



# Sites of multimodal literacy: Comparing student learning in online and face-to-face environments

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## Abstract

This case study explores the efficacy of online environments for the teaching and learning of multimodal literacies. In our research, we seek to explore student learning between two groups who had experienced similar first-year composition curricula, one online and one face-to-face (f2f). Through an assessment of a pilot online curriculum taught at the University of New Mexico, which we call eComp, we explore the affordances and constraints of online and f2f learning environments for the development of multimodal literacies in first-year composition.

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## 1. Introduction

With distance education continuing to grow at a rapid pace and with more than 7 million students taking at least one online course (Allen & Seaman, 2014), composition scholars have increasingly studied and reported on the efficacy of online courses. These studies vary in content from focusing on student-perceived success in the online classroom (Boyd, 2008) to measuring the comparability of online courses to their face-to-face (f2f) counterparts (Arbaugh, 2000; Collins & Pascarella, 2003; Neuhauser, 2002; Sapp & Simon, 2005). In this article, we extend the conversation by asking how student learning of multimodal literacies differs in online and f2f environments. Specifically, we analyze assessment scores comparing student learning of multimodal literacies in online and f2f courses. It is not our intention to determine which is “better” equipped to provide students access to multimodal literacies, but instead, to understand the differences between the two environments. To compare student learning across these courses, we assess student e-portfolios from three sections of English 102, the second course in a two-semester sequence of required first-year writing courses at our institution. Of the three courses, one was taught f2f, two were taught online, and all featured an emphasis on multimodal composition. From the results of our assessment, we not only want to extend the scholarship regarding best practices within the online classroom, but we also hope to generate a conversation regarding what instructors of an f2f classroom can learn from the online environment, especially when adopting a multimodal curriculum.

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To contextualize our research, we first describe the recent scholarship surrounding online and multimodal pedagogies before discussing the ways in which our project highlights gaps in the scholarship, suggesting the need for more focus on online multimodal classes as a unique pedagogical environment. We then describe our methodology and the results gathered from a holistic assessment of student e-portfolios collected in the online and f2f classes utilizing a similar curriculum. The article presents our findings, combined with an explanation of the limitations of our small pilot study, and plans for future research. Lastly, based on the results of our assessment, we reflect on potential reasons for the differences in student learning of multimodal literacies in online and f2f classrooms and provide suggestions for teaching multimodal composition in both environments.

## 2. Online and multimodal learning

Although scholars largely agree that online education offers an experience equal in quality and effectiveness to traditional writing f2f courses, as Scott Warnock (2013) suggested, the conversation surrounding the “effectiveness” of online courses “is more challenging and dynamic than it might first appear” (p. 2). Recent research, most notably studies that assessed test scores and grades, indicated that student success in online courses was comparable to f2f courses (Arbaugh, 2000; Collins & Pascarella, 2003; Neuhauser, 2002; Sapp & Simon, 2005).<sup>1</sup> Similarly, in a study comparing a technical writing course taught online and f2f, Mehlenbacher, Miller, Covington, & Larsen (2000) reported “no significant difference” findings in terms of performance overall between the two groups. However, the authors also suggested “no significant difference” findings in the scholarship surrounding online education, including their own, could be influenced by other factors, such as student motivation, prior knowledge, and variances in learning styles.

To understand what factors impact student learning in online classrooms, scholars have analyzed specific components, such as student participation and instructor interaction. For instance, Meyer (2003) and Picciano (2002) suggested that students in online courses, especially those who are more introverted than their peers, generally participated more in online discussions than in traditional f2f synchronous discussions. William Finlay, Christy Desmet, and Lorraine Evans (2004) found that students participated more often and were generally more satisfied than students within f2f classes, with students’ comments suggesting that the online classroom allowed for more interactive community building, particularly within asynchronous discussion boards. Boyd (2008) also found that students in the online classroom perceived the platform to be more interactive, thus leading to greater satisfaction with the overall course.

When researchers did find variations in learning, as Finlay, Desmet, and Evans (2004) suggested, the differences most likely were affected by factors such as instructor motivation and the instructional quality of the course. We suggest that another factor that might influence student learning is the introduction of a multimodal curriculum—one that focuses on asking students to produce documents beyond traditional print-based texts native to a digital environment. Specifically, we seek to understand the differences in student learning of multimodal literacies within online and f2f environments.

To date, no comparative study of online versus f2f learning has focused on student acquisition of multimodal literacies. For more than a decade, teachers and scholars have called for the cultivation of multimodal literacies, asking students to create texts that exceed the alphabetic by including sound, animation, images, and more (Takayoshi & Selfe, 2007). Acquisition of multimodal literacies, NCTE (2005) suggested, includes prompting students to use multiple modes<sup>2</sup> of communication to transform the meaning of their work. As Lutkewitte (2014) noted, “[M]ultimodal composition offers us the opportunity to discover other ways of knowing and communicating ideas besides the ways we know and communicate through traditional print-based writing” (p. 11).

Just as multimodal composition offers students new and engaging ways of learning, it also offers instructors new ways to approach online education. Because online students already communicate through technology in multiple ways (i.e., asynchronous discussion boards, course blogs, videoconferencing, nonlinear classroom environments, etc.), multimodal composition, specifically in terms of the creation of digital documents, is a natural fit for online writing

<sup>1</sup> We acknowledge that others, such as Sener (2004), have pointed out the problematic implications of comparing online courses with f2f counterparts, stating that the differences between online and f2f education make comparison and equivalence an “irrelevant goal” and that online education should therefore be evaluated “on its own terms” (p. 1). However, we felt that our research goals were valid, especially in light of the dearth of scholarship about multimodal assessment generally and multimodal online assessment specifically.

<sup>2</sup> While these modes do not have to be digital in nature (Shipka, 2011; Williams, 2007), all of the projects discussed in this article were technologically based and were meant to promote digital literacy as well as multimodal literacy.

courses. Additionally, as online education continues to grow, it is imperative that online students receive similar experiences and educational opportunities as f2f students. As more instructors turn to multimodal composition in traditional f2f courses, the design of online writing courses must also remain informed by current understandings of best practices in composition pedagogy.

However, educators also need to make sure that the multimodal curriculum they implement, no matter what the medium, does more than just engage students; such a curriculum also needs to ensure that students are learning the rhetorical concepts behind creating multimodal texts. As Neal (2011) suggested, one way to ensure student learning of these concepts is through assessments—not only assessments that quantify learning through traditional measurement procedures, but also examine students’ reflective assessments of their work. In the sections that follow, we discuss our methodology and assessment practices used to study and illustrate student learning.

### 3. Methodology and assessment: A mixed-methods approach

For our methodology, we turn to Johnson, Onwuegbuzie, & Turner’s (2007) definition of mixed-methods research, which defined the approach as an “intellectual and practical synthesis based on qualitative and quantitative research” (p. 129). We believed both qualitative and quantitative research would best help us answer our research questions: What are the differences in student learning of multimodal literacies in both f2f and online environments? What are the potential reasons for these differences and how can they lead to increased best practices of multimodal composition? To present the results of our study, we offer quantitative results from our assessment, where we scored students’ e-portfolios according to a rubric we used for evaluation within the courses in our pilot study. We also add qualitative research in the form of quotes from student projects, using their own work and reflections to illustrate student learning. In the sections that follow, we offer a description of the courses and curriculum within our study, as well as a detailed illustration of the qualitative assessment and results.

