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Rhetorics of Functionally Applicative Game Design: Designing and Testing the Project Management Game *Scrummage*

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RHETORICS OF FUNCTIONALLY APPLICATIVE GAME DESIGN:

DESIGNING AND TESTING THE PROJECT MANAGEMENT GAME *SCRUMMAGE*

by

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ABSTRACT

RHETORICS OF FUNCTIONALLY APPLICATIVE GAME DESIGN:
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In this project, I designed and tested Scrummage, a tabletop game to teach the scrum project management system to undergraduate students. The project grew from the gaps in both academic literature and pedagogical tools for project management and collaboration in the technical communication classroom. Although the field of technical communication places significance on project management, research shows that many employers find the project management skills and knowledge of recent graduates to be under-developed. Situated in the fields of game design, game studies, project management, and technical communication, this project asks how we as educators can improve the project management learning outcomes for technical communication graduates. After conducting research into the forms of project management, I make the argument that using a game designed using vetted game design and playtesting techniques from the field of game design could be a possible solution to this problem. I argue for term "functionally applicative games" (instead of educational, serious, or transformative games) as a way to define games designed with objectives that extend beyond the gameplay itself. I develop a series of rhetorics of functionally applicative games to guide the development and design of these types of games.

To demonstrate these rhetorics of functionally applicative game design, I developed Scrummage, a four-player cooperative game in which players work together to complete a project scenario using scrum project management. My project utilizes a dual methodological

approach. The first set of methods--used for playtesting Scrummage--describe the process of crafting, designing, and revising Scrummage over a series of three playtesting sessions with undergraduate students. The second set of methods draw from instructional design testing schema and test the presumed learning outcomes of Scrummage in regards to scrum project management with a separate group of students. The results not only provide insight into development and testing a functionally applicative game, but also how the processes of introducing, teaching, and reviewing games as learning tools need a heuristic that can be utilized by educators wishing to incorporate them into the classroom.

Dedicated to the game designer in all of us.

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TABLE OF CONTENTS

Page

Chapter Page

LIST OF TABLES

LIST OF FIGURES

Figure Page

CHAPTER 1

PROJECT INTRODUCTION

While it is unrealistic to expect every student to become an ideal project manager, it is not unrealistic to note that one of the ideal goals of technical and professional communication classes is to teach students what useful and effective project management looks like. Despite this clear importance on distributed work and collaborative effort in technical communication instruction, students continue to struggle with the act of collaboration. In technical communication courses, students may work in groups to write an instruction set or be assigned roles within the project by their instructor, but they may not understand the dynamics of how group roles are expected to balance one another, how to establish expectations with their team members, or build realistic timelines.

In their survey of 42 technical and professional communication (TPC) programs, Allen and Benninghoff (2004) found that 30 of 42 TPC programs covered collaboration in all or most of their courses, while 6 programs included it as a featured topic in at least one or two courses (Allen & Benninghoff, 2004, p. 162). Additionally, collaboration and project management ranked in the top nine topics emphasized in these programs (pp. 163, 165). More recently, Meloncon and Henschel (2013) analyzed the course catalogs of 65 technical and professional communication programs and discovered that only 24% of the programs required or offered electives on collaboration and 18% on project management (p. 50). Although research shows that project management and collaboration are clearly vital practices in TPC work (Dicks, 2003; Hackos, 2006), students can still be resistant to group work. This aversion can stem from a number of ideological spaces, whether it be personally, professionally, or culturally. Although collaborative work is privileged in technical communication coursework, the Western view of

texts as work from a single author and representative of a personal argument persists among university undergraduates. Introductory composition courses rarely include group work that results in long-form research reports. It is for these reasons that it is necessary to have TPC classes and coursework explicitly teach collaboration and project management.

