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Drafting and Revision Using Word Processing by Undergraduate Student Writers:  
Changing Conceptions and Practices

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The concepts of drafting and revision were developed out of process theory and research done in the early 1980s, an era when word processing was not as pervasive or standardized as it is now. This paper reexamines those concepts, drawing on an analysis of two decades of previous college-level studies of writing processes in relation to word processing and an exploratory survey of 112 upper level undergraduate students who use computers extensively to write and revise. The results support earlier studies that found students' revision is predominantly focused on local issues. However, the analysis suggests that the common classroom practice of assigning multiple drafts to encourage global revision needs to be rethought, as more drafts are not necessarily associated with global revision. The survey also suggests that printing out to revise may be on the decline. Finally, the analysis suggests the very concept of a draft is becoming more fluid under the influence of word processing. The study calls for further research on students' drafting and revision practices using more representative surveys and focused qualitative studies.

## Introduction

Revision remains a major pedagogical goal in U.S. college composition and writing across the curriculum (WAC), despite criticisms made by the post-process movement since the 1990s (e.g., Kent, 1999). However, unlike writers at the time when process theory (e.g., Emig, 1971) was being formulated, most undergraduate students (and other writers) today write and revise at least in part using computers. Indeed, Microsoft Word™ has become ubiquitous since its introduction in 1983. Moreover, there is a common sense view that computers have changed the processes of writing and revising. A good deal of research since the mid-1990s has closely examined the writing practices and processes of individual writers and small groups using process tracing research methods: fine-grained observation of writers at work, textual analysis of multiple drafts, interviewing, and so on (Prior, 2004; Leander & Prior, 2004). Through qualitative means they have shown that writing processes are indeed plural and complexly woven into the fabric of student life. Little research has been done, however, to see the extent to which *concepts* of drafting and revision have changed now that writing with word processors has become the norm for college students, and the extent to which computer technologies have changed undergraduate student writing practices. In this paper, we attempt to retheorize the concepts of drafting and revision in ways that were suggested to us by process-based research comparing computer and paper-based drafting and revision done in the 1980s and early 1990s—an era when word processing was not as pervasive or standardized as it is today—and by a preliminary, local survey of upper level undergraduate students in a Midwestern university who use computers extensively to write and revise. We wish to emphasize, however, that we do not see the survey results that we present in this paper as definitive; rather, the data that we present illustrate a theoretical issue with research implications that we will explore in this paper.

Though the process approach was first formulated before the advent of word processing, the rise of the process approach in writing pedagogy coincided with the rise of word processing on the personal computer. For example, Flower and Hayes published their seminal article “A Cognitive Process Theory of Writing” in 1980, shortly before the first Macintosh was marketed in 1984. The process approach made central to writing pedagogy the term “draft,” which is drawn from the world of paper and pen or typewriter (“draft” is etymologically linked to the term “draw”—a physical action on some material). With the process approach, students began turning in what came (through the influence of that pedagogy) to be termed “your draft” or “final draft” instead of “your paper” or essay, and so on. In one sense, it was fitting that word processing and the process movement developed simultaneously. Before word processing, creating a new draft meant a significant investment in handwriting or typing time and effort (or money for those who had to hire a typist). With the advent of word processing in the 1980s, computers made the task of producing multiple drafts easier, along with providing for the ease of revision through cut/paste operations, creating high hopes that this would lead to increased global revision and improved writing.

Yet, in a different sense, it is perhaps ironic that the process approach, which institutionalized the term “drafts” as the official marker of revision, coincided with and continued to hold sway even as word processing grew in dominance and sophistication, holding out promise for significantly changing practices of drafting and revision. The term “multiple drafts” was institutionalized in countless first-year composition program requirements and writing-intensive course syllabus requirements. (A Google.com search in May 2007 of “multiple drafts” on higher education sites yielded 41,000 hits.) This institutionalization of “draft” at the very time computers were changing the technology of “drafting” raises a central problem: What have drafting and revision become, for students, in the age of pervasive and standardized word

processing? Specifically, what does the term “draft” mean to students now? What is the relationship between drafting, revision, and printing? Is it possible, for example, that word processing has made the term “draft” largely superfluous at least as a material marker or “hard copy” of some stage in a process of writing? (Before computers, all copy was hard.)

Furthermore, what, then, does the term “multiple drafts” mean to students and how do they count drafts? In short, what is the relationship between drafts and revision? Perhaps computers have separated “draft” as an institutional requirement and official practice from the personal and idiosyncratic practices of drafting and revising that the computer and printer now mediate in much more complex ways, for the first time on a mass scale.

We wish to clarify here that by using the terminology of the process movement (multiple drafts, global revision), we do not mean to reinforce its information processing, cognitive-theoretical underpinnings. Rather, we wish to question these terms in new ways. Revision-related research in the 1980s was dominated by cognitive theories (Flower & Hayes, 1980; Lunsford, 1980). By the late 1980s and early 1990s, the writing process had begun to be associated with social theories as well (Bazerman, 1985; Bizzell, 1982, 1992; Bruffee, 1984; Cooper, 1986; Reither, 1985). It appears to us as given, therefore, that any research on drafting and revision needs to be viewed in social as well as cognitive terms. This is especially true now because student writers compose varying numbers of drafts using variable mediational means (handwriting, printouts, word processor, web-based applications, etc.) to accomplish a variety of social actions in a range of locations (classrooms, networked classrooms, dorms, social networking software, homes, workplaces). Also, it is important to remember that process pedagogy (K-16), which has influenced teaching, is now part of the social context of school writing. However, it is still very unclear how much—if at all—these institutional meanings and

practices have influenced students' conceptions of drafting and revision (c.f. Clifford & Erwin, 1999).

#### Writing Processes and Word Processing: Two Generations of Research

Research on writing processes and computer-mediated writing is vast; here, we are focusing on a few key issues and areas (such as global and local revision, number of drafts, printing out, concept of a draft, process tracing studies) to characterize broad trends over the past three decades. The first generation of empirical studies of undergraduate students' revision, including several on revision using computers, was published in the 1980s and 1990s. These studies grew out of the central terms and theories of the process movement. Most importantly, Sommers (1980) found that freshmen student writers, unlike their experienced counterparts, emphasized "lexical" issues in their revision such as vocabulary, grammar, and redundancy.

#### *Global/Local Revision, Frequency and Quality .*

With the rise of word processing, a series of studies looked at the effects of computers on revision and text quality, comparing word processing to handwriting or typing—and with generally unfavorable conclusions for word processing. Collier (1983) found that the use of word processing resulted in more revisions by students, but most of these were local in nature (at the word, phrase, or sentence level). Revisions related to "idea clusters" and those at the paragraph level were better achieved through the "handwritten" mode (p. 152). The study found no connection between students' revision using word processing and improvement in their writing. Harris (1985) found that students made fewer global revisions when using word processing than when they revised without the help of word processing.

Hawisher (1987) found that students revised significantly more with pen and typewriter than they did with word processing. However, more revision did not translate into better drafts. That is to say, Hawisher did not find any difference in the quality of revision between that

achieved through pen and typewriter and that achieved on a computer. Nonetheless, the study found a positive correlation between global (“macrostructure”) revisions and improved final drafts. Boiarsky (1991) found that word processing increased “fluency or verbiage” (p. 124) in students’ writing, but did not result in better writing because students lacked “the skills to control their new-found fluency” (p. 124).

Hill et al. (1991) found that experienced writers using computers did more global revision while student writers revised more at the sentence level, confirming Sommers’ findings a decade earlier. The study did not find any difference in student writers’ quality of revision with pen and paper versus computer. Although these studies credited word processing with ease (Slattery and Kowalsky, 1998) or frequency of revision (Hawisher, 1987), a preponderance found no relationship between revision using word processing and improved writing (Harris, 1985; Hawisher, 1987; Hawisher, 1989; Hill et al., 1991).