### 4. Multimodal curriculum

Our study sought to compare two pilot online courses with an f2f class employing similar curricula. Our online courses were designed as part of a program called eComp (short for Electronic Composition) that two authors of this article, Dr. Andrew Bouelle and Dr. Tiffany Bouelle, developed for the University of New Mexico. The program was designed based on a similar program developed (with other colleagues) at Arizona State University called the Writers’ Studio, which was successful in maintaining the standards of first-year writing while emphasizing multimodal literacies (see Bouelle, Rankins-Robertson, Bouelle, & Roen, 2013; Bouelle, Bouelle, & Rankins-Robertson, 2013; and Rankins-Robertson, Bouelle, Bouelle, & Fisher, 2014). Much like the program established at ASU, all of the online courses within eComp required that students create three projects and an electronic portfolio that showcased their writing process throughout the semester and discussed their achievement of course outcomes through reflection. Students worked through multiple drafts of their projects, which were supported by peer review, instructional assistant review, and instructor review. The instructional assistants (IAs) within eComp’s pilot semester were graduate teaching assistants from the writing program and undergraduate tutors from the university’s writing center who were trained to give feedback on multimodal texts (for more information about the use of instructional assistants, see Bouelle, Bouelle, & Rankins-Robertson, 2015). This type of feedback is important in an online class, where research has suggested that students require more interaction (Boyd, 2008). The inclusion of IA feedback can also be beneficial when online instructors may already find the workload challenging (Reinheimer, 2005) and cannot offer the extra feedback that is so crucial in the composition of multimodal projects (Borton & Huot, 2007). Therefore, in addition to peer review with classmates, students had access to another round of review from a knowledgeable tutor. We believe this helped students develop their writing process, while at the same time providing them with more opportunities to make connections in the online environment.

Informed by the belief that online students (many of whom could not attend f2f classes due to circumstances such as geographical barriers, professional obligations, or familial responsibilities) should have equal opportunity in terms of learning multimodal literacies, the eComp classes asked students to create multimodal texts in response to all three major assignments: a review, a commentary, and a proposal. The eComp classes used *Writing Today* by Charles Paine and Richard Johnson-Sheehan & Paine, 2013, the common textbook for all first-year composition classes at the University of New Mexico. All projects corresponded with chapters in the textbook that offered information

about composing specific genres, including ideas for multimodal projects within each genre. In terms of a typical multimodal project, students could develop a podcast, video, or blog, among other options that used more than one mode to communicate. These multimodal documents often supplemented, rather than replaced, the written portion of the assignment. Students then reflected on their multimodal choices in their e-portfolios, where they detailed how a chosen medium effectively achieved a desired purpose for a given audience. The e-portfolio reflections were in-depth self-assessments using [White's \(2005\)](#) model of reflection, wherein the reflections acted as an argument that course goals have been met, with the contents of the e-portfolio constituting the evidence that students drew from to make their claims. As [Shipka \(2005\)](#) pointed out, such reflections are especially important when students are creating multimodal projects because “students must always account for the specific goals they aimed to achieve with their work and then specifically address how the rhetorical, material, methodological, and technological choices they made contributed to the realization of their goals” (p. 287). The e-portfolios were also multimodal in nature, created in Google Sites, and students were prompted to add visual and aural elements to complement the reflective texts. The instructor provided feedback on the projects and the e-portfolio simultaneously in an effort to help students continue to craft their work throughout the semester.

Typical scaffolding of a project included online discussions regarding the criteria of the project, as well as choice of medium. Students often analyzed sample projects, either student-produced or examples in popular culture, offering rhetorical analyses and critiques of a piece before commenting on what they would do differently when composing their own multimodal pieces. They were also prompted to discuss the unique features of each medium: a website would have links to supplemental pages; a video might have sound, as well as pictures and text; and a podcast might have narration, sound effects, and music. For example, in the commentary project, students found a sample commentary online and discussed its merits and drawbacks with peers in a discussion board. They not only commented on the argument, but also on the design features that either enhanced or stymied the argument; they responded similarly when analyzing student work. Including analyses of student work helped students continue to build understanding in the genre as well as generate ideas for their own projects. Other scaffolding assignments included reading response journal entries and quizzes on project overviews.

One of the authors of this article concurrently taught an f2f section of English 102 alongside one section of eComp. Students working in the f2f class completed the same set of assignments, but discussion board posts were replaced by in-class discussions. For instance, the instructor led discussions much like the ones in the online section, including those that analyzed multimodal documents and allowed students to critique rhetorical choices. The instructor utilized the same videos, newsletters, and other multimodal documents that were used in the online course. The instructor also facilitated numerous class discussions about course outcomes and how to effectively write reflections that clearly indicated the rhetorical choices which influenced students' multimodal projects. Just like in the online classes, the students received feedback on these e-portfolio reflections when they turned in their instructor drafts. The f2f students also created Google Sites to house their e-portfolios, and they participated in peer review before turning in their instructor drafts. So while the daily assignments and activities were not identical between the online and f2f sections, the overall curricula and scaffolding exercises were functionally parallel.

Students in the f2f class also worked through multiple drafts of each project. They were encouraged to visit the university's writing center, which would give them access to the same IAs within the eComp class. In fact, the administrators of eComp helped train all tutors working in the writing center to give feedback on multimodal projects, not just the IAs who worked in the eComp model. Unfortunately, our university does not currently offer embedded tutors for f2f writing classes, as these students can either physically visit the center or receive their tutoring online. However, the f2f students could also utilize the writing center's online tutoring service, giving them access to extra feedback in a similar manner to the online course.

## 5. An in-depth look at the assessment procedures

For our assessment, we examined student e-portfolios within the three classes, which showcased a number of digital texts composed in various genres and media. This method attended to [Hamp-Lyons and Condon's \(1993\)](#) suggestion that portfolios used for assessment include students' work in a variety of genres. We agreed with Hamp-Lyons and Condon when they said that portfolio-based writing assessment is highly contextualized, and we sought to create a small-scale assessment that would fit our institutional context and research interest. The pilot study was deliberately done on a small scale to inform our curriculum before we expanded the online program significantly; however, we

believe that our results are relevant to teachers, scholars, or writing program administrators developing online and/or multimodal curricula in both f2f and online environments. While we certainly encourage more research in the areas we discuss, we argue that our study provides insight for teaching multimodal composition in both f2f and online environments.

### 5.1. Performing a holistic assessment

Hamp-Lyons and Condon (1993) pointed out that using portfolios for assessment complicates the scoring process because readers must look at a variety of texts, often differing in quality, rather than a single document. However, for our study, we sought to look not only at student projects, but also at the reflections, wherein the students made arguments for their learning in the course, using the projects and other class material as evidence to support their arguments. Therefore, we wanted to consider not only the work the students completed, but also their own assessment of their learning during the semester. We recognized that this further complicated matters (even more than Hamp-Lyons and Condon suggested), but nevertheless, we felt that a true assessment of the students' learning would be incomplete without giving the students the agency to also assess themselves through reflection (Neal, 2011).

For the assessment itself, we assembled a team of five readers (two faculty members and three graduate students) to read the students' final e-portfolios. Following Huot's (2002) recommendations that assessment be locally designed and controlled, four of these readers had taught or tutored in the model and, therefore, were intimately familiar with the curriculum; however, the assessment was designed in such a way that no one would be reading the work of a student with whom she or he had direct contact over the course of the semester. The fifth reader was needed to ensure that all students' e-portfolios would be read by someone who had not worked with the student previously, even in the case where a discrepancy between two scores required a third reader.

