

Microcore: Using Online Playable Cases to Increase Student Engagement in Online Writing Environments

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Authentic Learning

Student Engagement

Educational Simulations

Online Writing Instruction

Playable Case Study



This case study explores a type of educational simulation, an alternative reality game we call a playable case study (PCS), and how its use influenced student engagement in an online writing classroom. The goal of the simulation was to help students create professional communication artifacts and experience real-world professional communication situations. This article reports the effectiveness of the playable case study as a tool specifically for online writing instruction (OWI). The context of our research was a PCS called Microcore. Acting as interns for a company, students are asked to investigate a serious problem that occurs and present a solution to ensure similar problems do not occur again. Forty-seven students in two sections of an online professional writing classroom responded to pre- and post-survey questions and prompts that gathered their perceptions about writing, understanding of workplace communication, and levels of engagement. Responses were coded and analyzed for thematic trends. Results suggest that playable case studies like the one reported here may be effective in countering primary OWI difficulties, including disengagement; lack of social presence; faltering self-efficacy; and unclear, unproductive perceptions about writing assignments. Students responded positively to the simulation and appeared to develop more realistic views about workplace communication.

Introduction

Educational studies have long stated that student interest, engagement, and motivation are necessary for active, lasting learning. As Sullivan (2011) argued, “students who are engaged and motivated learn almost effortlessly. Those who are not almost always struggle, resist, and often fail” (p. 120). These ideas are echoed by Meyer (2014), who said that authentic learning in online classrooms requires engagement in the situation at hand—solving realistic problems and encouraging deeper engagement in assignments. However, engagement is particularly difficult to maintain in online writing classrooms because of the unique challenges that both students and teachers face. These include uncertainty related to assignments and tasks, feelings of detachment and isolation, and unclear expectations (Cunningham, 2015; Kebritchi et al., 2017). Additional studies express concern that a lack of social presence, engagement, humanity, and

training affect the learning value of online writing courses (Gouge, 2009; Hewett & Bourelle, 2017; Hewett & DePew, 2015). Further, students in online writing environments “often perceive the content knowledge they learn as independent bits of information rather than as parts of larger related constructs,” leading to a failure to integrate and transfer writing skills (Boiarsky, 2004, pp. 252–53).

How to remedy this issue of engagement, along with other difficulties associated with digital learning, is still deeply debated by online writing instruction (OWI) researchers. Hewett and DePew (2015) argue that there is very little in terms of OWI practices “that might possibly be called ‘effective,’ let alone ‘best’” (p. 34), with ideas and local developments that don’t transfer broadly to other institutions. They further argue for innovations in online writing instruction that work to address issues of transfer. Other scholars have similarly insisted on the necessity of improving the quality of online writing instruction in overall design structure and focus, and offer largely broad suggestions for how to do so (Greer & Harris, 2018; Kebritchi et al., 2017). For example, Cunningham (2015) advocated helping students feel like they are communicating with actual others, addressing an often-missing sense of community in writing. Stella and Corry (2016) recommend a greater emphasis, structurally, on engagement, while Greer and Harris (2018) desired structure to be less reliant on systems and more focused on individual users. Hewett et al. (2011) asked OWI faculty what the most important principles, theoretical or pedagogical, are for OWI. Responses included “audience and purpose,” “writing as a (social) process” (pp. 49-50), and more face-to-face interaction with students. These findings reflect Hewett and DePew’s argument that OWI scholarship could use innovative practices that address the needs of online writing (OW) students.

In this paper we report our study of how online writing instructors can address these and similar issues through the use of serious games. Girard et al. (2013) defined serious games as “digital games, simulations, virtual environments, and mixed reality” that are concerned with education over entertainment through responsive narrative and story (pp. 208–210). Often, such games take the form of some type of simulation, which Gredler (2004) defined as, “open-ended evolving situations with many interacting variables. The goal for all participants is to each take a particular role, address the issues, threats, and problems that arise in the situation, and experience the effects of their decisions” (p. 571). The use of simulations as instruction has been a staple of both business and medical education since the 1950s (Gredler, 2004), and in the Internet-age their use has spread widely to other domains in higher education (Chernikova et al., 2020). Recently, a form of mixed-reality simulation known as an alternative reality game (ARG) has emerged as a new educational platform that focuses on student engagement in the classroom. ARGs are, “a genre of transmedia storytelling, comprised of interactive elements . . . To engage with an ARG, players . . . solve puzzles and [find] clues to reassemble the fragments of a story” (Bonsignore et al., 2014, p. 1). Over the past six years, we have developed and researched the effects of a form of alternative reality game we call a playable case study (PCS). The PCS is a unique contribution to the area of educational simulations through its combination of authentic tasks, fictional (yet realistic) storylines, transmedia forms of interaction (both computer-assisted and non-digital activities), that can be integrated into classroom instruction with minimal technical know-how or preparation on the part of the teachers involved (citation masked for review). In this paper we describe the PCS, called *Microcore*, and report our investigation into the following research questions:

1. In what ways does a professional context simulated through a playable case study impact students’ writing and engagement in an online course?
2. What are the effects of the playable case study on student learning and how students approach professional writing and communication?