### *Number of Drafts*

Studies of writing with computers—much influenced by the process movement—seem to have assumed that multiple drafts were necessary for effective revision. But they did not investigate the relationship between number of drafts and word processing. However, Boiarsky’s (1991) survey found that 75% of students said they produced 2-3 rewrites per paper. The study posed the question of whether future research will show students doing more revision directly on the computer screen—a question our study takes up. Palmquist et al.’s (1998) study of student writing and revising in traditional versus computer-aided classrooms found that student writers in computer-aided classrooms generated more drafts.

### *Printing Out*

Many of these early studies also assumed that printing out was necessary for global revision. Haas’s (1989) series of observational studies of writers experienced with computers

found that they used printouts for proofreading, revising organization, formatting, and critical reading. But there was little research on frequency of printing except for Boiarsky's (1991) survey, which found that 94% of students said they printed out a hard copy to revise because they found it easier to revise on a hard copy than on the computer screen.

### *Concept of Draft*

Perhaps because the technology was new—or the concept of multiple drafts so important to the theory—early researchers did not think much about how students might conceive of drafts in a computer environment. The question of what constitutes a new draft in word processed writing has not been addressed in the previous literature. Palmquist et al.'s (1998) study classified the term “draft” into “major” and “minor,” choosing for analysis only “major” drafts (p. 71). However, beyond stating that minor drafts “included changes made in five to ten minutes following the peer review workshop,” the authors did not specify any particular criteria for classifying a draft as either major or minor.

Some have called for clarity in concepts of drafting and revision. Using the cognitive concept of task definition, Hill et al. (1991) suggested that student writers' task definition (representation) of revision may be the most important variable in how they revise. Two groups of writers—student and experienced writers—had different ideas about what revision meant. The study asked future researchers to “explore task definition [of revision] as a variable” (p. 105). As Slattery and Kowalsky (1998) have noted, the ongoing revision of a “single” draft allowed by word processing provides no demarcation between drafts. Slattery and Kowalsky (1998) have asked future researchers studying word processing “to consider the fluidity of electronic composition and to sharpen their critical awareness of what can and should be called a ‘draft’” (p. 73).

### *Process Tracing Studies: Recent Developments*

A second generation of writing process studies, beginning in the 1990s and now flowering in the 2000s, traces through careful qualitative analysis the detailed processes of individuals and small groups to see how they use and perceive writing tools. Using cultural-historical activity theory, they “map” what Prior (2004) terms “literate activity” (not only writing processes *per se*) across space, time, media, and modes. Much of this work has focused on workplace writing (e.g., Gunnarson, 1997; Winsor, 2003) and graduate education (e.g., Prior, 1998), without taking computer-mediated writing specifically into account. But recently a number of studies have asked how computers in concert with other mediational means (talk, notes, drawing, calculations) become woven into the rhythms of writers’ workplace activity and lives (e.g., Spinuzzi, 2003; Graham and Whalen, 2008).

There have been fewer studies of undergraduates’ literate activity, and these have tended to focus on mediational means other than word processing and processes other than drafting and revision (Spinuzzi, 2003, on students using a GIS program in a course on geographic information systems; Prior, Hengst, Roozen, and Shipka, 2006, on talk, drawing, and dance in a first-year composition course; and Prior et al. 2007, on students using databases for research and on a “music day” unit in first-year composition). This is logical, as the theory and methods strive not to privilege one medium or mode over others. Nevertheless, Prior and Shipka’s (2003) study of a professor, a graduate student, and an undergraduate shows how “writers’ multiple streams of activity and the ways texts mediate that activity” are “deeply laminated (multi-motivational and multi-mediated)” (p. 1) and the computer and printer figure prominently in the accounts of laminated literate activity. Such careful analysis of students’ and professors’ writing practices—in their homes, dorms, workplaces, as well as in their classrooms—suggests how they are actually using computers for writing.



The fullest account thus far of undergraduate students' writing processes using computers is Shipka's (2005) study of six first-year composition students orchestrating a wide range of semiotic means to create open-ended multi-media and multi-modal projects. She developed a "multi-modal task-based framework" to theorize the ways students "repurposed (i.e., transformed or remediated) objects" to "engineer" compositions where "writing is not the starting point" (p. 300). In her account, computers, including word processing, printing, copying, and so on, appear in complex and manifestly non-linear processes in students' lived experience of the course, such as responding to distractions while on a computer in a dorm room by "set[ting] aside the work they have already begun and return[ing] to an earlier stage in the production process" in an often time-consuming process of "testing goals through action" (p. 291). She reported that students who experience what she terms "this deep revision . . . no longer equate revision with proofreading. Rather, revision has become *re-vision*: A demanding process that involves both the potential and the willingness to reimagine the goals, contexts, and consequences associated with their work" (p. 291, italics in original). (See also Donald Murray, 1996, on "re-vision" as a creative and experimental process of "seeing again.") Process tracing research on undergraduates' writing has emphasized case studies of individual students, often doing exceptional projects. Though research is underway using time-use diaries (Hart-Davidson, 2007) with larger numbers (n=20) to map patterns, process tracing does not attempt to gauge the extent of routine practices in an institution through means such as surveys.

In word-processing environments, changes in texts may seem constant and largely invisible; writers may make global changes to a document without saving a new file or generate a series of different documents with minimal changes. Research to date has not examined how the changes in word processing technology over the past two decades have reshaped

conceptualizations of drafting and revision. From our review of the two generations of research on writing processes and word processing, we gleaned four key theoretical questions:

- 1) What are the ways in which students define a “draft”?
- 2) What is the relationship between the number of drafts and revision?
- 3) What is the relationship between word processing and revision, global and local?
- 4) What is the relationship between revision and printing?

#### Methods: An Exploratory Survey to Inform Theory-building

These issues led us to formulate an exploratory survey we gave to 112 business and technical communication students in a Midwestern university who use computers extensively to compose and revise. Because we wanted to retheorize, in the age of word processing, the concepts of “draft” and revision, we chose survey as a method to obtain a relatively large sample with which to explore these basic issues, reflecting Babbie’s (1990) view that “survey methods provide a ‘search device’ when you are just beginning your inquiry into a particular topic” (p. 53). The method we chose also agrees with Beason’s (1993) suggestion that “quantitative inquiry might reveal unexpected patterns that qualitative research is best suited to further examine” (p. 413). Moreover, Scherff and Piazza (2005) have asked composition researchers to pay more attention to survey as a method, arguing that knowing student perceptions can enhance our understanding of students’ academic experiences. Of the studies we cite in our literature review, only Boiarsky’s (1991) is survey-based, others are mainly either protocol-based or analyses of students’ drafts, often with small samples. However, we also wish to underscore here limitations of our survey, which was very preliminary in nature given that we neither pretested the survey instrument nor administered it to a probability sample.

Four items in the 10-question survey (see Appendix) directly asked questions related to the theoretical issues raised by our research review:

- How many drafts do students report producing? (Q. 3)
- To what extent do students have a global view of revision? (Q. 8)
- How do students define a draft? (Q. 2)
- To what extent do students print out a copy to help with revision? (Q. 4, item 2)

The other six questions provided demographic information or other data that proved uninformative for our theorizing (except item 8 in question 4 in which we asked students about their use of Track Changes).

In addition, we cross-analyzed responses from the questions above to address the following additional issues:

- What is the relationship between global revision and more drafts?
- Do students who report producing more drafts also report printing out more often?
- Are students who print out more frequently more likely to report doing global revision?

#### *Data Collection*

As our survey was exploratory, we designed what Babbie (1990) called a “loosely structured questionnaire” (see Appendix). To facilitate its quick and easy administration, we designed it on [www.surveymonkey.com](http://www.surveymonkey.com). After obtaining informed consent, we administered it online to a total of 112 undergraduate students from six business communication classes and one technical communication class, allowing one response per student. The classes, taught by five doctoral students in the rhetoric and professional communication program (including two taught by the first author), were selected based on convenience sampling for easy access. We do not suggest that these represent university students generally.

