Student Reflections on Digital Literacy

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Scholars in composition have been advocating reflections and ePortfolios over the past few decades. Transfer of writing skills from one context or mode to another is among the primary benefits of reflective writing. Our own multimodal writing program has embraced ePortfolios as a learning tool and space for reflections. In an effort to understand and refine our locally developed ePortfolio platform, we have been analyzing student reflections since 2016. For this project, we collected a corpus of student reflections from more than 1,000 ePortfolios, and in this paper we describe and demonstrate two methods we are considering for systematically analyzing student reflections for programmatic assessment, focusing specifically on improving student transfer and meta-awareness in digital composition. Our corpus contains multiple subcorpra, but for this project we focus on student reflections about electronic communication. Findings support ePortfolios as a space for students to take ownership of their digital composition. Further, this study emphasizes the value of mixed-methods approaches to composition studies.

Students in our department's writing classes are often enthusiastic (and at times surprised) by the variety of genres and technologies we address. Their reactions are not the result of the unusual nature of our approaches, but they are the result of the persistent belief that writing classes are strictly about language training or dominated by the traditional essay format. In reality, technology and writing instruction have a long history we can point to (Palmeri & McCorkle, 2017). Almost twenty years ago, coinciding with strong calls for multimodality and multiple literacies (Lunsford, 2006; Selfe, 1999; The New London Group, 1996), our (large Midwestern public research) university developed a multimodal, writing across the curriculum program. One of the newer elements of the program is our locally developed and managed ePortfolio platform (Lutz, Blakely, Rose, & Ballard, 2016; Lutz, O'Connell, & York, 2014). Recently, our ePortfolio initiative has become an integrated practice into all sections of our first- and second-year required writing courses. Because the system has been developed and managed in our program, we have been able to use it as a site for programmatic assessment and research.

This paper presents the methods and some initial findings of a mixed-meth-

ods study we've conducted concerning composition student reflections on their digital literacy with the goal of developing practices to increase student transfer and self-awareness in digital composition. First, we'll discuss some of the existing literature surrounding ePortfolios, transfer, and multimodal writing. Then, we'll connect it to our position within the writing program and how it relates to this ongoing project. This will follow with a focus on the mixed-methods analysis we conducted on a selection of ePortfolios. After an overview of the results, we briefly explore implications for future research into student writing using ePortfolios.

ePortfolios, Transfer, and Multimodal Writing

The use of portfolios has been a benchmark in first-year writing for years, and the popularity of content management systems like WordPress or Drupal has made it possible for programs and instructors to utilize ePortfolios as a digital space for students to practice reflection and multimodal composition. Scholars such as Miles Kimball (2005) considered the benefits but also challenges of using an online system, warning instructors to align ePortfolio practice with portfolio pedagogy. This can be maintained, he argued, through actions that include the continuation of meaningful reflections. In the years since Kimball's work, researchers have continued to explore and advocate for ePortfolios, particularly for its potential to support writing, reflection, and knowledge transfer (Blakely, 2016; Cambridge, Cambridge, & Yancey, 2009; Jenson, 2011; Yancey, Robertson, & Taczak, 2014). Because of this scholarship, our department recognizes ePortfolios as an active space for multimodal composition which is incorporated into both introductory writing courses within the program.

As programs across the country continue to adopt multimodal composition and ePortfolios into their writing courses, the need for research on the success of these practices grows. Studies show that students' identification of the "perceived similarity" between composing and online composing within the context of their own writing increases the likelihood of transfer (Shepherd, 2018). In addition, meta-awareness has been used to promote the creation of multimodal content through transfer, remediation awareness, and elements of adaptive remediation such as literacy linking (Alexander, DePalma, & Ringer, 2016; DePalma, 2015). Methods of analyzing the success of the implementation of these ideas are largely qualitative, relying on interviews and surveys as data. Although these methods have proven valid and applicable, there is inherent value in exploring a range of methods, and the call for empirical research in writing studies (Haswell, 2005) leaves us searching for ways to incorporate quantitative or mixed-methods approaches to scholarship.