Literature Review

The Growth of Serious Games in Education

In the last two decades, since the development and gradual proliferation of serious games for education (Whitton, 2008), researchers and subject experts have considered the utilization of computer-based interactive games for writing instruction. Findings in education and technology studies have suggested that serious games can promote engagement

and responsibility for one's own learning (Anastasiadis et al., 2018; Bagley & Shaffer, 2011; Finseth, 2015). Some even claim that these types of games may even teach more effectively than traditional methods in classroom instruction (Girard et al., 2013; Kebritchi et al., 2017; Silvia, 2008; Sitzmann, 2011). Alexander (2009) recommended that instructors "consider using complex computer games as primary 'texts' in composition courses as a way to engage with students" (p. 37). In a similar manner, Moseley (2012) argued that the field has reached a point where games can reach new audiences of learners because of the different types of educational engagement and effectiveness they can provide.

However, a restrictive belief has persisted in the academic field that the "social motive of schooling . . . is fundamentally different than that of work. And schooling cannot represent the activity of workplaces, even in simulations" (Russell & Fisher, 2010, p. 164). Some researchers have even claimed that only professional contexts can help students learn the professional communication genres they will need in the workplace, even if school contexts are simulating the professional context (Freedman et al., 1994). Although not new, this belief became more widespread with the advent of the Internet and alternative teaching methods. But as more time and research has been applied to the topic, the conversation has shifted more toward advocating for the affordances that simulations, serious games, and similar strategies provide, along with their intrinsically motivating aspects in classrooms (Chaudhuri, 2020). However, certain divergent views have stated that simulations are not more motivating under all circumstances, contradicting the findings of Chaudhuri and others (Sailer & Homner, 2020). Thus, the research surrounding serious games is still in development, though many researchers lean toward the positive benefits that the technology can have in classrooms.

Serious Games as Tools of Engagement

One aspect of serious games that has not been sufficiently investigated is how they can function in and potentially counter the challenges of online writing instruction (OWI). The inherent problems with OWI—namely, expectations on feedback and structure, disconnection and lack of identity, and passive or nonexistent engagement (Kebritchi et al., 2017)—need to be addressed in this digital age. Simulation-based serious games, in which students are placed in new environments outside of school, could be a new solution to this problem of online engagement. Games such as SimCity have been used in traditional, in-person classrooms (Bagley & Shaffer, 2011), as have more directly educational simulations like the VirtualPREX Classroom Simulation (Dalgarno et al., 2016), and MyCase (Russell & Fisher, 2010). Russell and Fisher (2010) noted that such experiences create conditions in which students can experience in a vicarious way what it is like to participate as a member of a given community. These sorts of serious games are designed to transport participants into a fictitious story environment, where they are expected to learn to succeed in specific circumstances, interact with strangers, and deliver products in a way that mimics the real world.

When students take online courses, there is an even greater need for engagement, since students have a far greater degree of control over their choices and amount of conscious participation (Stella & Corry, 2016). Serious games like ARGs, simulations, and playable case studies have been reported to increase overall engagement through a greater sense of interaction and control over learning, immersion, and complex, compelling narrative and real-world situations (Bonsignore et al., 2014; Gredler, 2004; Hansen et al., 2017; Russell & Fisher, 2010). Therefore, for serious games to be effective online teaching tools, they must sufficiently engage students.

The Workplace Communication Simulation Microcore

Against this backdrop of research, we have developed a new form of educational game called a playable case study (PCS). The goal of the PCS is to allow students to participate in realistic and engaging environments that simulate some aspect of the professional practices for which they are being prepared. Given the need in many workplace settings for professional writing (Williams & Beam, 2019), the PCS environment meaningfully integrates writing into other professional assignments that students will perceive as applicable outside of school. This allows students to demonstrate skills associated with critical thinking and argumentative writing in simulated environments that have real-world affordances (Hansen et al., 2017). The PCS genre is modeled on a type of serious game called an alternative reality game (ARG), that is characterized by gameplay taking place in both computer-simulated environments as well as players' everyday lives (Hansen et al., 2013; Kim et al., 2008). This blend of environments encourages a gaming ethos known as *This is Not a Game*, "meaning the simulation strives against interface forms that participants perceive to have

been fabricated. Interactions take place in the context of authentic digital or face-to-face modes of communication as much as possible” (Winters et al, 2020, p. 128). These immersive stories as the core of the simulation require the participants—here, students—to be a part of something that feels authentic, active, and personalized. This design creates ownership of learning, interest, and engagement through narrative, which stimulates knowledge acquisition and comprehension (Abrahamson, 1998; Hidi, 2006; McDaniel et al., 2000; Meyer, 2014). The most effective learning requires a developed sense of challenge and individual involvement in order to remain situationally interested in computer-based assignments (Finseth, 2015; Tulis & Fulmer, 2013). The open-ended approach of the PCS is designed to achieve effective learning and imitate the business world through rigorous challenge and intellectual demand. This article focuses on a PCS—known as *Microcore*—developed for advanced writing courses.