The students were juniors and seniors at a Research Extensive public university of science and technology. Almost all of these students have previously taken basic composition courses and could be considered beginning writers in their majors. Students have had access to

computers throughout their undergraduate courses in some computer labs in every major building and dormitory. So many students own laptop computers that the university is not building more labs. Approximately 25% of the courses at the university are on WebCT. On the 2007 National Survey of Student Engagement (NSSE), 80% of seniors reported using email to communicate with an instructor “often” or “very often.”

The enrollees in the business communication course mainly come from business, liberal arts, or science majors, while the technical communication course is taken mainly by engineering or science majors. The nature of writing expected in business communication and technical communication courses ranges from single-page memos to long reports, and the average number of writing assignments in these courses varies from seven to ten. At least one class meeting a week is in a networked computer classroom (and this is true of the first-year composition courses as well). Revision of some assignments is required in these courses, though the extent and types varied among the five instructors. The four instructors we received information from required revision as part of their course. The revision was done both on the printed copy and electronically. One instructor relied entirely on his students’ peer-reviewing their classmates’ drafts on the course web site. Three of these instructors required multiple drafts (ranging from two to more), whereas one instructor said she required one draft before the final submission for most assignments. All four instructors required a combination of global and local revision. Finally, revision was achieved in their classes both using peer reviewing among students and as a result of instructors’ comments.

Fifty-eight percent of those who responded to our survey were male students and 42% were female students. The students were juniors and seniors, in majors ranging from Management Information Systems and Agricultural Studies to Biology and Management.

This survey has a number of limitations besides those already alluded to. Because our study asked basic, exploratory questions about students' conceptions of a draft and their general (not their course- or major-specific) writing and revision practices, we did not differentiate students on the basis of contextual factors such as previous writing courses taken, test scores, majors, assignments or revision requirements in the specific course where the survey was administered, and so forth. Additionally, although we asked students their gender, major, and the type of communication course (business or technical communication) in which they were enrolled, we did not treat these as variables. The students filled out the survey in a business or technical communication class (the informed consent form specifically stated that they were invited to participate because they were enrolled in a business or technical communication class). Thus, the context for the survey was clearly business or technical communication courses. However, since the survey did not specifically ask them to respond to the writing in this course alone, they may or may not have had other courses or writing in mind. The survey instrument asked students how they define "revision" and "a draft," before asking more general questions about their use of computers for writing, which may have affected their responses there and on the later multiple-choice questions. Finally, not unlike most surveys, this exploratory survey captured respondents' perceptions, which may or may not reflect their actual beliefs and practices, much less their writing performance (Warnock, 2009).

### *Data Analysis*

We obtained descriptive statistics from multiple choice or five-point Likert-scale questions on three of the four theoretical issues that we explored: number of drafts, global revision, and printing out. For the fourth issue, definition of a draft, we asked an open-ended question, "How do you define a draft?" (survey question 2). We read (multiple times) all the 111 responses to the question and together developed coding categories (see Table 1). Two months

later, we coded the responses independently, achieving an inter-rater reliability (IRR) of 83% on “First Draft,” 73% on “Iterative,” and 36% on “Unrevised Finished Document (UFD).” We then discussed the differences and reconciled them to 64% on UFD. The differences related mainly to whether a particular response containing a word such as “preliminary” or “beginning” should be classified as a “UFD” or a “first draft.” After discussing each response on which we disagreed as to whether it was “UFD” or “first draft,” we separately coded these responses, paying close attention to the complete text of the response, and arrived at the new IRR for “UFD.” Our effort produced an initial overall IRR of 66% and after reconciling, 73%. Table 1 shows the three categories, accompanied by key words, phrases, and markers used in determining them, as well as a few representative student responses illustrating them.

Insert Table 1 about here.

Finally, we cross-analyzed the results from three of the four issues (number of drafts, global revision, and printing out) using a chi-square crosstabulation analysis to see if there were statistically significant relationships among these issues. We also report the survey statistics, as well as offer limited analysis, for an additional dimension, use of Track Changes. These statistics and analyses are preliminary in nature; their main usefulness, we believe, lies in their suggestive or illustrative potential for re-theorizing drafting and revision, as well as informing future research.

### Exploratory Survey Results

#### *Drafting and Revision*

The survey helped us explore, first of all, new ways of understanding drafting, revision, and the relationship between them in an age of pervasive and standardized word processing.

*How Many Drafts Do Students Report Producing?* One of the premises of the process movement, espoused by many if not most writing teachers (Harris, 1989), is that multiple drafts

accompany global revision (Sommers, 1980), which has been linked to improved writing (Hawisher, 1987; Sommers, 1980). Word processing made the task of producing multiple drafts easier (Palmquist et al., 1998). However, only one study in our literature review (Boiarsky, 1991) attempted to find out the number of drafts first-year composition students reported producing using word processing. Because word processing has become both more sophisticated and widespread since Boiarsky's 1991 study, we decided to ask our survey respondents how many drafts they produced, in general, of a given writing assignment. The majority of students (64.3%) reported producing 2-3 drafts, which is similar to—though slightly less than—Boiarsky's (1991) finding of the majority (75%) of students reporting 2-3 rewrites per paper (p. 125). Thirty-three percent of the students said they produced only one draft. Table 2 gives all the responses.

Insert Table 2 about here.

We suspect that the widespread adoption of word processing since 1991 might have reduced the number of drafts students report producing (as drafting can be continuous on computer with new drafts unmarked). However, a deeper question is: how do students count drafts? Do they simply count them the way their teachers count them when they have a required number of (or “multiple”) drafts? We do not know whether students are defining/perceiving—and thus counting—drafts the same way as they did in the 1980s and early 1990s. For example, about two-thirds of the respondents in Boiarsky's 1991 study reported producing the first draft with pen and paper, using computer only for revision. Process tracing research has found that word processing is complexly woven into the activities that produce documents and other artifacts now that multi-media composition is made possible by computers, perhaps making the concept of a draft more fluid.

*To What Extent Do Students Have a Global View of Revision?* Global revision has been linked with improvement in writing (Sommers, 1980; Hawisher, 1987; Hill et al, 1991). Perhaps because it is easier, in terms of technology, to revise globally using a word processor as compared to a pen and paper or a typewriter, a number of early studies of student revision attempted to find out whether word processing helped improve students' writing (Boiarsky, 1991; Moran, 2003), only to find that while word processors did increase student writers' production or manipulation of text (Crafton, 1996), the quality of the text did not improve much (Collier, 1983; Slattery & Kowalski, 1998). To see whether today's far more standardized and widespread word processing technology is a better facilitator of global revision among student writers, we decided to ask our respondents about the nature of their revision. The response choices included both local (e.g., proofreading) and global revision (e.g., rewriting the whole or part of the draft). An aggregate of 64.3% of students reported that their revision generally consisted of revising specific words or sentences and proofreading (the aggregate of student response choices 2, 3, and 5 to survey question 8—see Table 3 below). For our analysis, we call these three choices “local revision.” This finding agrees with that of previous studies—Collier (1983), Harris (1985), and Hill et al. (1991)—that undergraduate students' revision using computer word processing is largely concerned with surface-level or “lexical” issues (spelling, minor grammatical problems, vocabulary, and the like.). This result suggests that despite the ease with which global revisions can be made with current word processors, students' perception of the task of revision may not have changed much in this regard over the last 20 years.

Insert Table 3 about here.

On the other hand, 36% of students stated that their revision generally consisted of both global and local issues. That is, these students reported that their revision generally included all of the following: 1) rewriting the whole or part of the draft, 2) revising words or sentences, and



3) proofreading (selecting 1, 4, or 6 as response choices to survey question 8—see Table 3). For our analysis we call these three choices “global and local revision.” Table 3 gives all the responses.

Process pedagogies have for the last 25 years encouraged global revision to improve writing (Boiarsky, 1991; Hawisher, 1987; Hill et al, 1991; Slattery & Kowalsky, 1998; Sommers, 1980), yet the widespread adoption of process approaches has not necessarily resulted in widespread global revision, either in college composition, WAC programs (Beason, 1993), or K-12 education (Yagelski, 1995). However, the complexity of literate activity described by recent process tracing research suggests that the very terms in which the question is phrased, drawn from print or early word processing practices—rewriting, drafting, revising, proofreading—may occlude practices or conditions for which there are as yet no standard terms: for example, conceiving of revision in terms of global/local may not make sense to students for tasks done under time pressure or for short assignments (in which revising specific sentences can change the structure of a draft).