ISUComm, WOVE, and ePortfolios

ISUComm is Iowa State University's communication-across-the-curriculum initiative. The goal of ISUComm is to strengthen student communication and enhance students' critical thinking skills by creating opportunities for them to practice communication skills throughout their academic careers. Students are required to take an ISUComm course every year of their time at Iowa State, including two foundation level, one advanced course, and one in their major. When ISUComm was developed, it adopted the WOVE (written, oral, visual, and electronic) model for thinking about communication. The WOVE model of communication emphasizes each mode of communication as an equal contributor to composition in first-year writing courses and continues into advanced composition courses. ePortfolios are used to emphasize the importance of digital literacy and the process of remediation. The program, therefore, requires students to engage with and produce forms of communication across a range of modes and media types because of their relevance in the world outside of composition (advertisements, websites, etc.). To help emphasize the electronic portion of the curricula, or the ability to create, understand, and analyze content online, graduate students and faculty developed an ePortfolio platform now known as ISUComm ePortfolios (Blakely, 2016).

ISUComm ePortfolios is the platform developed at our university for use in our classes. It is a customized multi-network WordPress installation with setting, themes, and plugins that connect it to our university network, ensure student privacy, and give students substantial, although not unlimited, control over their own WordPress site. ISUComm ePortfolios were developed as a space for students to curate a collection of their work and write reflections about the kinds of communication they work on in our writing courses. It is also a powerful teaching tool that gives teachers and our support team needed access to student sites to facilitate learning and troubleshoot challenges that students encounter.

Investigating Student Writing

The most emphasized portions of the portfolio are the reflective elements, where students are encouraged to think back on their writing process, choices, and experiences. At our institution, as the use of ePortfolios continues to grow, we are continually working to improve the ways we use ePortfolios in our courses. While the system was developed and managed by our writing program, students are free to continue using the system throughout their university careers, promoting the transfer of composition beyond the introductory writing course.

For our writing program, the system is a beneficial tool as a means of assessing student writing as well as helping students develop a better understanding of electronic communication through reflection and digital composition. Once ISUComm ePortfolios were in use, their potential for investigating became clear. In one sense, ePortfolios have become a large repository of student writing representing hundreds of courses across a period of years. And the collection continues to grow each semester. In our courses, students are asked to write reflections about the projects they are working on, such as textual and visual analyses. Over the course of the semester, students are asked to collect their work and write more targeted reflections that incorporate examples of their work with written, oral, visual and electronic modes of communication. To assess these reflections, instructors use a rubric with 5 components:

1. Supports claims with evidence from their own work
2. Makes connections (between assignments, across courses, across contexts)
3. Addresses specific choices about their writing (especially about feedback)
4. Makes inferences and analyzes (not simply a narration or list of tasks)
5. Uses terminology specific to the assignment, objective, and rhetorical aims

We don't use these categories solely for evaluating students in class, however. Like other writing programs, our program regularly engages in programmatic assessment. Over the past few years, the programmatic assessment process has involved collecting data through the evaluation of student ePortfolios. These rubric categories are the same categories used for our programmatic assessment initiative, and at the end of each semester, a random stratified sample of ePortfolios is rated for how well the students achieve these objectives. The program assessment has helped us to refine our assignment prompts to be more direct and explicit about the task of reflection in our writing classes. However, the current practice of random sampling and rating is time consuming and limited in scope. The research presented here is, in part, an attempt to find additional avenues for systematically and empirically assessing student writing using ePortfolio reflections.

Special Reflection on Electronic Communication

In conjunction with programmatic assessment, we continue to research ways to promote transfer and meta-awareness in the digital composition process. To ensure students are thinking about how they communicate and create

content on the web (or electronic communication), students are prompted to write a special reflection on their electronic communication. This assignment requires students to write a reflection about the ways they've composed online during the semester, and how it has impacted their understanding of digital spaces. In their reflection description, the following questions are asked:

What are the advantages to being able to author web content, rather than merely being able to browse it?

- What does web composing give you the power to do as you communicate with a particular audience?
- How is web composing similar to and different from other types of communication you have done in the past?
- Now that you've become a web composer, what do you see yourself being able to do with these skills and abilities in your personal, professional, and/or academic life? (Remember that not all the skills and abilities you have developed are technical!)

Asking students these questions allows them to reflect on how their use of the ePortfolio has impacted their digital literacy directly and during the composition process, which provides us the opportunity to assess their meta-awareness within their project rather than after its completion.

Methods: Striving to be RAD

Based on the existing literature within ePortfolios, transfer, and multimodal writing and our existing corpus of student reflections on electronic communication, we chose to conduct a mixed-method analysis of our ePortfolios to determine how students were understanding their relationship to digital composition, specifically how they believe the ePortfolio has impacted their digital literacy. What follows is a report on the methods, some initial results, and a brief discussion.

