants protection program can be found at: <http://orip.syr.edu/human-research/human-research-irb.html> Protocol changes are requested on an amendment application available on the IRB web site; please reference your IRB number and attach any documents that are being amended.

**STUDY COMPLETION:** Study completion is when all research activities are complete or when a study is closed to enrollment and only data analysis remains on data that have been de-identified. A Study Closure Form should be completed and submitted to the IRB for review ([Study Closure Form](#)).

Thank you for your cooperation in our shared efforts to assure that the rights and welfare of people participating in research are protected.

Tracy Cromp, M.S.W.  
Director

**DEPT:** Writing Studies, Rhetoric & Composition, 239 HB Crouse Hall

**STUDENT:** Jordan Canzonetta

## Appendix B: Informed Consent for Interviews

Hello—thank you for your participation in this study! I am eager to hear about your experiences with Eli Review and/or WriteLab. I will be recording our audio data with Evernote as I begin to ask you questions about your teaching labor and deployment of (Eli or WriteLab). Please note that you may withdraw from this study at any point if you wish to do so; we may proceed if you are over 18 years old. If at any point you would like to contact me about this study, my email is [jncanzon@syr.edu](mailto:jncanzon@syr.edu).

## Appendix C

## Interview Questions for Teachers

1. What is your teaching workload and faculty status? And at what time of institution do you work?
2. How/why did this technology come into your classroom? How long have you used it?
3. How does this technology affect your teaching labor? Does it help or constrain you in any ways?
4. How does it affect your workload? Does it help or constrain you in any ways?
5. How much say do you have in how the technology is deployed in your classroom?
6. Is it integrated into classroom or into your pedagogy?
7. What happens to your teaching labor when the tool breaks down or stops working?
8. How would you feel if your institution no longer subscribed to this technology?
9. Has the technology replaced, enhanced or reconfigured your teaching labor in terms of revision, feedback, or grading?
10. Would this technology work without a teacher or does it require your skillset/input to operate?
11. Does this technology change how you or your students view your expertise?
12. Did anything surprise you about using this technology? Were there any unexpected benefits or consequences of using it in your classroom?
13. Do you feel that this technology is an effective means of reducing or managing your teaching labor?
14. Does using this technology facilitate any changes in your approach to teaching?
15. Would you make any changes to the technology in terms of how it could help manage your labor?

## Appendix D: Survey Questions

1. How long have you been teaching college writing and rhetoric courses?  
1-3 years; 4-6 years; 6 + years
2. How do you identify?  
Male; Female; Non-binary/third gender; prefer to self-identify\_\_\_; prefer not to say
3. What is your age range?  
22-32; 33-44; 45-55; 56-66; 67-77; 78-88; 89+
4. What is your ethnicity:  
  
Non-Hispanic White or Euro-American  
Black, Afro-Caribbean, or African American  
Latino/a/x or Hispanic American  
East Asian or Asian American  
South Asian or Indian American  
Middle Eastern or Arab American  
Native American or Alaskan Native  
Other  
Prefer not to answer
5. What is your typical teaching workload each semester?  
1 course; 2 courses; 3 courses; 4 courses; 5+ courses
6. Are you hired on a part-time non-tenure, full-time non-tenure, or full-time tenure basis?  
part-time non-tenure; full-time non-tenure; full-time tenure
7. How long is your teaching contract?  
1 semester; 1 year; 2 years; 3 years; 5 years; tenure-track
8. What writing classes do you typically teach (check all that apply)?

Composition I ; Composition II; Professional Writing; Digital Writing; Other

9. What is the most labor-intensive component of your teaching?

Grading; providing feedback on drafts; lesson planning; pre-semester course prep; conferencing; other \_\_\_\_\_

10. Which of the following have you used in your classrooms before?

WriteLab; Turnitin; Eli Review

11. How long have you been using these technologies?

1 year; 2 years; 3 years; 4 years; 5+ years

12. Please indicate your level of agreement with the following statement: These technologies help me manage my teaching labor:

- Strongly disagree
- Disagree
- Neutral/Neither agree nor disagree
- Agree
- Strongly agree

13. Please indicate your level of agreement with the following statement: These technologies are effective in reducing my teaching labor:

- Strongly disagree
- Disagree
- Neutral/Neither agree nor disagree
- Agree
- Strongly agree

14. Please indicate your level of agreement with the following statement: Are these technologies creating more teaching labor for you?