Method

Game Description

Microcore is a fictitious startup tech company, specializing in revolutionary medical nanotechnology that is on the verge of breaking into the market. Acting as new interns for the company, students are asked to investigate a serious problem that occurs—a test pig explodes due to malfunctioning nanomachines—and present a solution to ensure similar problems do not occur again. Using style guides, pre-recorded but interactive video interviews, clickable images, and other tools shown in Figures 1 and 2, participants investigate the incident and draw conclusions to present to company management in the form of a business proposal.

Figure 1

Microcore features. These include information about the (fictional) team, the library of materials—style guides and templates—an email system, and a virtual crime scene photo with clickable items.

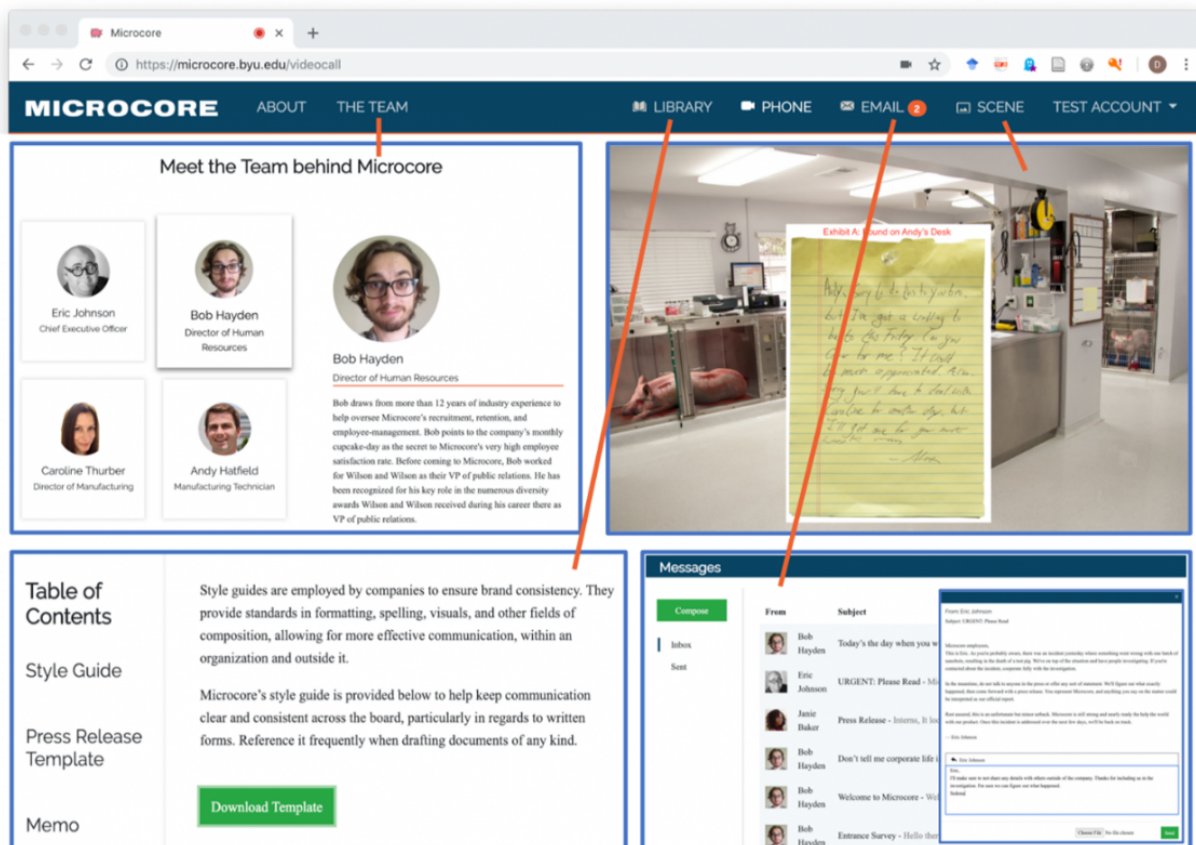
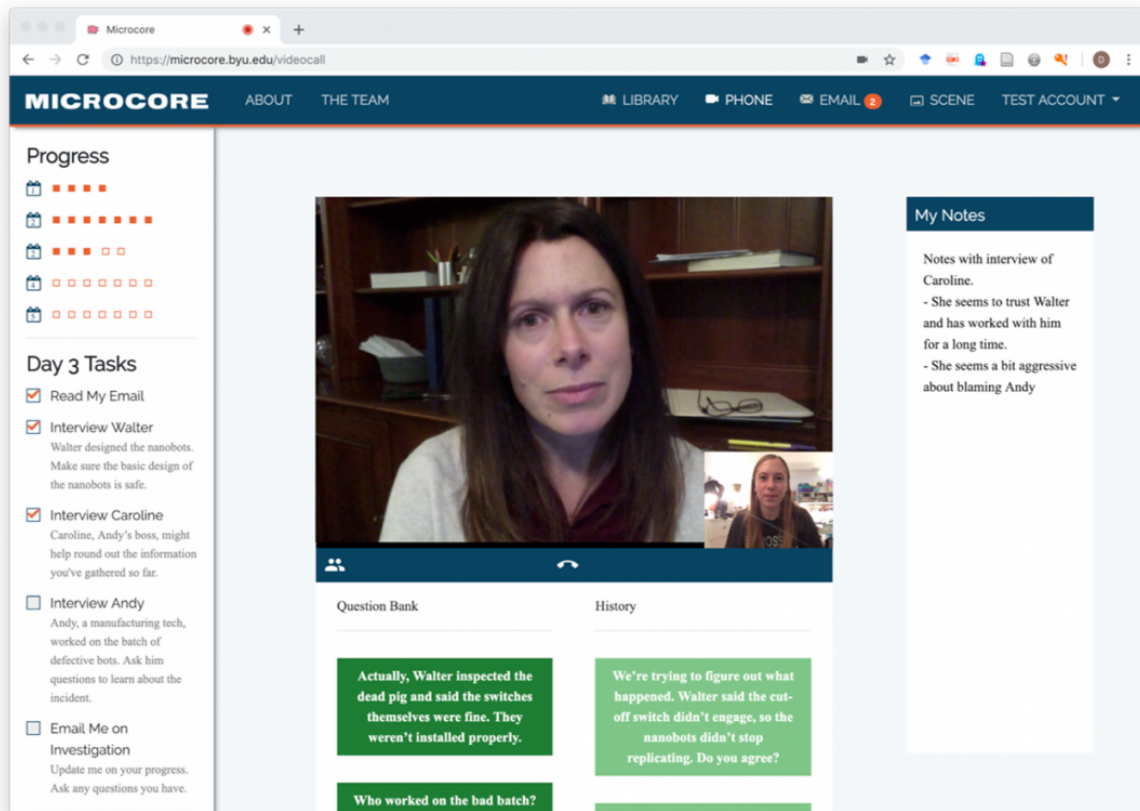