### 5.2. Calculating a sample size

The team assessed all available e-portfolios from the f2f English 102 class and randomly sampled half of the e-portfolios from the online classes. Because a few students withdrew from the courses and some portfolios were inaccessible, in the end, we compared the same number of e-portfolios from each group: 21 from the f2f class and 21 from the online class. Twenty-one e-portfolios from the two online classes would provide a 50% sample. We believed that a 50% sample was adequate to give us a clear picture of the learning that occurred in those courses, and we wanted a one-to-one ratio of the number of online e-portfolios versus f2f e-portfolios. The outcomes assessment office at our institution supported the decision, indicating that the 50% sample was more than adequate. However, we wanted to establish a confidence level in our sample; therefore, we used Kerlinger and Lee's (1999) equation:

$$n = \frac{Z^2 \sigma^2}{d^2}$$

to determine a confidence level of 80% in our sample size of 21 e-portfolios for the online classes. (For more information on the equation we used to determine our sample size and confidence interval, see Appendix A.)

### 5.3. Scoring the portfolios

To establish inter-rater reliability, we held norming sessions prior to reading the e-portfolios, where the readers met to rate and discuss several sample e-portfolios. Such standardizing sessions are integral to portfolio assessment, according to Hamp-Lyons and Condon (1993) and White (1994). The purpose of the standardizing sessions was to, as White (1994) explained, "create a temporary, artificial interpretive community" or, in other words, "a group of teachers who agree to agree on scoring" (p. 100). We recognized that our e-portfolio readers, as White argued, "must 'own' scoring standards before they can work together as a reliable team" (p. 102).

Readers conducted careful reviews of the e-portfolios in their entirety, both the projects and the reflections. The rubric used for assessing the e-portfolios, as Hamp-Lyons and Condon (1993) suggested, included criteria grounded in the curriculum of the course in which the e-portfolios were produced. The criteria were scored on a five-point scale (0-4), and readers were given guidance as to what each numeric marker represented. The portfolio rubric is available in Appendix B.

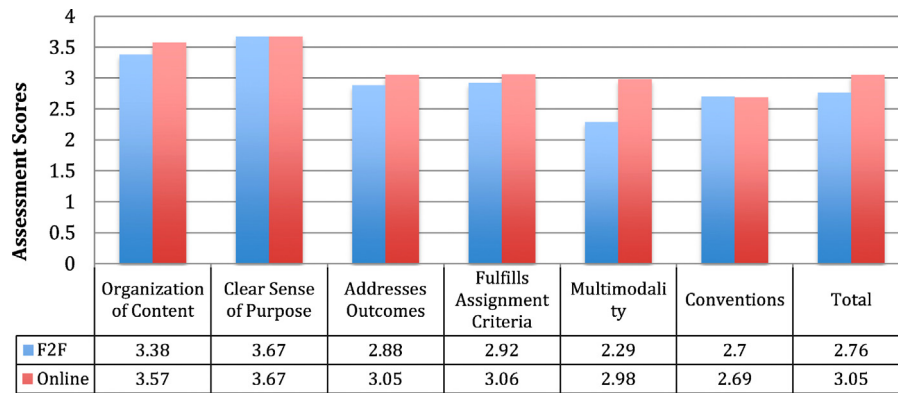


Figure 1.

Readers were allowed to score each criterion to the 0.5 decimal point. For example, a reader could score a criterion with a 3.5; however, a reader could not give a score of 3.4. For each e-portfolio, readers assigned scores to the different criteria using an Excel spreadsheet. The spreadsheet was set up to automatically calculate the total score for the e-portfolio using the percentages for each criterion (see Appendix B for more details).

Although readers did not consider any of the criteria with more importance or scrutiny than others (such as in a primary-trait assessment), when scoring for the category of multimodality, they were encouraged to evaluate the rhetorical choices students made when creating the project rather than the software used. For instance, a well-designed blog post or newsletter was regarded as highly as a video or podcast, instead of privileging one medium over another. Our assessment of this criterion included reviewing student projects in a similar manner to Murray, Sheets, and Williams' (2009) evaluations. The authors suggested that instructors evaluate multimodal texts, as much as possible, as they would when evaluating written-based texts. Their suggestions included evaluating such qualities as organization of contents (a logical progression), the overall focus (thesis), development (the unique features of the medium and how well the modes worked together), format and design (overall design aesthetics, as well as color, font, and image selection as they pertained to the project), and mechanics (grammar and punctuation). To support their scoring in this category, readers also looked at student reflections as a means of evaluating student learning of multimodal literacies.

Once the individual attributes were scored, a total score for the e-portfolio was determined based on the percentage breakdown of the criteria. Based on White's (1994) suggestion that two scores "disagree" when they are "more than one point apart" (p. 237), we decided that a one-point differential would constitute reasonable agreement. Therefore, if an e-portfolio was assigned scores that varied by more than a single point, that e-portfolio was assigned to a third reader to arrive at what White called "a reconciliation score" (p. 212). By the third read, inter-rater reliability would be established; the two similar scores were saved, and the anomalous score was discarded. For example, if an e-portfolio received scores of 3.5 and 1.5 on its first round of reading, the gulf between the scores would trigger a third read. If the third reader assigned the e-portfolio a score of 3.0, then the 1.5 score would be discarded as the outlier. The need for a third reader was not common, occurring only about 10 percent of the time.

## 6. e-Portfolio assessment

### 6.1. Numeric results

The results of our assessment revealed that, in general, the students in the online classes received the same or higher scores than the f2f class<sup>3</sup>. The differences were usually minor, with the online courses showing slightly higher scores in several categories. However, the largest disproportionality occurred in the "Multimodality" category. (For more information, please see Figure 1 for the numeric data, as well as a visual representation of the numbers.)

<sup>3</sup> With a larger population size, we could determine if the differences were "statistically significant"; however, with a sample size of 21 for the online class, we only descriptively addressed the discrepancies ((Norbert Elliot, 2014, personal communication).

The f2f students scored an average of 2.29 in “Multimodality,” the lowest score among all the criteria. In the online classes, the multimodality average was 2.98, making the difference 0.69. In contrast, the second largest area of disproportionality was “Organization of Content,” where the difference was only 0.19. This shows us that student learning in the classes was comparable in most ways, with the exception of how well the students performed on the multimodal requirements of the e-portfolio and assignments. In fact, the disparity in the “Total” column was predominantly because the “Multimodality” criterion is so far apart. Without such a wide difference between the “Multimodality” scores, the overall scores would be much closer.

We conclude that four factors potentially contributed to the discrepancy between the online and f2f students’ scores in the multimodality criterion. First, students more comfortable with using technology could self-select the online classes (although, as we discuss later, we believe this factor was likely negligible). Second, the presence of the instructional assistants in the online courses could have made an impact. Third, the nonlinear learning environment and the archival nature of the online classes could have aided students in writing more robust self-reflections, which was an important part of the portfolio evaluations. And, finally, we believe that providing the same level of instruction regarding technology—i.e., giving students access to online tutorials rather than spending in-class time teaching students how to use particular computer programs—contributed to students in the online classes receiving higher scores because online students are probably more likely to use the provided tutorials. In the upcoming “Discussion” section of our article, we address in detail how these four factors could have contributed to the discrepancy between online and f2f students in the multimodality criterion. However, before we discuss our conclusions, we believe it is worthwhile to look at some of the student projects and reflections in detail, as they provide more information than the numerical numbers alone can tell us.