*What is the Relationship between Global Revision and More Drafts?* In a study comparing drafting practices of eight graduate students, four of whom identified themselves as “one-drafters” and four as “multi-drafters,” Harris (1989) found that “multi-drafters” engaged in “frequent large-scale [global] changes on paper” (p. 183). Harris’s observation found echoes in observations or findings of other studies of revision (Hill et al, 1991; Slattery & Kowalski, 1998; Sommers, 1980), although in all of these studies (except perhaps Harris’s, in which writers identified themselves as “single or multi drafters” to begin with) global revision appeared to have led writers to produce more drafts. To get a better sense of the relationship between global revision and multiple drafts among our respondents, we cross-analyzed our survey data on these two categories. To answer this question, we cross-analyzed students’ responses to Question 3,

(number of drafts students report producing), and Question 8, (students' reported revision practices). The results (see Table 4) confirm what we "should" expect from the process theory: global revision is associated with more drafts. Among those who reported doing both global and local revision, a greater number (80%, 32/40) also reported producing two or more drafts. Conversely, however, our survey also found that the majority of those who reported producing two or more drafts did so for local revision (57.3%, 43/75). A Pearson chi-square test performed on the cross tabulated counts (see Table 4 below) indicates that there is a significant relationship between number of drafts and global revision (our category of global and local revision) (chi-square = 4.780  $p = .029$ ). Table 4 shows the overall results.

Insert Table 4 about here.

Our findings appear to suggest that global revision is associated with students producing more drafts (perhaps because they need to mark off major changes, to return to the earlier "draft"). However, our findings also suggest that more drafts are not necessarily associated with students reporting global revision (57% reported only local revision). If global revision is a pedagogical goal, then producing more drafts by itself may not help. Perhaps, along with more drafts, a task definition of revision (emphasizing global revision), as suggested by Hill et al. (1991), may orient students toward global revision.

The traditional process model suggests that if teachers have students produce multiple drafts, they will be more likely to make global revisions. However, our findings show that more students who reported producing two or more drafts did so for local revision only (57%, 43/75). Also, in general, more students in the survey reported doing only local revision (64.3%—see 4.1.2). These findings call into question the assumption of the process approach that more drafts by themselves may help students achieve global revision. However, the picture is more complex, as we shall see.

*How Do Students Define a Draft?* The material work of drafting has changed, but has the concept of a draft changed? Slattery and Kowalski (1998) questioned the term “draft” in their study given the seamlessness of writing on a word processor. A decade after their study and with far more writing being done using word processors, this question could not be more timely. Our analysis suggests that students conceived of the term “draft” in three main ways. We coded the responses to the open-ended question “How do you define a draft?” (Question 2) into the following four categories. As noted earlier, we achieved an interrater agreement of 83% for “First Draft,” 73% for “Iterative,” and 64% (on second attempt) for “UFD,” getting an overall agreement of 73% for three main categories. Table 5 shows the overall results:

Insert Table 5 about here.

Most students (41%) defined a “draft” as a first draft, a rough draft, an outline, or a freewrite. The second most popular (33%) conception of a draft was “iterative.” That is, these respondents defined a draft as one of many writing stages or versions until the submission of the paper. In a somewhat ambiguous third category, which we named “Unrevised finished document (UFD),” 23% students defined a draft as a “finished” paper minus revisions. This category seemed different from the “first draft” because of the words used by respondents, such as “preliminary copy,” “completed version needing revision,” “final document,” and so on, leading us to believe that some students conceive of a draft as more than a rough draft or an outline. But of course they were not asked to describe their processes in detail, only to quickly formulate a definition, so they may well have fallen back on conventional definitions of a draft, which inevitably elide and occlude complex literate activity that process tracing research has described.

A quick survey of recent dictionary definitions of “draft” showed that the definitions mirrored our respondents’ conceptions of a draft. While both the Oxford (2005) and the Merriam-Webster (2005) dictionaries define a draft as a preliminary piece of writing or an outline (matching our “first draft” and, to some extent, “UFD” categories), only one, the American Heritage Dictionary (2006), included a definition matching the description of our “iterative” category: “any of various stages in the development of a plan, document, or picture.” Two of these dictionaries also included the phrase “final draft” in their definitions, resembling our somewhat ambiguous category of “UFD.”

Finally, considering that it is easy to produce iterations of a text with computers, it is not surprising that the responses of many students suggested that they have an “iterative” view of a draft. However, the majority of students did not describe a draft in iterative terms, indicating perhaps that despite the ease of revision afforded by sophisticated word processing and other Web-based tools (such as Google Documents), many students continue to think of a draft as a preparatory sketch to the main writing (as a rough draft).

### *Printing*

A paper copy, whether printed or typewritten or handwritten, has traditionally been the marker of a “draft” and, in much process pedagogy, a marker of revision as well (Boiarsky, 1991; Piolat et al., 1997; Slattery & Kowalski, 1998;), as in the frequent requirement for “multiple drafts.” We asked several questions of our exploratory survey findings that probed the relationship between printing out for revision on one hand and number of drafts and global revision on the other.

*To What Extent Do Students Print Out a Copy to Help with Revision?* Many previous studies (Boiarsky, 1991; Piolat et al., 1997) reported that students found it easier to revise on printed copy rather than on a computer screen. The problems in revising directly on the computer

screen had to do with its “small amount of visible text,” “small screen size,” and the like (Piolat et al., 1997, p. 567) or the “tangible” quality of paper where “each piece of information occupies a single, fixed location on the page, providing users with visual [and “tactual”] cues about the location of information with respect to the text as a whole” (p. 567). To assess our survey respondents’ overall printing out, we asked them how often (or not) they print out *to help them revise*. Table 6 summarizes responses to the five-point Likert-Scale question, “I print out a hard copy to help me revise” (Question 4, item 2).

Insert Table 6 here.

Forty-seven percent of students reported they always or often printed out a hard copy to help them revise. Sixteen years ago, Boiarsky (1991) found that 94% printed out in the process of revision. This suggests there may be a dramatic reduction in printing out for revision. Students today may be less likely to feel the need to print out to aid in revision, perhaps because in the last 16 years there have been vast improvements in screen size and in word processor adoption, sophistication, and standardization. Because of these technological advances and a greater use of computers in general, students now may also be more comfortable reading text on the screen. Many professors allow or require electronic submission of papers. And perhaps a smaller percentage of computers are connected to a convenient printer today.

Yet these results also suggest that a “paperless” writing process has not yet arrived, as only 23% of students said they rarely or never printed out a hard copy to help them revise, and only 3% always revise without printing. Apparently, for certain tasks at least (formatting? long drafts?), almost all students find printing helpful—or required (we do not know the extent to which printing drafts is due to teacher requirements). These responses raise the question of how students are continuing to use printouts in their writing processes.

*Do Students Who Report Producing More Drafts Also Report Printing Out More Often?*

To explore the relationship between drafting and printing, we decided to cross-analyze our survey data on the number of drafts and printing frequency. We cross-analyzed responses to the statement “I print out a hard copy to help me revise” in Question 4 (item 2) and Question 3, the number of drafts students report producing of a given writing assignment before turning in the final version.

As shown in Table 7, 78.8% (41/52) of students who reported printing either always or often also reported producing two or more drafts. Conversely, only 40% (10/25) of those students who reported printing either rarely or never also reported producing two or more drafts. On the other hand, 21.2% (11/52) of students who reported printing either always or often also reported producing just one draft and 60% (15/25) of those who reported printing either rarely or never also reported producing just one draft.

When we relate more drafts to frequency of printing (as opposed to the frequency of printing to more drafts, as was the case above), we find the results (see Table 7) confirm the two-way relationship between more drafts and more frequent printing. Fifty-five percent (41/74) of students who reported producing two or more drafts also reported printing out either always or often. Conversely, only 14% (10/74) of those who reported producing two or more drafts also reported printing out either rarely or never. On the other hand, in the case of “single drafters,” 42% (15/36) reported printing out either rarely or never and 30% (11/36) reported printing out either always or often.