Figure 2

Microcore corporate Intranet. Progress through the five virtual days and daily tasks are shown on the left. Student (bottom-right of central image) is interviewing fictional character, Caroline, by selecting options from the Question Bank. Notes can be taken on the right



As shown in Figure 2, there are five total “days” in the PCS, each giving participants a series of tasks to complete before moving on to the next day, as well as providing new information to assist them in their cumulative goal of determining the cause of the problem and recommending a solution in the form of a written proposal. It is not mandated what solution should be presented. The open-ended setup is meant to encourage greater creativity and engagement. As Sitzmann (2011) noted, “high interactivity and the opportunity to make choices while participating in simulation games may result in trainees [participants] feeling empowered, ultimately enhancing [their] self-efficacy” (p. 495) and personal investment in their own learning and end product. Participants in *Microcore* have a company contact named Bob, who provides instruction on how to navigate the website and assigned daily tasks. In the course of their investigation, participants interact with several other employees at the company who present differing viewpoints, priorities, and interpretations of events, which students evaluate and consider to come up with their final solution and recommendation. This interactive element utilizes principles of ARG combined with the open-ended, ever-evolving component of simulations to create the playable case.

According to the College Composition and Communication Committee (CCCC) for Effective Practices for Online Writing Instruction, “an online writing course should focus on writing and not on technology orientation” and “appropriate composition teaching/learning strategies should be developed for the unique features of the online instructional environment” (CCCC Executive Committee, 2013). This principle was echoed by Greer and Harris (2018), who stated

that instructors should ensure they are prioritizing student needs above the technology to be truly effective. Serious games should first and foremost be about education. *Microcore* was created to function similarly, and thus meets the CCCC requirements and expectations. If students connect with the PCS and it counteracts online writing instruction issues, *Microcore* could serve as a reliable technology and method of teaching in digital classrooms. OWI needs effective best practices—ones that aim at engaging and at creating authentic skills, self-efficacy, and investment in personal learning.

Participants

During the Fall 2018, we used the *Microcore* playable case in two advanced online technical writing courses at a major western university. Populating these sections of advanced technical writing were students of both sexes, between twenty and twenty-five years of age, in their junior or senior years of college, and in pursuit primarily of technical degrees. These academic pursuits varied from neuroscience and civil engineering to public health and communication disciplines, allowing for a wide spectrum of intellectual diversity. Of the 50 students enrolled in both sections, 47 students agreed to complete both questionnaires about their experience using the simulation tool and allow researchers access to those responses. All students in the two classes participated in the simulation, so we could not include a control group. All policies of the university's institutional review board (IRB) were followed for the administration and analysis of the survey described in the next sections.