## 6.2. Differences in student learning: Examining student projects and reflections

White (1994) pointed out that “the major theoretical difficulty with holistic scoring emerges from the limitations of the single score, which gives useful and reliable ranking information but no details” (p. 232). Therefore, we hoped to complement our numeric data by carefully looking at the projects and comments students made in their reflections. For the most part, regarding the projects in the f2f classes, the e-portfolio readers indicated that students struggled with what Murray, Sheets, and Williams (2009) described as development, or knowing how to take “advantage of all of the available rhetorical possibilities that the modes have to offer.” In many examples, the f2f students also seemed to have trouble with format and design, or an awareness of how to make choices about overall design as well as “color, typeface, layout, image selections, audio choices, etc.” The authors tied these considerations to audience awareness, or an understanding of how to make choices in design according to the needs of the audience.

To gain a deeper understanding of why students were making these choices, we turned to their reflections. In general, we found that the student reflections in the online courses more often emphasized learning from the multimodal formats than the reflections from the f2f class. References to “multimodal” work or specific multimodal genres, such as blogs or videos, were evident in the e-portfolios of the students who were in the online classes. However, in the f2f class, many students had difficulties discussing multimodality or their choice of medium and how the choice would best communicate their message to their chosen audience. They also had difficulties relating their specific format and design decisions to the needs of their audience.

For instance, in the f2f class, one student developed what she defined as a website for the first project, a review. She chose to design this project about her favorite local restaurant. Recall that both the f2f and online classes incorporated discussions about unique rhetorical features of various media, including websites; therefore, the student should have been at least somewhat familiar with the medium and its capabilities. However, she only used two pictures throughout the entire site, and there were no links to supporting pages, indicating she had not taken advantage of the digital space to its fullest rhetorical capacity. In regards to development, the two pictures were added to the website without regard to where they were located in the text (i.e., the picture of food was not placed in conjunction with the paragraphs where the student described the menu choices). In addition, the pictures appeared in the text somewhat haphazardly, which indicated an issue with format and design. In other words, the text was not wrapped around the pictures and by adding the pictures, the text surrounding the pictures became centered instead of left-justified like the other text seen throughout the webpage.

We turned to her reflection as a guide for evaluation, and her comments indicated what we suspected: the student had difficulties with choice of medium and understanding the needs of her audience for her purpose. She stated,

My review could be used as a medium for a paper document and/or a website. My review on paper would be a lot longer than what I would put on the internet. My review on a website has pictures and concise writing to catch readers [sic] eyes. The purpose of my review was written to not only inform people about [the restaurant], but to get people to try it and invite more people to visit it.

Here, the student wrote somewhat generally about her choices, making rather rudimentary distinctions between the website and what she called the medium of a “paper document.” She mentioned the readers, but did not offer specifics regarding who these readers are and the choice of medium according to the needs of her chosen audience. She failed to address why she chose the website option, nor did she actually provide any reflection about what she learned. Moreover, her opening statement—“My review could be used as a medium for a paper document and/or a website”—used the word medium in a confusing way, suggesting that she might not fully understand what was expected from her when she was asked to choose her medium. Her writing did not suggest that the student could effectively communicate that she learned the rhetorical considerations associated with creating multimodal projects, as was the goal of the reflection.

Contrast this project and response from the f2f class with the following student in one of the online sections who chose to write her review in the form of a newsletter. The student created this newsletter about her favorite restaurant, similar to the f2f student. However, this student seemed to understand the rhetorical possibilities of the medium, providing numerous photos that complemented the text. For example, she used pictures of the outside and inside to illustrate to her audience the “good old fashioned atmosphere” of the diner. In addition, she included a picture of fries that were similar to the ones she described, noting the seasoning that made the food delicious; the picture also captured the green seasoning flakes, illustrating what the student was describing. Lastly, for format and design, the student used columns for text and included the pictures in the columns as well, leaving enough whitespace between the text and illustrations to indicate the importance to the reader. She also included a gray border around the edge of the newsletter, very similar to wallpaper that one might see in the type of diner the student described.

To support our evaluation, we turned to the student’s reflection, where she indicated her reasons for choosing the newsletter medium. “I tried to compose it as something that might be found on the front desk of a hotel,” she stated, adding, “I have lived in hotels and worked in hotels, so I know from both sides of the counter how helpful those newsletters can be. I have found newsletters to be more detailed and a tad more reliable than an online review found on yelp.com or such.” These comments demonstrated that the student put considerable thought into her decision about medium. For instance, she illustrated two various sides of her audience—a hotel patron and an employee—and how she developed the project accordingly. This example demonstrated what Hess (2007) was advocating when he stated that students need to “develop their own perspectives and theorize how they came to a particular composing approach and *why* it fits their project” (p. 29, his emphasis).

The student also indicated that she understood the needs of her audience, and this understanding came about after conducting primary research:

Because my review was written as a way to encourage my audience to visit [the restaurant], I tried to point out the unique qualities it possesses, while holding it to my own expectations. It would ideally be read by others seeking a good dining experience. I posed my ideal diner within the content of my review, because during my secondary phase of research—questioning friends, family, and just a few helpful strangers—I realized that my expectations on a quality diner were similar to that of others. People wanted a good atmosphere and great food for the most part, preferably with reasonable prices. In my review, I tried to balance out the positive with the negative aspects.

The student clearly illustrated audience awareness with the choice of her medium and the content included within. Furthermore, this student expanded on what she learned in the first assignment when deciding what medium to use for her second project. She stated in her reflection,

The idea of creating another word document and doctoring it to fit a certain style did not seem very exciting this time around. It worked well enough for my review project, but now that I knew more of what to expect from the multimodal aspects of the assignments, I wanted to have fun with it. Therefore I decided to create the pages of my commentary as actual images themselves. I have a very particular visual aesthetic, and this format allowed



me to really play with the visual components in a way that *Microsoft Word* could not. I did write my initial drafts within a document, if only to help me with the tedious editing process, though the majority of the work was done within *Adobe Photoshop*. I wanted to create a very sleek and clean visual, but at the same time I wanted to give the editorial a bit of whimsical newspaper flare. I am quite pleased with the outcome.

In this case, the student not only articulated her choices when composing the multimodal aspect of the commentary project, but she also demonstrated enthusiasm for the work she did, a good indication that this was a productive learning experience for her. She commented on both the style of her writing, which she described as “whimsical,” as well as the style of her design, which she described as “sleek and clean.”

The same student provided substantive detail about her third project as well, which included a video PSA that went through several drafts. Moreover, she spent time in her reflection comparing her own video to another classmate’s video that was “rather good.” “It was comprised of photographs and a narration about drinking and driving,” she stated, adding,

It was short, but well done and it got the point across. I chose not to narrate mine, but rather I presented the information through text. I did this partly because I have been told I sound like a Disney Princess, and I figured my voice would take away from what I was trying to express. I covered up the silence through an array of sound effects and music, but I rather liked how [my classmate] narrated his PSA.

In this case, the student was not only reflecting on her work, but she demonstrated that she looked at the work other students did and thought critically about the rhetorical choices they made as well. Ultimately, she recognized that there was more than one way to effectively complete the assignment, opting for what worked best for her in her rhetorical situation. Her reflections demonstrated an underlying understanding of the rhetorical aspects of creating multimodal projects.