Insert Table 7 here

A Pearson chi-square crosstabulation performed on the counts of “two-or-more drafters” and “one-drafters” with respect to frequent (always+often) and infrequent (rarely + never) printing out found the difference significant (chi-square = 11.392  $p = .001$ ). The counts for

“sometimes” were not considered because the question focused on students printing out more and less often—the extremes—since we were interested in finding whether more printing out was associated with more drafts (and vice versa) and less printing out was associated with fewer drafts (and vice versa).<sup>1</sup>

The results also suggest that students employ a wide spectrum of writing and revising practices that involve printing. Thirty percent (11/36) of the students who reported producing one draft also reported printing out “always or often.” For these students, perhaps the one draft printed may be a kind of “proofreading draft.” The next to final draft is printed to make it easier to catch formatting and surface errors.

These results also suggest that for the approximately 45% (33/74) of students who produce two or more drafts but only sometimes, rarely, or never print out, their multiple drafts tend to be electronic only. Printing out is no longer a necessary marker of a draft, apparently. For many students, the concept of a draft has been uncoupled from printing. Perhaps they mark off a new draft by electronic means: e.g., assigning a new document name or version number. But perhaps they simply imagine a certain level of change as marking out a new draft (a sort of psychological new draft rather than a physical/electronic one). The same may also be true for the 69% (25/36) who produce only one draft but only sometimes, rarely, or never print out. They sometimes print out a hard copy and sometimes make revisions on the draft electronically.

Although students seem to have gone a long way toward “paperless” composition, they have apparently not gone entirely there. And it is worth considering whether and how “paperless” writing classrooms/pedagogies acknowledge and take account of the ways many students still use paper. When assignments urge students to produce “multiple drafts,” what do students hear—and do? More importantly, what does it mean that students who say they produce more drafts also report printing out more often and vice versa? It might mean that the concept

of a draft is still tied to a printout for some students. Many students may associate a new printout with a new draft, and thus those who report producing more drafts may also report printing out more often. Further research might look at whether they print out when revising longer texts or texts that require careful review. Whatever the reason, printing certainly has not disappeared as an aid to revision, and teachers may wish to keep that in mind. This brings us to the question of whether printing out is associated with global revision.

*Are Students Who Print Out More Frequently More Likely to Report Doing Global Revision?* To explore this question, we cross-analyzed responses to the statement “I print out a hard copy to help me revise” in Question 4 (item 2), and Question 8, students’ reported revision practices. Results indicated that printing out was not related to students’ reported revision practices.

Nearly 68% (36/53) of respondents who said they always or often printed out a hard copy did so for local revisions, against 32% (17/53) who reported printing out to do a mix of global and local revision. The percentages remained the same for both kinds of revisions in the case of students who reported printing out either rarely or never. A Pearson chi-square test performed on the counts of those who reported printing out either always or often and those who reported printing out either rarely or never with respect to both kinds of revisions indicated no significant relationship between students’ printing out and their reported revision practices. Among those who reported printing out sometimes, the percentage who did so for local revision (55%, 18/33) was close to the percentage who did so for global and local revision (45%; 15/33). Table 8 shows the overall results.

Insert Table 8 about here.



Boiarsky (1991) suggested that printing out a copy to aid with revision may be associated with global revision, perhaps because seeing the physical paper draft helps one see the structure of one's argument and other global patterns. Indeed, 94% of his participants printed out. However, our finding of 47% of students printing out either always or often (see Table 6) suggests that students have gotten more used to computer screens, to manipulating text on screen. Indeed, Piolat et al. (1997) found that the numbered pages on the computer screen allowed writers to address global revision issues better than scrolling. In addition, screens have gotten bigger, and the hardware for manipulating the screen (mouse, scrolls, etc.) has gotten more sophisticated. It also may mean, as we suggested earlier, that students who print out text are not tending to lay the pages out to see global patterns, but rather reading print text for local revision—a proofreading draft. (Sixty-eight percent of respondents who said they always or often printed out a hard copy did so for local revisions.)

If students still do not tend to think of revision in global terms (despite 20 years of process pedagogy), it is not surprising they did not show evidence of any relationship between printing out and global revision. They tend to revise for local issues even on a hard copy. Students may still not think in terms of global revision even though the technology now makes it far easier to manipulate blocks of text—and to produce a paper copy to help them see what needs manipulating. Austen (2003) pointed to the ephemeral nature of revision on the computer screen, noting Heim's (1987) suggestion that with computer screen, the “inner gestation of thought formulation is foreshortened” (p. 206). If this is so, then other tools may help to extend that gestation. Printing out and cut/paste are technologies for re-seeing and manipulating a draft globally. We now turn to another of those technologies, which may help instructors expand students' conceptions and practices of revision.

*Track Changes*

Track Changes and similar word processing features save a continuous record of revisions automatically. More importantly, they allow a writer to return to any point in the composing process, and as such may be an important tool for revision. However, students reported using Track Changes very little (see Table 9), which is a question worth exploring further. As shown in Table 9, 73% of students reported having rarely or never used the Track Changes feature or something similar.

Insert Table 9 about here.

Nor did students who used Track Changes report producing more drafts. Theoretically, every change tracked produces what could be considered a “new draft,” but students apparently do not think of Track Changes as recording new drafts. Only 13.5% (10/74) of those who reported producing two or more drafts also reported using Track Changes either always or often.

Table 10 shows the results:

Insert Table 10 about here.

And finally, Track Changes has in no sense become a substitute for printing out to aid revision. Thirty-nine respondents who said they rarely or never used Track Changes also said they always or often printed out a hard copy. Compare this to only five students who said they rarely or never printed out a hard copy also saying they always or often used Track Changes.

Track Changes might be a very useful electronic tool for revision and revision pedagogy. Because it provides a record of the process of composing, writers and writing teachers can search out patterns of revision, transformation of ideas, and so on. It is also possible to quickly check on the level of revision, from local to global.

But these tools for individual writers (or teachers of individuals) pale in comparison with the use of Track Changes for collaborative drafting and revision. Social software programs such as Google Docs and Spreadsheets, Wikipedia, and de.lic.ious are already in wide use in business,

government, non-profit, and personal entertainment sectors. Students are already using them for collaborative projects—with and without teacher support. It may be that writing pedagogy is actually rather behind practices in other sectors, especially those that are built on social software databases that track changes and use them as routine parts of social/work interactions that involve writing. Perhaps this is where (and through), ultimately, the concept of draft (and revision) will change, rather than through pedagogical changes in the “process approach” in writing teaching.

If, as we speculate here, the process approach did not much change revision practices or the ways drafts are conceived, practices that use technology to restructure writing processes might. In this sense, computers may have paved the way for (though not determined) a shift from 1980s cognitive approach to drafting and revision to a nascent 2000s social approach. And the promise of computers for improving writing processes might be realized socially where it was not realized cognitively.

#### Discussion: Rethorizing Drafting and Revision in the Age of Computers

Our study addresses the theoretical question: What have drafting and revision become, for students, in the age of word processing? In one sense, there is perhaps little change. Our exploratory survey found that most students (64.3%) reported only doing revision that consisted of changing specific words or sentences and proofreading, just as Sommers (1980) found—in research before the age of word processing—that student writers did relatively little global revision. One might be tempted to ask to what extent, if any, the pervasive emphasis on multiple drafts and process in composition instruction has affected students’ practice of global revision, especially as word processing makes it technically easier—and today more than in previous decades when word processors were less sophisticated. The relationship between drafting and

revision bears further theorizing, especially in light of the significant relationship between global revision and number of drafts this exploratory study suggests.