Data Collection and Coding

The aim of the technical writing course is to instruct students on how to produce clear, effective communication commonly used in professional environments, with the students learning genre conventions and creating a variety of technical documents, including literature reviews, presentations, and business proposals. *Microcore* aids in this teaching as it asks students to create a business proposal, as well as other smaller documents such as press releases and memos. The students in both sections of technical writing were required to take part in the playable case for the class, which was conducted and played in November 2018 over a two-week period. This was the penultimate unit, after the unit on writing instructions and before the final one focusing on literature reviews, so by this point students had over half a semester of exposure to the course and online environment. The instructor who ran *Microcore* for both sections has previous experience with the technical communication course and OWI. However, this was the instructor's first opportunity to teach this specific course online.

Our research team collected two sources of data on the students' experience with the online PCS: (1) pre and post surveys and (2) student written work in the form of online chats, emails, and class writing assignments.

To introduce students to the *Microcore* PCS, they filled out an electronic pre-survey, which asked a series of questions regarding views on communication, the writing process, and self-efficacy. Then, after the PCS was completed two weeks later, students were asked to complete a post-survey, which asked similar questions to the pre-survey. Both surveys were written in-character from the perspective of a company contact in the HR department to allow for authenticity and a more pronounced sense of verisimilitude.

The questions in the surveys can be divided into two parts, based on type. In one part, students were asked open-ended questions about applicable prior experiences (for verisimilitude), perceptions about communication and how to solve problems therein, and writing processes. In the second part, students were given prompts and asked to select their level of agreement (Not Sure, Strongly Disagreed, Somewhat Disagreed, Neutral, Agree, Strongly Agree). This scale was developed from Donald O. Prickel's research in 1994 on adult basic writing and its use in correlational analysis. Higher scores indicate higher self-efficacy. These modified Likert scale prompts dealt with self-efficacy in workplace writing, confidence in personal capacity to function well in a more professional setting, and feelings of engagement.

While care was taken to ensure consistency across the pre- and post-survey questions, some questions were adjusted in the post-survey after we could ensure that students had experience with workplace communication. For example, general questions about communication problems and the writing process were asked in the pre-survey because

previous exposure to workplace communication and the proposal genre could not be guaranteed for all participants. The questions were then specifically applied to workplace communication and proposals in the post-survey.

The student responses were collected and organized onto a multi-tab spreadsheet, with IDs being provided to students in order to deidentify the data. Two researchers followed the coding process described by Blakeslee and Fleischer (2010), including identifying themes, identifying categories within the themes, and coding for the themes. Specifically, with the pre-survey responses next to the post-survey ones, two researchers developed coding schemes for the data, searching for relevant changes in wording and ideas between the two sets of responses. These researchers had no predetermined changes for which they were specifically looking. Rather, as they went through each question and compared pre- and post-survey responses, themes became distinct between the responses before and after the PCS. They tested a code on one set of questions, found the code to be effective as an overall trend in the responses, and then repeated the process for the remaining open-ended questions and prompts. For the Likert-scale prompts discussing self-efficacy and engagement, the researchers calculated the numerical difference in responses between pre- and post-survey responses.

Comparing responses between the surveys for our open-ended questions suggested trends in expanded understanding of the social demands and humanity of workplace communication, in developed nuance in the scope of resolution required for solutions to miscommunication, and in greater sense of purpose and meaning with the *Microcore* proposal project. For the Likert-scale prompts, we found an overall positive increase in online student engagement and confidence with writing assignments and business communication.

Findings

Understanding of the Social Dimension

Student definitions of what it means to communicate professionally saw a pronounced change between the pre- and post-surveys, with students identifying a social dimension to communication. Many of the responses to the question before the PCS were impersonal in tone and generic in content. After the PCS, students appeared to see a human- and audience-focused element in workplace situations, coloring their responses and offering more professional answers. Table 1 reports student responses to the open-ended question, “What is the goal of professional communication” that illustrates this finding.

Table 1

A Subset of Student Responses About Professional Communication

Pre- and Post-Survey: What is the goal of professional communication?		
Student ID	Pre-Survey Response	Post-Survey Response
344	“To allow people to communicate in a structured way that can be standard across many companies and industries.”	“To express your feelings, thoughts, and concerns to others in a professional manner. This often entails following a pattern or style that has been developed within [a] company.”
529	“The goal of professional communication is to discuss matters of importance and work through the everyday challenges of a work environment.”	“The goal of professional communication is to be clear, approachable, and open in your interactions with others via email, phone, and face-to-face conversation.”
636	“The goal of professional communication is to ensure cooperation and efficiency in professional environments.”	“To ensure that all levels of an organization interact in a professional manner and without misunderstandings.”
152	“Communicate clearly any and all details pertinent to business.”	“To clearly communicate information so that recipients of the information can completely understand what is going on.”