Such in-depth reflection on the multimodal aspects of projects was not as common from students in the f2f class, although it was not absent altogether. For example, the following student from the f2f class provided one of the most voluminous, thorough reflections of any of the students. Her reflections predominantly covered what she learned about writing, though she did address multimodality. When describing the digital poster PSA she created in *Microsoft Word*, she explained that she had learned the five principles of design (as described in *Writing Today*) and tried to incorporate those principles into her project about rising tuition costs. She stated, “I paid attention to balance by reducing the amount of text I include to balance with the line graph. I also added contrast by using a bright color, red, for text [to] get my audience attention. Designing is helpful skill to learn to get a reader’s attention.” The student clearly reflected upon and learned from the multimodal component of the project, including how images and text interact. However, it is worth noting that she only gave this attention to multimodality for the one particular assignment, not all three, as the online student mentioned earlier did. Indeed, unlike the online students, many of the f2f students were not able to clearly articulate their rhetorical choices within their reflections.

While some students in the f2f class referenced multimodality in some capacity, the reflections in the online classes generally seemed richer and more developed. The online students seemed to consider how the multimodal components fit into their written work, as well as how they learned from working in multiple modes. For example, one online student stated that she “stepped out of [her] element” composing multimodal projects: “I have always been use [sic] to just writing in text and maybe once in a while using powerpoint,” she stated. For her first project, she created a blog with a short video, which included images and music. For the second, she used a newsletter format, with pictures. And for her third, she wrote an open letter accompanied by a video slideshow. “I think this class has broadened my horizons and showed me the importance of using the multimodal component,” she said.

We were also heartened by the frank way the online students reflected on the challenges of multimodal composition, describing the difficulty as well as what they learned. The students were not just doing the work; they were learning from doing the work. For example, one student explained that the instructional assistant pointed out that she was missing a “big idea sentence” in her proposal; she speculated that she had missed this because she had been preoccupied by focusing too much on the multimodal elements. “Although it is no longer daunting, and in fact I rather enjoy working with media programs and such to better the appearance of my writing, it is a bit distracting,” she stated. “In other words, I have discovered that I get very easily distracted while working with multimedia, and I neglect essential elements in the writing itself. I am grateful to be aware of this flaw.” One of the major concerns of emphasizing multimodality in composition is that students’ learning about writing will be affected negatively—that the emphasis on multimodality

will detract from writing rather than enhance it. Rather than support this fear, we think this student's comments actually showed the value of working with multimodal and textual elements. The student discovered how challenging it is to work with multiple modes, and she learned to make sure to focus on her writing and not let it suffer because there are other elements to a project. She also learned to recognize that just because there are other elements, the written aspects of a project must be high quality—and all the elements must work to complement each other.

## 7. Discussion

As we noted with our assessment scores and from the reflection, student learning of multimodal composition seemed to vary between our online and f2f courses. In this section, we explore some of the reasons for these differences and postulate the impact these differences had on student learning of multimodal literacies.

### 7.1. Self-selection

When looking at the results, one might assume that the differences between the scores in the criterion of multimodality are most likely a result of self-selection—that is to say that the students who naturally gravitate toward online classes might generally be more comfortable with technology. Although this hypothesis may have some merit, we do not think self-selection is a major factor in the discrepancy between the online and f2f scores based on the student population of the eComp courses. Preliminary survey research in a subsequent semester of eComp courses revealed that roughly a third of eComp students are above traditional college age, and that about two-thirds of the students enrolled in eComp elected to take the course online because of pressing life circumstances (i.e., familial obligations, work, medical conditions, or geographical barriers). Some respondents also indicated they were not entirely comfortable with using technology. Based on these responses, we have determined that the majority of eComp students choose to take the course online for reasons other than their interest in or facility with technology, and, therefore, we have tentatively ruled out self-selection as the reason for the discrepancy between scores in multimodality across the sections we studied.

### 7.2. Instructional assistants

An additional hypothesis explaining the online students' higher scores in multimodal composition involves the inclusion of instructional assistants (IA). Although the f2f students were encouraged to visit the campus-based tutoring center, the online students had immediate access to tutors for every project. [Borton and Huot \(2007\)](#) suggested that students should receive formative feedback on their multimodal projects throughout the process of writing or creating the project, and this is sometimes difficult to do in f2f classes. It can be even more challenging in an online class, where the instructor often works harder to provide substantive feedback in a timely fashion ([Reinheimer, 2005](#)); thus, the work of instructional assistants could potentially make a substantial difference in student learning.

For example, one student said the IA helped by both commenting on the project as well as communicating via email when the student had follow-up questions. "This was a huge help because I was definitely stuck on the multimodal component," he said. Other online students expressed how the IAs helped them in general and with their multimodal projects specifically. "After watching the video from my Instructional Assistant," one student stated, "I still had further questions. So, I had responded and asked her to help me with my video that I created for my multimodal component." Another student expressed how he found the feedback very helpful, particularly that the IA had used a Jing screen-capture video, instead of written comments, showing that the team was using multimodal instruction as a way to demonstrate the possibilities of multimodality to students. "This was interesting and I believe that this video was a lot more informative than a written review would have been," he stated. The student comments supported, at least anecdotally, our hypothesis that the IAs helped with multimodality, perhaps influencing the higher score in this category within the online class. The presence of the IAs might, in fact, account for the equal or slightly higher results across the board.

### 7.3. Nonlinear learning environment

[Mehlenbacher et al. \(2000\)](#) suggested that the archival nature of the online course may offer opportunities for more robust reflection, as students can easily return to previous ideas, discussions, or even supplemental videos to better

grasp concepts. This archive can help them when reflecting on their work, as they are able to “relearn” or revisit certain concepts. In other words, students who are not only active, but also reflective, may fare better than others because they are able to engage with the interactive components of the class while simultaneously reflecting on their learning process. In turn, [Lauer \(2013\)](#) suggested, when students write deeper reflections where they account for their choices regarding audience, purpose, and medium, they tend to produce more rhetorically effective multimodal projects. Thus, the opportunity to return to “evidence” of their learning within the online archive may have influenced the quality of the online students’ reflections, thereby leading them to produce more effective multimodal projects than their f2f peers.

An additional benefit of online learning environments may include the spatial and temporal location of tools and resources, especially in a course that supports multimodal literacies. [Halverson and Shapiro \(2012\)](#) outlined the distinction between “technologies for learners” and “technologies for education” (p. 3). Technologies for learners are “designed to support the needs, goals, and styles of individuals,” such as “digital media production tools, word processors, presentation software, blogging tools, and video editing tools,” as well as “technology-mediated activities, video games, fantasy sports, fan fiction, and on-line stock trading” (p. 3). In contrast, “technologies for education” are “tools that policy makers and leaders use to measure the process and quality of academic work in schools,” and these include, among other technologies, learning management systems (p. 2). Students who have access to technologies for learning (i.e., technological tools for multimodal composition and video tutorials on how to use them) within their actual learning environments (i.e., learning management systems, or technologies for education) may have a distinct advantage over f2f students. In multimodal pedagogies that prioritize the process of rhetorical selection of modalities rather than focusing on the various technological tools, the convergence between technologies for education and technologies for learners may have an impact on students’ learning.

In addition, online students may also be better prepared to recognize and analyze the variety of modes they currently consume and produce. As [Ito et al. \(2013\)](#) suggested, a central paradigm for twenty-first century education can be described as “connected learning,” wherein learners are able to connect formal learning (which is moderated by technologies for education) and informal learning (which is supported by technologies for learners) while receiving ongoing formative assessment from mentors and peers in both realms. Many of the informal learning environments that today’s first-year writers engage with outside of the classroom—such as fan fiction, social networking, vlogging, and gaming ([Ito et al., 2013](#))—take place in or are supported by online communities that are characterized by their own literacy practices, many of which are multimodal. As a result, multimodal composition might be one area of learning that is particularly well supported by making connections—both cognitively and spatio-temporally—between formal and informal learning environments. As a result, online learning environments, which exist in the same space as digital extracurricular composition, may facilitate transfer of students’ preexisting knowledge about multimodal literacies into the first-year composition curriculum.