- Strongly disagree
- Disagree
- Neutral/Neither agree nor disagree
- Agree
- Strongly agree

15. Please indicate your level of agreement with the following statement: Are these technologies enhancing or constraining your pedagogy?

- Strongly disagree
- Disagree
- Neutral/Neither agree nor disagree
- Agree
- Strongly agree

If you would like to be considered for an interview about your experience with these programs, please write your email in the box below. Please note that doing so will inform the researcher about your identity, but it will remain anonymous in the analysis of her study.

Appendix E  
Email to Public Listserv in Rhetoric & Composition  
Listserv: WPA ([wpa-l@asu.edu](mailto:wpa-l@asu.edu))

Subject: Quick Survey and Interview Opportunity for teachers experienced with WriteLab and/or Eli Review

Dear Colleagues,

My name is Jordan Canzonetta, and I'm a doctoral candidate in the Composition and Cultural Rhetoric program at Syracuse University. Over the past few years, I've developed a focus on educational technology as it relates to writing revision applications and assessment software. Working with Krista Kennedy and Becky Howard, I've honed my research interests to more acutely analyze how humans and machines collaborate on teaching labor, especially as the labor crisis in higher education worsens and strains contingent faculty members.

My dissertation design is shaping up as two case studies of programs with very different approaches toward peer-review and revising: Eli Review and WriteLab. As such, **I'm hoping to conduct surveys and interviews with teachers who have used either Eli Review or WriteLab** for at least one assignment (past or present). Both the interview and survey are designed to learn how teaching labor changes when using these programs. Participants will remain completely anonymous for the survey, which consists of 15 multiple choice questions and a few fill-in options; the survey will be open for three weeks starting X-XX-XX. If participants would like to volunteer to interview after taking the survey, they may choose to leave their email in a fill-in-the-blank box (or you may email me directly). Interview participants will receive a \$20.00 Amazon Gift Card for their time and labor, which should take 30-60 minutes. The interviews will be recorded through Evernote and conducted via Skype (with your preference of audio or video). I will contact you to schedule an interview via my Syracuse email address. In my analysis of this data, no identifiable information will be reproduced. If you provide an email for the interviews, after twelve months (to allow time for follow up questions), I will delete your email address permanently. If at any point you wish to abandon the study, you are completely free to do so.

*IRB Statements: Whenever one works with email or the internet, there is always the risk of compromising privacy, confidentiality, and/or anonymity. Your confidentiality will be maintained to the degree permitted by the technology being used. It is important for you to understand that no guarantees can be made regarding the interception of data sent via the internet by third parties.*

*Additionally, participants must be at least 18-years old to participate.*

If have any questions for the primary investigator of this project, please reach out to [jncanzon@syr.edu](mailto:jncanzon@syr.edu) at any time.

Thanks very much for your time and consideration!



Appendix F  
Informed Consent for Survey Takers

(This statement will appear as a prompt before participants began the survey.)

This research is designed to inform a dissertation project about teaching labor and educational technology. Participants of this survey will remain completely anonymous. You will be asked a series of multiple choice questions about your experience with whichever programs you have used in your classrooms. In the analysis of this data, no identifiable information will be reproduced. If at any point you wish to abandon the study, you are completely free to do so. If you would like to contact the principle investigator with questions, email [jncanzon@syr.edu](mailto:jncanzon@syr.edu).

If you would like to volunteer to interview after taking the survey, you may choose to leave your email in a fill-in the blank box. Interview participants will receive a \$20.00 Amazon Gift Card for their time and labor. The interviews will be recorded through Evernote and conducted via Skype (with your preference of audio or video). You will be asked a series of qualitative questions about your experience with educational technology. If you provide an email for the interviews, after twelve months (to allow time for follow up questions), I will delete your email address permanently.

*IRB Statements: Whenever one works with email or the internet, there is always the risk of compromising privacy, confidentiality, and/or anonymity. Your confidentiality will be maintained to the degree permitted by the technology being used. It is important for you to understand that no guarantees can be made regarding the interception of data sent via the internet by third parties.*

*Additionally, participants must be at least 18-years old to participate.*

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