Students at first appeared to see professional communication as something technical, objective, and aloof. After the PCS, original definitions and conceptions about communication seemed to expand, with students adding elements of

socialization and humanity being prominent. They latched onto the social dimension, with their answers reflecting real-world interaction and complication possibly better than could be achieved in a traditional, lecture-based classroom environment. There was greater awareness of audience and its social necessities in professional communication. Post-survey responses included expanded ideas and terms such as collaboration (“team,” “coworkers,” “leadership,” “all levels of an organization,” “interact,” and “help each other”), clarity (“flow of information,” “no ambiguities or misunderstandings” and “limit miscommunication”), and personality (“open,” “approachable,” “timely,” and “professional”). This theme was almost entirely consistent, with only two of the post-survey responses not mentioning the involvement of others or demonstrating any substantial changes between pre- and post-survey responses.

Varied Solutions

Microcore was built to present its users with workplace communication problems, which we specifically asked students about to determine if their methods of addressing such problems would change. A theme emerged between the two surveys of greater nuance in their scope of what it means to resolve communication problems, with larger-scale fixes—beyond just themselves—being necessary for successful solutions to these kinds of issues, as reported in Table 2.

Table 2

A Subset of Student Responses About Communication Problems

Pre-Survey: How do you solve communication problems you encounter? Post-Survey: How do you solve communication problems in the workplace?

Student ID	Pre-Survey Response	Post-Survey Response
152	“By trying to understand the disconnect and fixing it.”	“By communicating. Try different methods of communication, go to other employees, managers, etc.”
344	“I prefer to speak with people and figure out what went wrong and discuss how to fix it moving forward.”	“You have to determine what is causing the problem, and then develop a method that will allow all people within the organization to communicate effectively and then implement it.”
404	“I consider who I am communicating with, what we are discussing and how to best deliver the information I need to share. If there is a problem, I first look to see what I can change on my end to ensure that proper communication is re-established.”	“Accountability. Documentation. If I need to speak with someone I reach out in more than one way. If something needs to be clarified I seek out the necessary authority and ask for help. I do not simply ‘wing it’ to prevent uncomfortable conversations.”
560	“When communicating through writing, I revise to make sure I am clear and concise. For large projects, I have others review my writing. I ask for clarification if I do not understand the others’ communication.”	“Communication requires a shift in company culture. Individuals should understand the importance of working on a team and that each member has a valuable role which can’t be completed unless everyone cooperates. Rules will be set in place until communication is more fluid in the work environment.”

Students seemed to develop a more nuanced perspective about miscommunication and what it takes to fix communication problems, along with varied solutions to address such issues. The responses in the pre-survey offered simple, general solutions that often simply involved discussing the miscommunication with someone via an unspecified dialogue method. However, after the PCS was completed, students offered more precise and varied solutions to communication problems and took personal responsibility for the issues they encountered. We found a pronounced trend of needing to implement solutions to prevent future problems (“setting specific regulations,” “approachable leaders,” “rules set in place,” and “build trust and foster communication between team members”). Previously, responses largely suggested that a communication problem, once addressed just by the students, would not thereafter be a recurring issue. This viewpoint appeared to evolve. Even responses that did not seem to change as much had some greater degree of nuance expressed through wording, including the importance of speaking “directly,” replying in a “timely manner,” and trying “different methods of communication” if one method does not work to ensure that the needed information is conveyed.

Greater Sense of Purpose

Having addressed workplace communication, we wanted to determine the effect of the PCS on students' writing process. Post-survey responses indicated that students experienced a level of enjoyment and a sense of realism and purpose with the writing process. One student wrote, "The nature of these documents [proposals] being centered around events and actions to be taken in response was something new and something I very much enjoyed." Another stated, "It was more enjoyable [than other writing assignments]. I was actually engaged in the process and was curious about what was going on." Proposals were unfamiliar to students, but students were engaged in the process of writing them.

Despite the "playable" nature of this case, students appeared to take it seriously. As one student wrote, "I felt that the writing assignments during the *Microcore* internship were actually meaningful and are . . . like what I could potentially be writing down the line of my future career." Another wrote about how the nature of the information they presented was important: "My proposal could get someone fired. That is life changing. It also could be a mistake for the company, should any of the proposal [sic] turn out to be incorrect information or a bad process." It seemed to feel real, with some even comprehending that their proposals—their suggestions of company action—could have drastic, real-world consequences, from company expenses to the firing of employees. This developed sense of purpose was reflected across most of the responses, with only three expressing superficial differences such as mentioning the templates and style guides that were provided with the PCS.

The students' expanded definitions and conceptions about professional communication and writing indicate an overall positive, rounded change in perspective that reflects a developed sensitivity to a professional context. The students appeared to identify social themes, explore larger intricacies, and develop real-world investment from the *Microcore* PCS.