#### 7.4. Teaching technology

To meet the [CCCC Online Writing Instruction, 2013](#) Principle 2, which states, “[A]n online writing course should focus on writing and not on technology orientation or teaching students how to use learning and other technologies,” we felt it important to spend little time on instruction of multimodal tools. In both the online and f2f formats, we did not “teach” technology to the students to support their development of multimodal literacies. Students in both the online and f2f classes were encouraged to use various programs to develop their projects, including what [Anderson \(2008\)](#) called “entry-level technologies,” or those with “simplified interfaces, limited feature sets, and broad availability” (p. 43), or more innovative technology, such as iMovie or Audacity. As mentioned during the discussion of our assessment, we focused on the rhetorical considerations learned to create the multimodal projects rather than the choice of software.

Several factors led us to our decision to focus on rhetorical skills instead of teaching technology in the f2f classroom. First, we wanted to give students the opportunity to choose genres and media that they thought would serve the rhetorical needs of their particular project. Second, our f2f class could not be held in a classroom where all students could have immediate access to a computer; the only computer in the classroom was for instructor use only. This type of classroom is consistent with the majority of first-year composition courses at our institution. Such a classroom limits the amount of instruction that can occur in terms of “teaching technology” that may accompany a multimodal curriculum; therefore, we felt it necessary to allow such a broad definition of multimodality, placing equal emphasis on all projects, no matter what software students used. However, in both courses, we provided tutorials for programs such as iMovie, Audacity,

and other comparable programs. The f2f students could access these tutorials in a supplemental Blackboard shell that accompanied the course.

We feel that the lack of technology allowed us to emphasize student development of the rhetorical skills promoted by a multimodal pedagogy. Instead of focusing on teaching technology, we could turn our attention to teaching the rhetorical concepts of multimodal composition. Indeed, Neal (2011) discussed the challenges of teaching multimodal composition without the use of such technologies as digital cameras, video-editing software, or even computer labs. Because of institutional challenges that may limit technology use, Neal argued that it is more important to focus on the rhetorical concepts learned as illustrated in students' reflections. The emphasis should be on the rhetorical considerations students must make as they think about their audience, purpose, and medium of delivery, as well as the ways their alphabetic writing interacts with other modes. Like Neal, multiple scholars (including Ball, 2012; Borton & Huot, 2007; Selber, 2004; VanKooten, 2013; Wysocki, 2004) have also suggested that rhetorical considerations are a crucial component of multimodal pedagogy.

However, after reviewing our assessment results, we believe more could be done to promote multimodal literacy, especially in the f2f courses. For instance, Anderson (2008) suggested that simply bridging the classroom with extracurricular multimodal composing can encourage students to experiment with more innovative technology outside the classroom. He suggested that instructors ask students to create playlists, something they potentially already do on a regular basis, writing reflections as to why they chose the songs and in what order they represented them in the list. Students can create playlists outside of class time, and these exercises can encourage students to test more innovative technology, which can ultimately lead to enhanced critical thinking when creating multimodal projects.

In fact, Anderson (2008) emphasized the "motivational potential" of multimedia projects, especially when students choose to work with programs in which they are unfamiliar (p. 51). According to Anderson, more innovative technology promoted a higher level of engagement with the program, which in turn encouraged "intellectual rigor" (p. 52). We certainly found this to be true within the students' reflections: the online students who used more innovative technology often wrote more in-depth reflections on their learning and the choices they made while composing. For example, one student stated, "When [the instructor] emailed everyone and told us, 'There are tutorials in the course that will help you learn how to create video using various software,' I went and checked out the tutorials and I was given great information on how to use iMovie which is what I used for my multimodal component of the project." Perhaps a reason for this deeper reflection was because of the online students' general tendency to choose more challenging or unfamiliar media, such as videos or podcasts, whereas the f2f students more often chose entry-level technologies, such as blog posts or newsletters using Microsoft Word templates. If we are to believe Anderson's claims, this deeper reflection may be a result of the online students choosing more challenging media to convey their messages.

## 8. Conclusion

While we speculate that some of the differences are just a natural part of the world of online education (i.e., self-selection, the nonlinear environment), there are other practices from our online curriculum that can perhaps inform best practices for multimodal composition in both the online and f2f classroom. For instance, from our student responses, we note the importance of the instructional assistants during the multimodal composing process. We believe there is enough evidence (both anecdotal and numeric) to suggest that they can help improve student learning of multimodal literacies. We hope to study the effects of IAs on student learning more in the future. We also want to challenge our readers to consider the inclusion of instructional assistants in their online classes. With sufficient institutional resources, the use of IAs, or writing fellows, can also be incorporated into f2f classes, and this too can be studied to further explore the impact of peer tutoring on the development of multimodal texts.

Other online practices such as the development of a robust nonlinear learning environment can also be transitioned more to the f2f classroom. For instance, when implementing a multimodal curriculum, instructors can create a supplemental platform using their university's LMS, asking students to participate in frequent discussion boards throughout the multimodal composing process. Instructors can also add multimodal instructional tools to the platform, including videos that explain concepts, mini-lectures that offer advice regarding choosing the appropriate medium for communication, tutorials that explain software programs, and successful models of multimodal texts, either created by former students or found in popular culture. As we noted, the archival and nonlinear nature of the online course can help students return to concepts and "relearn" ideas; this type of platform may be beneficial in aiding students in acquiring multimodal literacies and can easily be added as an extra element of support for the f2f classroom.

As multimodal composition and online education grow, we hope that the results of our study can be beneficial to teachers, scholars, or writing program administrators developing online and/or multimodal curricula. However, we recognize that more research can and should be conducted, both at our institution and nationally. While a robust library of scholarship on online education and multimodal composition is developing, these pedagogies are still in their infancy, and we must continue to investigate effective teaching practices. Our results suggest that student learning is indeed different within online and f2f multimodal courses at the University of New Mexico, and we encourage other teacher-scholars to further investigate these hypotheses in their own institutional contexts so that we all can continue to improve the digital, multimodal literacies of our students in both online and f2f learning environments.

## Appendix A.

### *Determining the confidence interval in our sample size*

Because we wanted to keep the number of portfolios assessed the same (recall the sample was 21 e-portfolios for both the online and f2f groups), we needed to establish a confidence level in our assessment and validate our sample size for our online class in the process. Scholars in the field have written extensively about e-portfolio assessment and sample size (Collins, Elliot, Klobucar, & Deek, 2013; Elliot, Briller, & Joshi, 2007), including how to choose the lowest possible number of e-portfolios to give an accurate representation of the course (Johnson & Elliot, 2010; White, Elliot, & Peckham, in press). To determine the confidence interval in our sample size, we turned to Johnson and Elliot's (2010) article, "Undergraduate Technical Writing Assessment: A Model." With statistician Kamal Joshi, Elliot and his colleagues have developed a general, very useful formula to achieve the lowest possible number of e-portfolios to score that are representative of all the students enrolled in a particular course. With 50 students enrolled in our online courses, with the help of Norbert Elliot, we ran descriptive statistics using SPSS, a software package used for statistical analysis. Here is a standard formula (Kerlinger & Lee, 1999, pp. 297-298) modified to address our case of sampling plan design. The core formula appears below.

$$n = \frac{z^2 \sigma^2}{d^2} \quad (1)$$

Where:  $Z^2 = 1.96$ , the Z-value associated with a 95% confidence interval (the upper and lower bounds for a statistic; for a 90% confidence level, the Z score = 1.645; for an 80% confidence interval, the Z score = 1.282)  $\sigma^2 =$  the standard deviation (the spread around the mean) of the population  $d^2 =$  the specified deviation defined as the deviation that we can tolerate between the sample mean (the score at hand) and the true mean (a hypothetical concept defined as freedom from random error).