One central assumption of the process approach (shared in many courses in composition and across the curriculum) is that producing more drafts facilitates global revision. Perhaps, as the exploratory survey findings suggest, the opposite is true: doing global revision leads writers to produce more drafts (however they define them). Making global changes in the ideas or organization of a text may lead these student writers to mark off a new draft (either physically or psychologically), whereas students who rarely or never do global revision may tend to perceive themselves as doing a single draft. So a new 'draft' may be a marker for a new approach to a problem, a new organizational strategy, or something memorable beyond specific edits. Though our study says nothing about the quality of drafts, early studies suggested that global revision is related to improvement in writing (Hawisher, 1987; Sommers, 1980;).

Another common assumption is that ease of global revision tends to produce more global revision. The fact that computers have made global revision easy has led some to assume that it has made global revision more common. But the ease of revision afforded by today's word processing may not have resulted in more students doing global revision, as suggested by our study and several earlier studies (MacArthur, Graham and Fitzgerald, 2006). As early as 1988 Curtis pointed out that assuming that word processing will on its own result in inexperienced writers composing better essays was "similar to assuming that, given a two horsepower table saw, writing teachers will build credenzas" (p. 338). How, then, to get students to do more global revision? One common answer is to require or encourage multiple drafts. But our exploratory finding suggests that simply requiring more drafts may not in itself get students to do more global revision.

Yet at a deeper level, the whole concept of a draft may be changing in response to word processing. Whereas in the paper age we could demarcate between drafts and count them, today what a draft means is far more variable, complicated, and fragmented. Is it just a few changes, more than a certain number of changes, complete or partial rewriting, a single major change, or a single minor change? The unit of revision for the process approach—the draft—may be undergoing a post-modern transformation in the e-age. If drafts are steps, as “iteratives” in our study seem to think of them, what does a step consist of? Teachers may require multiple drafts, but students, our findings suggest, interpret a draft (and hence multiple drafts) in a range of different ways.

This lack of clarity about what (all) a draft means can be a problem because students may think of minor changes as “drafts,” giving them as well as instructors a false sense of satisfaction that more “drafts” are being produced, and, as a corollary, that global revision is being achieved or at least encouraged. This observation agrees with what Slattery and Kowalski (1998), Austen (2003), and Crafton (1996) pointed out. Composing and revising using word processing, especially on the computer screen, seems to undercut itself. Making changes is easy, so students may make many of them—but without doing much deeper reflection—or global revision (Slattery and Kowalski use the word “abbreviate,” 1998, p. 73; Heim describes this as “the inner gestation of thought being foreshortened,” 1987, p. 206).

Perhaps the way to get students to do more global revision is to teach them to do it, not to simply expect it or require multiple drafts. And there is a rich literature on techniques for doing so, including computer supported planning and revision processes (MacArthur, 2006). For example, Reynold and Bunk’s 1996 study in a first-year college composition class found students did more global revision after receiving “metacognitive prompts” on planning and revising (p. 251). And the great variety of writing processes computers allow may provide

resources for making students more conscious of global revision: such as using Track Changes to see the depth (or superficiality) of revision; doing a save-as with numbered draft iterations then using the Compare Documents function to visually highlight to students the kinds of—or paucity of—revision. Google Documents allows writers to work on a document iteratively with all previous iterations of the document being saved by the software. MS Word™ itself allows features such as outline, comment, document map, merge, and compare documents to manipulate drafts as outlines, collaborative drafts, and finished drafts.

Theorizing writing processes requires understanding the relationship between paper and screen not as a choice between media, as earlier studies tended to posit, but rather as a dialectic between them (and among other media, as recent process research emphasizes). Our finding that printing out for revision may well have declined a great deal does not necessarily mean that paper is disappearing in the writing process. According to our exploratory survey, students reported printing out for revision far less than what Boiarsky found in 1991 (94%). However, our exploratory results also found that 47% still print out frequently (always or often) to help them revise. This suggests that there is still a culture of printing, although this may be gradually lessening. Even the humble act of printing out for revision is a multimedia writing process. Printing might not disappear even if teachers never allow paper to be submitted. The paper printout still seems to be an important technology for revision and embedded in many students' writing practices.

Finally, the significant two-way relationship between printing out for revision and producing more drafts might suggest paper is complementing and enhancing electronic revision in ever more complex ways. Among our survey respondents, those who reported producing more drafts also reported printing out more. The reverse was also true: those who reported printing out more also reported producing more drafts. Many students may still associate multiple drafts with

printing out for revision—though not usually for global revision. Our survey found that 68% of students who reported printing out either always or often did so to do *local* revision. (Other means of creating drafts, such as Track Changes, for example, have not been much utilized—our exploratory survey found only 16% of students using Track Changes or a similar tool, a finding worth pursuing in further studies.) Teachers may wish to take printing for revision into account—even in “paperless” classrooms, where the teacher never sees the printouts students may do—as an important tool that perhaps half their students use for revision (the teacher might lay out a printout to show the overall structure).

#### Directions for Further Research

This study was designed to explore students’ perceptions of drafting and revision a decade after the last *quantitative* studies were published and to retheorize these concepts. More elaborate surveys might not only have larger and more representative samples but also look at more variables: assignment (type and length), type of revision among students at various levels, gender, previous writing instruction, learning style, course type, and discipline. For example, the present study suggests that the institutionalized discourse of the process approach, used so widely in teacher talk about student writing (multiple drafts, local/global revision, etc.) might affect students’ perceptions or practices of writing (though it might also be an artifact of the survey itself, as we noted above). More sophisticated survey research might also suggest whether and to what extent the standard terminology and concepts of the process approach—now widely used in K-12 schooling and higher education—have affected students’ writing processes and their conceptions of writing. How are terms such as “multiple drafts” meaningful to students? Do they affect their practices?

In this sense, our study also points to the need for more process tracing studies to unpack and theorize how students’ conceptions and practices of revision are shaped by the intersection

of technology and the terms and concepts of process pedagogy. Qualitative process tracing might make visible what is hidden in or elided by these terms and concepts in the interactions between students and the institutionalized discourses of writing process (Prior et al. 2007). Moreover, alternative theoretical terms and concepts being developed from the second generation of writing process studies might be made part of the institutional discourses of writing and composition and affect decisions about the distribution of technologies in higher education and even the material arrangement of classrooms.

This study has asked what lies behind the widespread injunction that students produce “multiple drafts” using the now-standard tool of word processing—the distance between the institutional meaning of the term and students’ understanding of it. Yet other electronic tools for re-visioning (re-seeing) writing are also buried or blurred in this institutional meaning. Track Changes elides the notion of multiple drafts, for example. Outlining functions on word processors allow students to see the global structure quickly, not only for planning purposes but also for revision purposes. Similarly, social software tools such as Google Docs and Writeboard ([www.writeboard.com](http://www.writeboard.com)), which make a “draft” available anywhere there is a networked computer, may provide other affordances if we conceive of drafting and revision beyond institutionally sanctioned terms (Rice, 2009). Other electronic tools, such as Speech tools (Honeycutt, 2003), now consigned to the category of prosthetics for differently abled students, might also be used as tools for many other students who might benefit from “hearing” their text for revision.

Interestingly, these new electronic writing tools can be used for research as well, to trace students’ textual manipulations over time and answer fundamental questions about how students (and professionals) draft and revise. Yet these have to our knowledge not been done since these electronic tools became available for research. For example, what do students do when they



report doing global revision? How do students do global revision? To what extent and in what circumstances do they revise directly on the computer screen? To what extent do they use printouts to do global revision? Is global revision linked with students' or teachers' perceptions of improvement in quality? Indeed, where and to what extent is global revision a meaningful term?

A decade ago, in a review of previous research on revision through word processing, Crafton (1996) opined that computer-based revision is largely a local (not global) practice. He suggested that handwriting may teach students how to revise better. Today that suggestion seems quaint. We now have a wide range of tools beyond handwriting (and in various media) available for improving drafting and revision. But we still need research on the ways these tools—singly and in concert—affect students' writing processes. Our hope, then, is that this preliminary research may generate more questions and discussion on how we might help our students become better writers and revisers with computer word processing.