Self-Efficacy and Engagement

Students responded to Likert-scale prompts before and after the case that assessed their self-efficacy and confidence in solving workplace problems with writing and professional communication skills, asserting the place writing has in their future careers, communicating in a workplace environment, understanding how writing functions in the workplace, and navigating people and tasks in the business world. They responded as shown in Table 3.

Table 3

Student's Self-Ratings Regarding Their Writing Self-Efficacy

Average Pre- and Post-Survey Responses Regarding Self-Efficacy.

Prompt	Pre- survey average	Post-survey average
I am confident in my ability to solve workplace problems with writing.	5.25	5.8
Writing is critical to my future career.	5.55	5.8
I am confident in my communication skills in a workplace environment.	6.05	5.8
I understand how professional writing functions in a workplace environment.	5.75	5.9
I am confident in my ability to navigate people, tasks, and difficulties related to communication in a business environment.	5.55	6

In four of the five responses, students reported increased self-efficacy after participating in the PCS. In particular, students reported greater confidence and self-efficacy in solving workplace problems with writing and professional communication skills, asserting the place writing has in their future careers, understanding how writing functions in the workplace, and navigating people and tasks in the business world.

This generally positive response count continued with the final section of Likert-scale prompts, in which we assessed student engagement and recommendation for this method of instruction. This was especially important to determine if

this method of OWI would be able to counteract one of the inherent problems—lack of engagement—associated with online learning. These results are shown in Table 4.

Table 4

Mean Student Responses to Questions of Engagement

Post-Survey: Select the appropriate level of agreement with each of the following statements.

Prompt	Mean Post-Survey Responses
I found this digital internship to be interesting.	6.05
I was engaged with the assignments I was given.	5.75
The resources provided to me were helpful in understanding my assignments.	5.7
I would recommend the Microcore internship to others.	5.55

In response to all questions, students on average agreed that the PCS was interesting and engaging. Further, students on average agreed that they would recommend the case to others. Despite these positive responses, many of these students had feedback to offer in the post-survey on how to better improve the internship experience in the simulation, which suggests some opportunities for improving the simulation. However, based on the large-scale trend toward positive change in student responses, it would seem that *Microcore* is able to generate sufficient engagement with online students.

Discussion

Our intent with this survey study was to test the PCS to see what kind of impact it would have in online writing instruction. In response to research question one, results from the study indicate that the simulated environment of the *Microcore* PCS positively impacted students' writing and engagement with course topics related to business communication. The majority of students who participated in this study reported increases in self-efficacy, reported feeling engaged and invested in the material, and reported enhanced understanding of the social elements of professional communication. In response to research question two, students reported more nuanced and varied solutions to communication problems. Their responses indicated expanded understanding of the social demands and humanity of workplace communication, a stronger sense of nuance in how to resolve miscommunications, and a greater sense of purpose related to the importance of professional communications. In the discussion that follows we offer some commentary on these findings.

In pre-survey responses, students' definitions of professional communication were general and detached. However, with the completion of the PCS, students seemed to describe a greater level of humanity and social interaction necessary for effective technical communication. As Finseth (2015) stated, "technical writing does not happen in a bubble" (p. 258), and she advocates for technical communication instructors creating game-based classrooms to "keep a keen focus on the importance of audience" (p. 247). She observes that interactive games could theoretically enable students to gain this sense of audience because such games allow for audiences other than the instructor. This study applies Finseth's (2015) theoretical claim and provides some empirical evidence that suggests that a playable case study enhances students' attentiveness to audience, as supported by the students' responses to the pre- and post-survey questions. Specifically, the themes and changes in audience-focused word choices—repeated across the responses we received—suggest that students came to better consider their audiences, which we presume occurred through their interactions with the PCS's characters and personalities.

Pre-survey resolutions to communication problems were often simple and limited to students' reliance on their own selves and on one-and-done solutions, but these views changed in the post-survey, where they provided greater depth and variety of answers, with the need for systemic alterations and follow-ups. Students appeared to grasp that writing and interaction within a workplace is not isolated—even a simulated work environment—and responded accordingly. Students commented on the complexity of workplace communication, as shown in Table 3, and reported a decrease in

their perceived preparation for workplace communication. This decrease may signal students' willingness to better prepare for a more complex communication environment. Freedman et al. (1994) argue that students must be embedded within workplace contexts and not educational contexts to understand communication genres and their complexities. They argue that students must learn genres by gaining "sense from the inside" (p. 221) or organizations. However, more recent research provides some qualitative evidence that online simulations encourage students to transfer genre knowledge from the classroom to the workplace (Meyer, 2014; Russell & Fisher, 2010). Furthermore, Farashahi and Tajeddin (2018) argued that simulations were the most effective method of teaching problem solving skills in business settings when compared to case studies and lectures. The present study provides additional support that online simulations, PCSs in particular, help students gain some sense of the complexities of the workplace environment and the communication that occurs therein. These findings suggest a potential value of the playable case format we did not anticipate at the beginning of our research. It seems the simulation helped attune students to some of the detail and nuance that accompanies expert performance in professional fields.