The correction for a finite sample is then applied:

$$n' = \frac{n}{1 + n/N} \quad (2)$$

Where:  $n' =$  estimated sample size  $n =$  sample size estimated using formula 1 above  $N =$  sample size of the population

After running the equation with 95%, the number of e-portfolios we would need to read would be 69, exceeding the number of e-portfolios available. When we ran the equation with a 90% confidence interval, the number of e-portfolios we needed to read would have been 29. However, since we evaluated 21 e-portfolios, not 29, we ran the formula a third time using an 80% confidence interval.  $n = 1.282^2 \times .532^2 / .119^2$   $n = 1.64 \times .284 / .014$   $n = .46 / .014$   $n = 32$  and then ran the correction for a finite sample:  $n' = 32 / 1 + (32 / 50)$   $n' = 32 / 1 + .64$   $n' = 32 / 1.64$   $n = 19$

Because 21 e-portfolios were read, we are confident that our sample captures at least 80 percent of the total population.

## Appendix B.

### *Portfolio rubric*

Qualities	Highly Effective 4	Effective 3	Satisfactory 2	Needs Further Attention 1	Fails to Meet Criteria 0
<b>Organization of Content Portfolio</b> must include all three major writing projects in final draft (5%)	Writer has thoughtfully considered and carefully crafted the content within the portfolio platform for ease of navigation, including selection of background, images, font, and chunks texts with headers.	Writer makes an attempt to consider and craft the content in an effective way, including a background, images, font, and chunks text with headers.	Writer needs to do much more to craft the content and utilize background, font, and chunks text with headers.	Writer has made minimal attempt to consider the content, including background, images, font, or the layout and management of the text.	Writer makes no attempt to consider the layout or management of content. Lacks the use of background, images, font, or headers.
<b>Clear Sense of Purpose</b> (5%)	Writer's purpose—to demonstrate learning—is clear throughout the entire project, giving context to the audience as to why the portfolio was produced.	Writer's purpose is clear throughout most of the project, giving context to the audience as to why the portfolio was produced.	Writer needs to further clarify the purpose of the project and give more context to the audience as to why the portfolio was produced.	The purpose of the project is not clear and needs restructuring for further clarity; more context is needed as to why the portfolio was produced.	Writer makes no attempt to demonstrate a purpose for developing the portfolio or give context to the audience as to why the portfolio was produced.
<b>Clearly Stated Claims with Critical Reflection</b> (20%)	Writer has clearly stated what he or she has learned through critically reflecting about the skills and knowledge developed in first-year composition.	The claims need to be more clear and direct with additional detail. The writer needs to reflect more critically on the skills and knowledge developed.	The claim needs to be much clearer and more detailed. The writer needs to do much more critical reflection.	The claim is not identifiable. The writer has done little critical reflection.	Writer has made no attempt to make a claim or reflect on what was learned.
<b>Sufficient Evidence</b> (30%)	Writer has presented sufficient high-quality evidence to convince readers that learning outcomes have been achieved by using a wide variety of course content (i.e., drafts, journals, discussions, and final projects)	Writer could present some additional high-quality evidence to convince readers that learning outcomes have been achieved, using a variety of course content (i.e., drafts, journals, discussions, and final projects)	Writer needs to present much more high-quality evidence to demonstrate learning has occurred in response to the learning outcomes; a wide variety of course content (i.e., drafts, journals, discussions, and final projects) is needed.	Writer includes little to no high-quality evidence in the project (i.e., drafts, journals, discussions, and final projects) to demonstrate ability to understand and meet the learning outcomes.	Writer makes no attempt to include evidence of learning in response to the outcomes (i.e., drafts, journals, discussions, and final projects)
<b>Addresses Outcomes</b> (30%)	Writer has comprehensively addressed the outcomes and demonstrated an understanding of all content within each of the learning outcome areas.	Writer has attended to most of the outcomes and has demonstrated understanding of most of issues addressed within all of the outcome areas.	Writer needs to do more to attend to the outcome areas and demonstrate understanding of learning in detail to adhere to the outcome areas.	Writer has not attended to the majority of the outcome areas or demonstrated understanding of learning.	Writer has not attempted to address the outcomes or demonstrate understanding of each of the outcome areas.
<b>Conventions</b> (10%)	Writer has attended to all the necessary conventions of documentation, surface features, and genre.	Writer has attended to most of the necessary conventions of documentation, surface features, and genre.	Writer needs to attend to more of the necessary conventions of documentation, surface features, and genre.	Writer has made little to no attempt to attend to the necessary conventions of documentation, surface features, and genre.	Writer does not attempt to attend to necessary conventions of documentation, surface features, and genre.

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## References

- Allen, I. Elaine, & Seaman, Jeff. (2014). *Grade change: Tracking online education in the United States*. Babson Park, MA: Babson Survey Research Group.
- Anderson, Daniel. (2008). The low bridge to high benefits: Entry-level multimedia, literacies, and motivation. *Computers and Composition*, 25(1), 40–60.
- Arbaugh, J. B. (2000). How classroom environment and student engagement affect learning in Internet-based MBA courses. *Business Communication Quarterly*, 63(4), 9–26.
- Ball, Cheryl. (2012). Assessing scholarly multimedia: A rhetorical genre studies approach. *Technical Communication Quarterly*, 21(1), 61–77.
- Borton, Sonya, & Huot, Brian. (2007). Responding and assessing. In Self Cynthia (Ed.), *Multimodal composition: Resources for teachers* (pp. 99–111). Cresskill, NJ: Hampton Press.
- Bouelle, Tiffany, Bouelle, Andrew, & Rankins-Robertson, Sherry. (2013). Employing a multiliteracies pedagogy through multimodal composition: Preparing twenty-first century writers. *Computers and Composition Online*. Retrieved from: [http://www2.bgsu.edu/departments/english/cconline/bouelle/cc\\_intro.html](http://www2.bgsu.edu/departments/english/cconline/bouelle/cc_intro.html)
- Bouelle, Tiffany, Bouelle, Andrew, & Rankins-Robertson, Sherry. (2015). Teaching with instructional assistants: Enhancing student learning in online classes. *Computers and Composition*, 37, 90–103.
- Bouelle, Tiffany, Rankins-Robertson, Sherry, Bouelle, Andrew, & Roen, Duane. (2013). Assessing learning in redesigned online first-year composition courses. In Heidi McKee, & Danielle Nicole DeVoss (Eds.), *Digital writing assessment and evaluation*. Logan, UT: Computers and Composition Digital Press/Utah State University Press. Retrieved from: <http://ccdigitalpress.org/dwae/12.bouelle.html>
- Boyd, Patricia Webb. (2008). Analyzing students' perceptions of their learning in online and hybrid first-year composition courses. *Computers and Composition*, 25(2), 224–243.
- Collins, Regina, Elliot, Norbert, Klobucar, Andrew, & Deek, Fadi. (2013). Web-based portfolio assessment: Validation of an open source platform. *Journal of Interactive Learning Research*, 24(1), 5–32.
- Collins, Joseph, & Pascarella, Ernest T. (2003). Learning on campus and learning at a distance: A randomized instructional experiment. *Research in Higher Education*, 44(3), 315–326.
- Conference on College Composition and Communication Committee for Best Practices in Online Writing Instruction. (2013). *A position statement of principles and example best practices for online writing instruction (OWI)*. Retrieved from <http://www.ncte.org/cccc/resources/positions/owiprinciples>
- Elliot, Norbert, Briller, Vladimir, & Joshi, Kamal. (2007). Portfolio assessment: Quantification and community. *Journal of Writing Assessment*, 3(1), 5–30.
- Finlay, William, Desmet, Christy, & Evans, Lorraine. (2004). Is it the technology or the teacher? A comparison of online and traditional English composition classes. *Journal of Educational Computing Research*, 31(2), 163–180.
- Halverson, Rich, & Shapiro, R. Benjamin. (2012). *Technologies for education and technologies for learners: How information technologies are (and should be) changing schools* (WCER Working Paper No. 2012-6). Retrieved from: <http://www.wcer.wisc.edu/publications/workingPapers/papers.php>
- Hamp-Lyons, Liz, & Condon, William. (1993). Questioning assumptions about portfolio-based assessment. *Computers and Composition*, 44(2), 176–190.
- Hess, Mickey. (2007). Composing multimodal assignments. In Cynthia Selfe (Ed.), *Multimodal composition: Resources for teachers* (pp. 29–37). Cresskill, NJ: Hampton Press.
- Huot, Brian. (2002). *(Re)articulating writing assessment for teaching and learning*. Logan, UT: Utah State University Press.
- Ito, Mizuko, Gutiérrez, Kris, Livingstone, Sonia, Penuel, Bill, Rhodes, Jean, Salen, Katie, Schor, Juliet, Sefton-Green, Julian, & Watkins, S. Craig. (2013). *Connected learning: An agenda for research and design*. Irvine, CA: Digital Media and Learning Research Hub.