Our approach for this project involved three stages. First, we collected a corpus of student reflections on electronic communication. Then we conducted a qualitative thematic analysis alongside a keyword analysis of student reflections on electronic communication. In both the thematic analysis and the keyword analysis, we were attempting to characterize the content that was written, the main claims being made, and the evidence used to support these claims to better understand the student perspective on electronic communication.

The corpus for this project contains student work from ePortfolios created between 2017 and 2018, during which time our research team collected consent from students to study ePortfolio reflections. In total, we gathered

data from 1021 student ePortfolios and after removing empty pages and sorting the results, the final corpus contains 4742 pages of student writing (Table 1). The number of sites included in the collection process is relatively small compared to the number of users on our platform due to our IRB constraints; however, we are working with institutional stakeholders to expand our research efforts in the future.

To gather texts for analysis, we wrote a Python application to save JSON files containing page information from WordPress's REST API. Then we processed the data using a second Python script to extract page content from the JSON data, saving each page as a single text file. The resulting corpus is a collection of text files, and each text file is named based on the title of the webpage and contains the text written by a student. Not all ePortfolios in the study were complete, and some students used titles that did not identify the content clearly. Still, students in our writing classrooms created ePortfolios following an assignment structure, so we were able to manually sort the text files into 10 subcorpra based on their titles. Since our program focuses on written, oral, visual, and electronic (WOVE) modes of communication, we were able to identify reflections on each mode using the title of the pages (pages on the ePortfolio are separated based on mode). Our target subcorpus for this study, electronic communication, contains 656 text files (Table 2).

Table 1. Student reflection corpus

Unit	Number
Student ePortfolios	1021
Pages of Student Writing	4742
Word Tokens	1,778,071
Word Types	21,749

Table 2. Mode based subcorpra

	Pages	Word Types	Word Tokens	Type/Token Ratio	Tokens Per Page
Written	454	8,577	208,841	.0411	460
Oral	439	5,945	125,171	.0475	285
Visual	427	6,423	131,993	.0487	309
Electronic	656	6,327	200,099	.0316	305

Thematic Analysis

For the qualitative methods portion of this project, we conducted a thematic analysis of a reflection within a sample of ePortfolios, specifically those ded-

icated to electronic communication. We gathered a total of 654 reflections, and from this selection we randomly sampled 70. From these 70, 35 were analyzed as part of our pilot study to determine what themes or codes we could identify before moving forward. During an initial analysis, a total of six primary codes were identified (Table 3). These codes ranged from advantages of creating an ePortfolio to references to tools such as WordPress or Google Sites. After the codebook was established, coding was completed using the qualitative analysis software NVivo. The codes we established were based on preliminary themes we identified within the reflections. Advantages, for example, was coded when students reflected on the benefits of learning to compose electronically. Challenges was used when students reflected on negative experiences or setbacks to using electronic communication.

Table 3. Codes and occurrences of the thematic analysis

Codes	Reflections	Instances
Advantages	29	61
Challenges	10	16
Future	15	29
Multimodal Communication	16	21
Social Media	5	6
Tools	14	18

Keyword Analysis

To conduct the keyword analysis, we compared the sub corpus on student reflections on electronic communication to the other samples of student writing as a reference using Log-Likelihood. The tool we used was AntConc 3.5.8. Initially, the comparison yielded a list of keywords that we sorted by keyness for further analysis. After reviewing the top keywords we selectively reviewed Key Words in Context (KWIC) lines to better understand how the keywords were being used in context. Below we present only a small sample of the findings.

Results

In the space here, we cannot fully address the codes in the thematic analysis, nor can we detail the uses of each keyword from the keyword analysis. Those findings will need to be reported in a later project. For now, both the thematic analysis and the keyword analysis reflect the idea that students believe producing digital media is a valuable activity. We make this claim based

on the number of instances students were noted reflecting on the advantages of using electronic communication as well as the key recurring key words within the same corpus of reflections. It should be noted that students may be inclined to affirm the importance of class curricula, as they perceive their grade being dependent on affirming the value of class content. However, the specificity and variety of student observations may be more telling.

Thematic Analysis

In this paper, we will focus on the advantages themes since they occur the most often across samples. After seeing that the advantages theme was the most frequently occurring theme within the reflections, we were eager to explore it further. As a frequently occurring theme, it can provide us with some insight into how students interact with the ePortfolio and their understanding of electronic communication.