With the final open-ended questions, we aimed to see if student approaches and feelings about *Microcore* writing projects were distinct from those of other school assignments. The findings in this study provide empirical support for the connection between objectives and engagement as the students participating in *Microcore* reported a greater sense of enjoyment with the final proposal product and work they did, compared to other school assignments, along with a developed sense of personal responsibility. The *Microcore* case clearly defined the students' roles and responsibilities, which seemed to contribute to a greater investment in their own learning and proposal they were creating. This aligns with other research on the use of educational simulations in a variety of settings to improve student engagement (Bigdeli & Kaufman, 2017; Shin et al., 2019; Veermans & Jaakkola, 2019). The majority of students also reported increases in self-efficacy and pronounced engagement with the PCS. Only one statement saw a dip in self-efficacy: "I am confident in my communication skills in a workplace environment." This change may be due to having perspectives changed on what exactly business communication entails after being exposed to the complexity and intricacy of the workplace. Thus, this decline could reflect students' more realistic understanding of the complexities of real-world workplace communication.

Our findings offer intriguing insights into student perceptions about communication and writing within the confines of online classes. Whitton (2008) suggested that there are three integral components with ARGs in order for them to be effective: exposition, interaction, and challenge. Sitzmann (2011) agreed with Whitton, stating that these narrative and design elements create a digital space for "engaging and engrossing" (p. 493) content. The *Microcore* PCS meets these criteria with a clear fictitious setting that places students in an important and interactive role, which expects them to produce a final product: a proposal—a genre with which few students had any prior experience. This sense of challenge is important for immersion, engagement, and active learning and retention (Dorn, 1999; Meyer, 2014; Tulis & Fulmer, 2013). Students on average seemed to find *Microcore* to be engaging and worthy of recommendation for similar classes, suggesting promise for the use of PCSs in OWI.

Based on these findings from our surveys, it seems that the PCS positively impacted online student writing, self-efficacy, and engagement, with visible upward trends from the responses we received. Vogel et al. (2006) similarly found that "those using interactive simulations or games report higher cognitive gains and better attitudes toward learning compared to those using traditional teaching methods." They do mention that, at the time, this claim was considered to have an insufficient research base to be entirely stated with confidence. However, this conclusion was independently reached by a number of other researchers (Meyer, 2014; Russell & Fisher, 2010; Sitzmann, 2011). Our results seem to align, with students reporting cognitive gains in demonstrating clearer and more nuanced approaches to communication and reporting better attitudes through their increases in self-efficacy.

Implications

This study has implications both for online writing instructors and for OWI researchers. Self-efficacy and the development of writing skills both happen slowly (Bruning et al., 2013), so serious games are not one-and-done solutions. But based on research from a number of scholars investigating other serious games and the preliminary results found in this study, the possibility exists for playable case studies to help online writing instructors develop

greater engagement with students and help them authentically learn and practice their writing skills. Sitzmann (2011), Girard et al. (2013), and others seem to reflect this claim with traditional classrooms and ARGs and educational simulations. As we found with this study, *Microcore* also appears to alleviate struggles typically found in *online* courses: lacking identity, disassociation and disengagement, and lacking control and interactive elements. A “social presence” (Cunningham, 2015, p. 35) is needed in every classroom to create sufficient interest, personal and situational. This effort to engage learners through narrative, to build connections through stories—as Abrahamson (1998) advocated—can create a sense of community and allow for increased retention and confidence within a program (see also Meyer, 2014). Trends in student responses suggest that playable case studies like *Microcore* could be useful to online writing instructors in rounding out student perceptions on writing assignments, increasing engagement and self-efficacy overall (though this will vary from student to student), and having a positive impact on the mentality of their students in regard to writing. Finally, it seems that the simulated environment of the PCS may be useful in attuning students to the importance of situational discriminations, as well as give them some initial practice with doing so.

Future Research

Future research could compare responses to the PCS between traditional and online classrooms to determine if the method is better suited to one or the other. Also, it could be beneficial to compare this PCS to others in the field to see how students of various locations and levels of ability respond to each in order to best engage writing students. Wouters et al. (2013) suggested that serious games (like the PCS) are not inherently more motivating than traditional methods of instruction, concluding that “serious games are more effective when they are supplemented with other instructional methods than they are when used as [the] sole instruction method” (p. 260). Future research can investigate this across an entire semester of an online class to determine if these researchers are correct in their claim.

Conclusion

This study examined student perceptions of a playable case study delivered through an online technical writing course. Students who participated in this study reported increases in self-efficacy, reported feeling engaged and invested in the material, and reported enhanced understanding of the social elements of professional communication. Their responses to survey questions also indicated expanded understanding of the social demands and humanity of workplace communication, a stronger sense of nuance in how to resolve miscommunications, and a greater sense of purpose related to the importance of professional communications. We believe, based on our results from this study, that the possibilities with the PCS are vast for online writing courses, serving as effective and authentic workplace-communication practice for students.

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