- Johnson, Carol S., & Elliot, Norbert. (2010). Undergraduate technical writing assessment. *Programmatic Perspectives*, 2(2), 110–151.
- Johnson, R. Burke, Onwuegbuzie, Anthony, & Turner, Lisa. (2007). Toward a definition of mixed methods research. *Journal of mixed methods research*, 1(2), 112–133.
- Johnson-Sheehan, Richard, & Paine, Charles. (2013). *Writing today* (2nd ed.). Boston: Pearson.
- Kerlinger, Frederick N., & Lee, Howard B. (1999). *Foundations of behavioral research* (4th ed.). New York: Wadsworth.
- Lauer, Claire. (2013). Examining the effect of reflective assessment on the quality of visual design. *Technical Communication Quarterly*, 22, 172–190.
- Lutkewitte, Claire (Ed.). (2014). *Multimodal composition: A critical sourcebook*. Boston: Bedford/St. Martin's.
- Mehlenbacher, Brad, Miller, Carolyn R., Covington, David, & Larsen, Jamie S. (2000). Active and inactive learning online: A comparison of web-based and conventional writing classes. *IEEE Transactions on Professional Communication*, 43(2), 166–184.
- Meyer, Katrina. (2003). Face-to-face versus threaded discussions: The role of time and higher-order thinking. *Journal of Asynchronous Learning*, 7(3), 55–65.
- Murray, Elizabeth, Sheets, Hailey, & Williams, Nicole. (2009). The new work of assessment: Evaluating multimodal compositions. *Computers and Composition Online*. Retrieved from: [http://www2.bgsu.edu/departments/english/cconline/murray\\_et\\_al/index.html](http://www2.bgsu.edu/departments/english/cconline/murray_et_al/index.html)
- National Council of Teachers of English. (2005). *NCTE position statement on multimodal literacies*. Retrieved from: <http://www.ncte.org/positions/statements/multimodalliteracies>
- Neal, Michael. (2011). *Writing assessment and the revolution in digital texts and technologies*. New York, NY: Teachers College Press.
- Neuhauser, Charlotte. (2002). Learning style and effectiveness of online and face-to-face instruction. *The American Journal of Distance Education*, 16(2), 99–113.
- Picciano, Anthony G. (2002). Beyond student perceptions: Issues of interaction, presence, and performance in an online course. *Journal of Asynchronous Learning*, 6(1), 21–40.
- Rankins-Robertson, Sherry, Bourelle, Tiffany, Bourelle, Andrew, & Fisher, David. (2014). *Multimodal instruction: Pedagogy and practice for enhancing multimodal composition*, 19(2). Retrieved from: <http://kairos.technorhetoric.net/19.1/praxis/robertson-et-al/index.html>
- Reinheimer, David. (2005). Teaching composition online: Whose side is time on? *Computers and Composition*, 22(4), 459–470.
- Sapp, David A., & Simon, James L. (2005). Comparing grades in online and face-to-face writing courses: Interpersonal accountability and institutional commitment. *Computers and Composition*, 22(4), 471–489.
- Selber, Stuart A. (2004). *Multiliteracies for a digital age*. Carbondale, IL: Southern Illinois University Press.
- Sener, John. (2004). Escaping the comparison trap: Evaluating online learning on its own terms. *Innovate: Journal of Online Education*, 1(2). Retrieved from <http://www.innovateonline.info/index.php?view=article&id=11>
- Shipka, Jody. (2005). A multimodal task-based framework for composing. *College Composition and Communication*, 57(2), 277–306.
- Shipka, Jody. (2011). *Toward a composition made whole*. Pittsburgh, PA: University of Pittsburgh Press.
- Takayoshi, Pamela, & Selfe, Cynthia. (2007). Thinking about multimodality. In Cynthia Selfe (Ed.), *Multimodal composition: Resources for teachers* (pp. 1–12). Cresskill NJ: Hampton Press.
- VanKooten, Crystal. (2013). Toward a rhetorically-sensitive assessment model for new media composition. In McKee Heidi, & Nicole DeVoss Danielle (Eds.), *Digital writing assessment and evaluation*. Logan, UT: Computers and Composition Digital Press/Utah State University Press. Retrieved from [http://ccdigitalpress.org/dwae/09\\_vankooten.html](http://ccdigitalpress.org/dwae/09_vankooten.html)
- Warnock, Scott. (2013). Studies comparing outcomes among onsite, hybrid, and fully-online writing courses. *WPA-CompPile Research Bibliographies*, 21, 1–15.
- White, Edward M. (2005). The scoring of portfolios: Phase 2. *College Composition and Communication*, 56(4), 581–600.
- White, Edward M. (1994). *Teaching & assessing writing: Recent advances in understanding, evaluating, and improving student performance* (2nd ed.). Portland, ME: Calendar Island Publishers.
- White, Edward M.; Elliot, Norbert; & Peckham, Irving. (in press). *Very like a whale: The assessment of writing programs*. Logan, Utah: Utah State University Press.
- Williams, Bronwyn. (2007). Foreword. In Selfe Cynthia (Ed.), *Multimodal composition: Resources for teachers* (pp. ix–xiii). Cresskill, NJ: Hampton Press.
- Wysocki, Anne Frances. (2004). Opening new media to writing: Openings and justifications. In Anne Frances Wysocki, Johndan Johnson-Eiola, Cynthia L. Selfe, & Geoffrey Sirc (Eds.), *Writing new media: Theory and applications for expanding the teaching of composition* (pp. 1–41). Logan, UT: Utah State University Press.