References

- Babbie, E. (1990). *Survey research methods*. Belmont, California: Wadsworth Publishing Company.
- Bazerman, C. (1985). Physicists reading physics: Schema-laden purposes and purpose-laden schema. *Written communication, 2*, 3-23.
- Beason, L. (1993). Feedback and revision in writing across the curriculum classes. *Research in the Teaching of English, 27*, 395-420.
- Bizzell, P. (1982). Cognition, convention, and certainty: What we need to know about writing. *PRE/TEXT, 3*, 213-243.
- Bizzell, P. (1992). *Academic discourse and critical consciousness*. Pittsburgh, PA: University of Pittsburgh Press.
- Boiarsky, C. (1991). Fluency, fluidity, and word processing. *Journal of Advanced Composition, 11* (1), 123-133.
- Bruffee, K. A. (1984). Collaborative learning and the "conversion of mankind." *College English, 46*, 635-652.
- Clifford, J., & Erwin, E. (1999). The ethics of process. In T. Kent (Ed.), *Post-process theory: Beyond the writing-process paradigm* (pp. 179-97). Carbondale, IL: Southern IL University Press.
- Collier, R. M. (1983). The word processor and revision strategies. *College Composition and Communication, 34*, 149-155.
- Cooper, M. M. (1986). The ecology of writing. *College English, 48*, 364-75.
- Crafton, R. E. (1996). Promises, promises: Computer-assisted revision and basic writers. *Computers and Composition, 13*, 317-326.

- Curtis, M. (1988). Windows on composing: Teaching revision on word processors. *College Composition and Communication*, 39, 337-344.
- Emig, J. (1971). *The composing processes of twelfth graders*. Urbana, IL: National Council of Teachers of English.
- Flower, L., & Hayes, J. (1980). A cognitive process theory of writing. *College Composition and Communication*, 31, 365-387.
- Google.com. Search of < “multiple drafts” -dennett -consciousness site:.edu >, 15 May, 2007.
- Graham, S. S., & Whalen, B. (2008). Mode, Medium, and Genre: A Case Study of Decisions in New-Media Design. *Journal of Business and Technical Communication*, 22(1), 65-91.
- Gunnarsson, B-L. (1997). The writing process from a sociolinguistic viewpoint. *Written Communication*, 14(2) , 139-188.
- Haas, C. (1989). “Seeing it on the screen isn’t really seeing it: Computer writers’ reading problems.” In G. Hawisher, & C. Selfe (Eds.), *Critical perspectives on computers and composition instruction* (pp. 16-29). New York: Teachers College, Columbia University.
- Harris, J. (1985). Student writers and word processing: A preliminary evaluation. *College Composition and Communication*, 36, 323-330.
- Harris, M. (1989). Composing behaviors of one and multi-draft writers. *College English*, 51, 174-191.
- Hart-Davidson, W. (in press). Studying the mediated action of composing with time-use diaries. In D. Devoss & H. McKee (Eds.), *Digital writing research: Technologies, methodologies, and ethical issues*. Cresskill, NJ: Hampton Press.
- Hawisher, G. E. (1987). The effects of word processing on the revision strategies of college freshmen. *Research in the Teaching of English*, 21, 145-160.

- Hawisher, G. E. (1989). Research and recommendations for computers and composition. In G. Hawisher, & C. Selfe (Eds.), *Critical perspectives on computers and composition instruction* (pp. 44-69). New York: Teachers College, Columbia University.
- Heilker, P. (1992). Revision worship and the computer as audience. *Computers and Composition* 9(3), 59-69.
- Heim, M. (1987). *Electric language: A philosophical study of word processing*. New Haven, CT: Yale University Press.
- Hill, C. A., Wallace, D. L., & Haas, C. (1991). Revising on-line: Computer technologies and the revising process. *Computers and Composition*, 9(1), 83-109.
- Honeycutt, L. (2003). Researching the use of voice recognition writing software. *Computers and Composition* 20, 77-95.
- Kent, T. (Ed.). (1999). *Post-process theory: Beyond the writing-process paradigm*. Carbondale, IL: Southern IL University Press.
- Leander, K. and Prior, P. (2004). Speaking and writing: How talk and text interact. In C. Bazerman and P. Prior (Eds.), *What writing does and how it does it: An introduction to analysis of texts and textual practices* (pp. 201-238). Mahwah, NJ: Lawrence Erlbaum.
- Lunsford, A. (1980). The content of basic writers' essays. *College Composition and Communication*, 31, 278-290.
- MacArthur, C. A. (2006). The effects of new technologies on writing and writing processes. In C. A. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (248-262). New York, Guilford Press.
- McAllister, C., & Louth, R. (1988). The effect of word processing on the quality of basic writers' revisions. *Research in the Teaching of English*, 22, 417-427.
- Merriam-Webster's Collegiate Dictionary (11th ed.), 2005. Merriam-Webster Inc.
- Murray, D. (1996). *The craft of revision*. New York: Harcourt Brace.

- Palmquist, M., Kiefer, K., Hartvigsen, J., and Godlew, B. (1998). *Transitions: Teaching writing in computer-supported and traditional classrooms*. Greenwich, Connecticut: Ablex Publishing.
- Piolat, A., Roussey, J-Y., & Thunin, O. (1997). Effects of screen presentation on text reading and revising. *International Journal of Human-Computer Studies*, 47, 565-589.
- Prior, P. (1998). *Writing/disciplinarity: A sociohistoric account of literate activity in the academy*. (The Rhetoric, Knowledge and Society Series, Charles Bazerman, Series Editor). Mahwah, NJ: Lawrence Erlbaum Associates.
- Prior, P. (2004). Tracing process: How texts come into being. In C. Bazerman and P. Prior (Eds.), *What writing does and how it does it: An introduction to analysis of texts and textual practices* (pp. 167-200). Mahwah, NJ: Lawrence Erlbaum.
- Prior, P., Hengst, J., Roozen, K., & Shipka, J. (2006). "I'll be the sun:" From reported speech to semiotic remediation practices. *Text and Talk*, 26, 733-766.
- Prior, P., & Shipka, J. (2003). Chronotopic lamination: Tracing the contours of literate activity. In Charles Bazerman & David Russell (Eds.), *Writing selves, writing societies: Research from activity perspectives* (pp. 180-238). Fort Collins, CO: The WAC Clearinghouse and Mind, Culture, and Activity. Retrieved September 5, 2004, <[http://wac.colostate.edu/books/selves\\_societies](http://wac.colostate.edu/books/selves_societies)>.
- Prior, P. Janine Solberg, Patrick Berry, Hannah Bellowar, Bill Chewning, Karen Lunsford, Liz Rohan, Kevin Roozen, Mary Sheridan-Rabideau, Jody Shipka, Derek Van Ittersum, and Joyce Walker. (2007). Re-situating and re-mediating the canons: A cultural-historical remapping of rhetorical activity: A collaborative webtext. *Kairos* 11 (3). <http://kairos.technorhetoric.net/11.3/binder.html?topoi/prior-et-all/index.html>
- Reither, J. A. (1985). Writing and knowing: Toward redefining the writing process. *College English*, 47, 620-628.

- Rice, J. (2009). Networked Exchanges, Identity, Writing. *Journal of Business and Technical Communication*, 23(3), 294-317.
- Scherff, L., & Piazza, C. (2005). The more things change, the more they stay the same: A survey of high school students' writing experiences. *Research in the Teaching of English*, 39, 271-304.
- Shikpa, J. (2005). A Multimodal task-based framework for composing. *College Composition and Communication*, 57, 277-306
- Slattery, P. J., & Kowalski, R. (1998). On screen: The composing processes of first-year and upper-level college students. *Computers and Composition*, 15, 61-81.
- Sommers, N. (1980). Revision strategies of student writers and experienced adult writers. *College Composition and Communication*, 31, 378-388.
- Spinuzzi, C. (2003). *Tracing genres through organizations*. Cambridge, MA: MIT Press.
- The American Heritage Dictionary of the English Language (4th ed.), 2006. Boston / New York: Houghton Mifflin Company.
- The New Oxford American Dictionary (2nd ed.), 2005. Oxford, New York: Oxford University Press.
- Warnock, S. (2009). Methods and Results of an Accreditation-Driven Writing Assessment in a Business College. *Journal of Business and Technical Communication*, 23(1), 83-107.
- Winsor, D. A. (2003). *Writing power: An ethnographic study of writing in an engineering center*. Albany: SUNY Press.
- Yagelski, R. P. (1995). The role of classroom context in the revision strategies of student writers. *Research in the Teaching of English* 29, 216-235.