Beyond coursework, studies have shown that collaboration is important to technical communicators in the professional sphere. In their survey of working engineers, Sageev and Romanowski reported that "many engineers reported spending 50% or more of their time working in teams" (Sageev & Romanowski, 2001, p. 688). Aimee Whiteside conducted a survey of technical communication graduates and managers and found that "because of the nature of their work, both recent graduates and managers of these technical communicators need additional training in project management to manage a given project" (Whiteside, 2003, p. 314). Additionally, nearly 60% of the managers responded that "their newly-graduated technical communicators lacked project management experience" (Whiteside, 2003, p. 312). Additionally, Myers and Sadaghiani (2010) demonstrated that, while millennials value teamwork and collaboration (p. 230), they may be unaware of the potential pitfalls of unexamined teamwork dynamics (p. 231). These include the ways that control systems are established when working in a team and how compliance with other members is an important element of norming the labor (p. 231). Meta-reflective coursework about collaboration for TPC undergraduates can begin to address some of the concerns that Myers and Sadaghiani raise. Reflective of these challenges in project management, Dicks writes that, "for an area that is as critically important to technical communication as project management, it is surprising that there are not more articles in the literature dedicated to the subject (Dicks, 2013, p. 312). The privileging of quantitative metrics in the TPC field over the past decade has perhaps made subdisciplines such as usability testing and

document design, which lend themselves more readily to traditional scientific testing and analysis, has decreased the interest of journals in publishing articles on project management and collaboration.

Games offer a possible solution to these pedagogical challenges of collaboration and project management. A game designed with mechanics, rules, text, and art that prompts players to collaborate via a specific type of project management has the potential to scale the complexities of project management to an experience for students that can provide discussion, teachable moments, and reflection in ways that could later be applied to their own semester-long projects. A game, specifically an analog game, can teach students concepts of project management in a more systematic way than a traditional textbook chapter is able. When playing a game, the player/user/learner must consent to the rules and algorithms of the game in order to play it, especially when the game includes playing with other people (Salen & Zimmerman, 2004; Juul, 2005; Flanagan, 2013; Sicart, 2014). One can imagine the consternation among players in a game of basketball if one player simply did not agree that dribbling the ball was necessary when moving. Asking students to learn course concepts with a game can be a fraught affair since games have historically been culturally positioned as artifacts for entertainment and escapism. However, all games teach players *something* (Schell, 2008; Ruggil & McAllister, 2011). At the very least, a game teaches the player how to play it through reproducing the means of its production (e.g. the game itself). A game about project management which embeds the necessary behaviors of project management into the rules of the game would require players to accept those practices as they interact with the game (again, assuming that they wish to play the game as it was intended). For example, the game that I have developed for this project, *Scrummage*, asks players to divide tasks among their available resources, determine timelines for

a project, tackle tasks that their avatar may not be specialized in, manage tasks that fall by the wayside, and deal with "real world" events that can help or hinder the progress of their overall goal. Each of these game mechanics and rules have antecedents in scrum style of project management, a type of agile project management which will be further explained in future chapters.

To contribute to this body of literature, this project will explore how a game about agile project management (APM) can contribute to students' understanding of the skills and goals of the agile style of project management, as well as simulate how a months-long project with multiple stakeholders functions from concept to delivery in an environment dependent on teamwork. I have chosen to focus on scrum project management (SPM), a version of APM, for several reasons. First, modeling a specific type of project management can give students a better sense of how each individual part of a team functions within specific roles of a project. Discussing a singular form of project management also gives the students a heuristic they can apply to their future projects that a more general discussion of teamwork or collaboration does not. Additionally, according to technical writers working in agile software development environments, writers have much more opportunity to advocate for users, express concerns and insights, and create more lightweight external documentation throughout short, iterative development cycles rather than focus on heavyweight internal documentation, ensuring better products and better supporting documents (Pope-Ruark, 2015, p. 113). A pedagogical game that emphasizes and highlights these features of SPM can demonstrate to students how, despite organizational constraints, they still possess degrees of agency and can advocate for a humanistic approach to development. I situate this project within the cross-section of literature and research from game-based learning, games in the workplace, collaboration, and project management,

arguing that designing and building a game that teaches students how SPM functions and the benefits of implementing it will be an effective method for communicating to students how this specific style of project management performs in the workplace and classroom.