There is a direct question within the assignment that asks students to reflect on the advantages of online communication, but we wanted to know what advantages students were identifying and how they were talking about them. We went through the excerpts from the reflections where students talked about advantages they felt they had after creating an ePortfolio. Some subthemes that emerged revolved a lot around agency. Several students explained the power, control, or allowance using an ePortfolio gave them over their ability to communicate with others on the web. Below is an example that represents expressions of agency that were identified within the reflections.

The example comes from a student writing about web composition and reaching audiences. The student wrote, "That advantage is that you are able to personalize it, and make it you [sic] own and have it reflect who you are as a person…web composing gives you the power to personalize in order to communicate to which ever audience you wish." This student focuses on the ways in which web composing extends their ability to reach an audience. Observations like these reflect the relevance of electronic communication in the lives of our students. Creating an online representation of their work has helped them think about the way they construct information and how they engage with audience.

Keyword Analysis

The keywords listed here had a high keyness value, indicating that they are statistically much more frequent than in the rest of the corpus (Table 4). The words with the highest keyness (website, web, electronic, etc.) in the list reflect the primary subject matter for the pages. Students are specifically writing

about electronic forms of communication on their ISUComm ePortfolio, so they are usually discussing the web. Sorting through the list is a starting point for characterizing the content of the pages. On a first glance, the words with the highest keyness value may seem obvious. But going down the list we can see some interesting groupings emerge.

Table 4. Selected keywords representing the subcorpus of student reflections on electronic communication.

Term	Keyness	Term	Keyness	Term	Keyness
Website	3977.76	Own	549.16	Power	274.83
Web	3453.14	Your	547.99	Design	239.13
Electronic	1144.29	Create	529.59	Advantage	200.51
Composing	1127.01	Able	497.51	Easy	199.77
ePortfolio	1106.22	Author	434.2	Professional	186.51
Site	1050.78	Allows	396.76	Personal	186.02
Content	1015.23	Can	326.68	Designing	181.64
Creating	881.33	Composer	313.99	Reach	153.07
You	807	Control	307.11		
Advantages	634.06	Gives	302.62		

Further down the list we see words focused on creating, words such as *creating*, *create*, *composer*, *design,* and *designing*. These words are related to the students discussing what it means to make digital artifacts, not simply consume them, and when students use these words, they are talking about themselves as creators of digital and multimodal texts. This is important to show that our classes are working to bridge the consumption production divide that we see with multimodal composition.

Another group of terms we can see are words that are associated with control and ownership: *you, own, your, author, can*, and *control*. These terms show that students are invested in the ways they can personally engage with digital production. And a final group we can see focuses on the power and advantages of electronic communication: *advantages*, *able*, *allows*, *gives*, *power*, *easy*, and *reach*. Reviewing these groups of terms shows that students are identifying as creators and view the work as empowering, relevant, and manageable.

Looking a bit closer at two of the words together there are some more interesting findings. The list of keywords shows both *you* and *can*, and a closer examination reveals that students often use the phrase "you can" followed by the verbs listed in Table 5. The verbs that follow the phrase "you can" reflect the ways students feel empowered when working with their ePortfolio.

Table 5. Common verbs following the phrase "you can"

You can:		
Add	Control	Edit
Appeal	Create	Find
Change	Customize	Learn
Choose	Do	Make

Discussion and Conclusion

Through our independent analysis, we both noted a significant focus on ownership and power. Students expressed investment in the use of digital tools to create electronic forms of communication.

Because of our findings, we support the following claims:

- Providing spaces for students to become meta-aware of their composition allows students to take ownership of digital composing.
- Mixed-method approaches help us determine how students are reflecting on their experiences.

Limitations and Future Research

There are, of course, some important limitations in the research presented here, which space limitations do not allow us to fully address. Researchers face obstacles when conducting research that involves collecting and studying authentic student writing. One of the challenges for researchers is sorting and analyzing data. Fortunately for researchers, the challenges that are involved also represent rich opportunities for further study. Using what we have gathered here, we plan to refine our collection and sampling procedures and work with additional researchers who will look at the data from new angles. As we do so, we also plan to stratify the data by demographic data, performance in the class, and writing features.

Although most studies concerning transfer and multimodality use qualitative methods for assessment, we found a mixed-method approach allowed for a wider variety of data collection from our students. Eventually, we look forward to introducing interventions and varying the writing prompt to determine the best strategies for promoting meta-awareness and transfer amongst first year writing students.

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