### Appendix: Our Exploratory Survey

1. How do you define revision?
2. How do you define a draft?
3. In general, how many drafts do you produce of a given writing assignment before turning in the final version?
  1. 1
  2. 2-3
  3. 4 or more
  4. Other (please specify)
4. These statements may describe how you approach revision of your writing. Please answer honestly and as accurately as you can. (Likert Scale: Always, Often, Sometimes, Rarely, Never)
  1. I revise on screen with or without a hard copy.
  2. I print out a hard copy to help me revise.
  3. Before beginning to revise, I discuss with the instructor his / her feedback first.
  4. Peer revision helps me improve my writing.
  5. I limit my revision to the instructor's comments.
  6. I e-mail drafts to my peers.
  7. I post drafts on a course website for peer review
  8. I use the track changes feature in Word or a similar feature in another word processing program.
  9. I run spelling and grammar check.

5. Briefly describe your computer use for writing and revising.
6. Which of these courses are you enrolled in currently?
  - Business Communication
  - Technical communication
7. What is your major?
8. Which of the following is generally true of your revision?
  - 1) Rewriting the whole or part of the draft
  - 2) Revising specific words or sentences
  - 3) Proofreading
  - 4) 1 & 3
  - 5) 2 & 3
  - 6) 1, 2, & 3
9. Anything else you would like to say on the subject of revising your writing using computers?
10. Your gender?



<sup>1</sup>This procedure is consistent with what is done commonly in multiple comparison tests or in the application of adjusted standardized residuals to individual (or combined) cells within a crosstabulation table to ascertain whether a statistically significant difference exists between categories of the crosstabulated variables.

Table 1: Categories of Drafts as Defined by the Students

Categories	Key Words / Phrases/ Markers	Representative Student Responses
First draft / outline / freewrite / rough draft	First, rough, outline, practice, reference to idea generation	<ul style="list-style-type: none"> <li>• "Putting your ideas for a work down on paper (could be in outline format)"</li> <li>• "A rough copy of your paper"</li> <li>• "First written or typed idea of the paper"</li> </ul>
Unrevised finished document (UFD) / final draft/preliminary copy	Final document, preliminary copy, beginning copy, completed version needing revision, an indication that this draft is just a step away from completion	<ul style="list-style-type: none"> <li>• "I define a draft as a completed version of a document/project either needing revision or ready for submission."</li> <li>• "A document that is meant to represent a final document but it is not yet completed due to the need for editing."</li> <li>• "One step before being done with a project"</li> </ul>
Iterative / process / distinct drafts	Stage, step, point, form, phase, version, piece, work in progress, process, multiple drafts	<ul style="list-style-type: none"> <li>• "Drafts are sequential steps to complete a final paper."</li> <li>• "It is a stage of writing. Whatever state my paper is currently in is its own draft"</li> <li>• "A draft is a document that has all of its parts and components. Each of these parts may not be fully completed (first draft) but they will continue to expand and get better as each draft is completed."</li> </ul>

Table 2: Number of Drafts Students Report Producing (n=112)

Survey question 3: In general, how many drafts do you produce of a given writing assignment before turning in the final version?	% Response	No. of Responses
1) 1	33	37
2) 2-3	64.3	72
3) 4 or more	3.6	4
4) Other (please specify)	0	0
<i>Total</i>	<i>100</i>	<i>112</i>

Table 3: General Revision Practices of Students (n=110)

Survey question 8: Which of the following is generally true of your revision?*	<i>% Response</i>	<i>No. of Responses</i>
1) Rewriting the whole or part of the draft	2.7	3
2) Revising specific words or sentences	8	9
3) Proofreading	1.8	2
4) 1 & 3	3.6	4
5) 2 & 3	54.5	61
6) 1, 2, & 3	29.5	33
Total	100	110**

\*Response choices 2, 3, and 5 indicate local revision. Response choices 1, 4 and 6 indicate global and local revision. Response choice 1 indicates global revision (significant rewriting), either of the whole draft or a portion (part) of it. Because only three respondents chose just response choice 1 (as shown in Table 3), for the purposes of analysis we have included these three responses among the respondents who stated that their revision generally consisted of both global and local issues. Thus, we treat response choices 1, 4, and 6 together as indicating a combination of global and local revision.

\*\*Two respondents did not answer this question

Table 4: Relationship between Number of Drafts and Global Revision (n=112)

No. of Drafts	Local Revision <sup>1</sup>	Global & Local Revision <sup>2</sup>	Total
1	29	8	37
2 or More	43	32	75
Total	72	40	112

<sup>1</sup>“Local Revision” is defined as response choices 2, 3, and 5 to survey question 8.

<sup>2</sup>“Global & Local Revision” is defined as response choices 1, 4, and 6.

Table 5: Student Categorization of the Term “Draft” (n=111)

<i>Categories</i>	<i>% Response</i>	<i>No. of Responses</i>
First draft / outline / freewrite / rough draft [STARTING POINT. FIRST STEP IN THE DRAFTING PROCESS]	41	46
Iterative / process / distinct drafts	33	37
Unrevised finished document (UFD) / final draft/preliminary copy [ALMOST FINISHED, BUT NEEDING REVISION--ONE STEP LEFT]	23	25
Others (Hard copy, peer review)	3	3
<b>Total</b>	100	111*

\* One respondent did not answer the question.

Table 6: Printing Out

I print out a hard copy to help me revise			
	%	Number of responses	
Always	16	18	
Often	31	35	
Sometimes	30	34	
Rarely	20	22	
Never	3	3	
Total	100	112	
Response Avg.	2.62		

Table 7: Relationship between Number of Drafts and Printing Out

<i>No. of Drafts</i>	Total Always+Often	<i>Sometimes</i>	Total Rarely+ Never	<b><i>Total</i></b>
1	11	10	15	36
2 or more	41	23	10	74
Total	52	33	25	110*

\* Two responses were not counted; one did not define draft, and one was erroneous.



Table 8: Relationship between Printing Out and Students' Reported Revision Practices

Printing Frequency	Local Revision <sup>1</sup>	Global and Local Revision <sup>2</sup>	Total
Always	10	8	18
Often	26	9	35
<b>Always+Often</b>	<b>36 (67.9%)</b>	<b>17 (32.1%)</b>	<b>53</b>
<i>Sometimes</i>	<i>18 (55%)</i>	<i>15 (44%)</i>	33
Rarely	15	7	22
Never	2	1	3
<b>Rarely+Never</b>	<b>17 (68%)</b>	<b>8 (32%)</b>	<b>25</b>
Total (without "sometimes")	53	25	78
Total	71	40	111*

<sup>1</sup> Local revision was defined as the following response choices to question 8: 2, 3, and 5.

<sup>2</sup> Global and local revision was defined as the following response choices to question 8: 1, 4, and 6.

\* One response was not counted

Table 9: Use of Track Changes

<i>I use Track Changes or a similar feature.</i>			
	%	No.	
Always	5	5	
Often	11	12	
Sometimes	11	12	
Rarely	26	29	
Never	47	52	
Total	100	110*	
Response Avg.	4.01		

\* Two respondents did not answer this question

Table 10: Relationship between Number of Drafts and Track Changes

<i>No. of Drafts / Reported Frequency of Using Track Changes</i>	<i>Always</i>	<i>Often</i>	<i>Sometimes</i>	<i>Rarely</i>	<i>Never</i>	<b><i>Total</i></b>
1	1	5	6	6	17	35
2-3	4	6	5	22	33	70
4 or More	-	-	1	1	2	4
Total	5	11	12	29	52	109*

\*Two respondents didn't answer this question; one respondent didn't answer the no. of drafts question correctly.