There is little debate at this point that project management and collaboration skills are important for technical communicators. While textbooks such as *Strategies in the Technical Communication Workplace* (Gurak & Lannon, 2010) and *Technical Communication Today* (Johnson-Sheehan, 2015) provide overviews of collaboration and some collaborative activities, traditional, textbook-based teaching methods cannot convey the nuances, problems, cooperation, organization, and adaptation necessary for effective project management. Since project management is about the sorting and cataloging of an individual's talents and skills through a given organization's institutional structures, I argue that a game-based method of instruction is a more effective method of introducing and teaching project management skills to undergraduate technical communication students than reading a description about the process in a traditional textbook. A game that emphasizes how the cooperation among players, the institutional structure of the game, and the affordances provided by the game in order to simulate the actions and responsibilities of individual actors with responsibilities to one another and the project gives students the opportunity to bear witness to individual elements of an effectively managed project while simultaneously participating in its construction.

My research questions are as follows:

1. How does one design a game with stated educational outcomes?
2. How do we then determine if the game has met those outcomes?
3. Is *Scrummage* more effective at teaching scrum project management than a traditional textbook?

As Whiteside, Sageev and Romanowski, and Myers and Sadaghiani demonstrated, students studying TPC have a high probability of working in a team when joining the TPC workforce. Therefore, it essential that TPC programs and courses include both instruction and critique of contemporary project management styles. To answer the first research question, I have collected ten TPC textbooks published from 2010-2016 and coded them for criteria related to collaboration, project management, and teamwork. Understanding how the field is currently teaching project management material to undergraduate students and what ideologies are being valued within its instruction serve as one of the reference points in the pedagogical and mechanical decisions in the design of my SAPM game, *Scrummage*.

CHAPTER 2

LITERATURE REVIEW

Due to the multidisciplinary nature of this project, the literature review will address research from several intersecting fields in order to situate the work within the fields of project management studies, literature on agile, game studies (games in the workplace, educational games, games as technical communication), and research on collaboration. The purpose of this literature review is to consider the following questions for my project and contextualize my approach to game design:

1. How does *Scrummage* fit into the larger context of games in the workplace and classroom?
    a. How does it reflect this heritage?
    b. How does it resist this heritage?
2. What disciplinary histories does the project owe its debt to?
    a. How are these histories manifested by the project?
3. How does the intersection of this scholarship form the space for my project?

Admittedly, I will need to paint in broader strokes address the varied disciplines in which this project situates itself. After moving through each of the disciplines, I will conclude the chapter by considering how, holistically, they form responses to the questions above.

Project management

The term project management describes the activities, processes, and behaviors that are encompassed by the systematic method(s) to see a project through from the drafting stages to audience dissemination. Project management began as a set of tools to optimize engineering and construction projects, which focused primarily on quantitative measures (money and time), and

has since grown into a “transfunctional discipline” that utilizes sets of methods, techniques, and tools to interact with other fields (e.g., general management, marketing, and business) to create a universal way of dealing with projects across multiple sectors (e.g., construction, engineering, information technology, etc.) (Bridellet, 2010). According to Gosset (2012), “modern theories of project management combine quantitative and qualitative means to measure project success or failure” (p. 371). While an individual can certainly use project management scaffolding techniques to accomplish his or her own work, more often a project management heuristic applies to work being done across a larger organization with multiple teams who are responsible for specific elements of the overall deliverable. The struggle between individual and institutional goals is a common topic across project management literature. For example, Hackos’ (2007) book *Information Development* details often conflicting goals of project management: efficiently managing the project to meet one’s own goals and successfully meeting the needs of the client while adding value to the product or service that your information supports (p. 317). Meanwhile, Dicks (2013) provides an overview of the field of project management and includes descriptions of styles such as waterfall, user-centered, agile, and extreme programming.

In the collective consciousness, the traditional waterfall system is perhaps the most common style that comes to mind when considering the concept of project management. With a focus on completing one milestone before moving on to the next, it shares many similarities to the assembly lines of Henry Ford or Olds Motor Company that emphasize repetition of the exact same movements from workers on a regular basis. However, the inflexibility of the waterfall system, lengthy development times, and end-products that no longer meet the client’s goals led to the development of project management techniques “that are aimed at reducing design and development time while ensuring that products do indeed meet customer needs” (Dicks, 2013, p.

314). Some of these refined project management techniques include user-centered design, agile project management (APM), and extreme programming. User-centered design involves creating user cases in which developers put together tasks that users might employ in their authentic work environment. In APM, "audience members and developers create 'stories' that are scenarios of user tasks to be performed and features needed to perform those tasks" (Dicks, 2013, p. 326). Extreme programming has technical communicators and programmers working in dyads during every step of the development cycle and addressing problems as they arise. Each of these three project management heuristics features a strong emphasis on iterative development, utilizing testing cycles to create deliverable prototypes in order to address problems that arise in development earlier rather than later.

While each of these methods brings its own affordances and constraints to project management, APM is perhaps the most applicable across multiple organizations and practices. As Pope-Ruark writes "agile's focus on process, self-organization, and collaboration has become increasingly important in industry and in academic programs training future professionals for these industries. Agile is not only popular in software development; a quick Google search reveals its reach in design, marketing, publishing, energy management, financial services, and civil and mechanical engineering, to name a few" (Pope-Ruark, 2015, p. 116). In addition, agile's priority on "people and teams, interactions with users throughout the process, and emergent and responsive documentation" respond to Miller's (1979) arguments for humanistic elements in technical and professional communication courses (p. 116). Research has also shown that participation in projects that use an agile approach make significant gains as software developers regardless of their initial skill level (Perera, 2009), benefit from the more social aspects of these learning environments (especially women and minorities) (Slaten et al., 2005),

and display significant improvement in their teamwork abilities (Lingard & Barkataki, 2011). Despite its benefits, it is not uncommon to for implementation of agile project management to be met some resistance. In the classroom, students may not be open such a drastic change from their traditional methods of approaching group work. They may not be able to maintain the rigorous meeting schedules on which agile management functions or there is resistance to the intense collaboration and self-organization that agile involves (Dennings, 2012; Grant, 2013).

Agile project management

Agile is a style of project management that gained popularity around the turn of the century when a group of individuals believed that software development needed a refined model of development. At the time, the current models of software development still relied on the factory-manufacturing structure of workflow known as the waterfall method, a method that the Agile group felt did not meet the needs of products, companies, or consumers in the current economy. According to history of the Agile group, the four tenets of Agile were developed during the days of February 11-13, 2001 by the seventeen members the software development community who, by the end of the third day, would produce the Agile Manifesto, a document describing the tenants of agile and their necessity. The four tenets of Agile are:

1. Individuals and interactions over processes and tools
2. Working software over comprehensive documentation
3. Customer collaboration over contract negotiation
4. Responding to change over following a plan (from http://agilemanifesto.org/)

The group acknowledged that, “while there is value in the items on the right, we value the items on the left more” (agilemanifesto.org). Although the Agile Manifesto represents the introduction of Agile practices in contemporary software development, Abbas, Gravell, and Wills (2008) note

that the philosophies of Agile "have been around since the 70's or even before" (p. 95). Their research provides historical evidence that "dissatisfaction with heavyweight approaches [to software development] existed long before the 1990s [and that] non-waterfall approaches existed as early as 1957" (Abbas, Gravell, and Wills, 2008, p. 101). Agile at least partially owes Demming's principles of Total Quality Management and Continuous Quality Improvement from the 1960s some credit for the emphasis on iteration (Johnson-Sheehan, 2015). Searching for change from traditional project management methods in industries has been an ongoing struggle within the software industry dating back to the era of punchcards. Agile is only one of the latest in responses to this challenge.

Agile project management (APM) has several different forms, but the most popular and widely applicable is the scrum-style of project management (Fig 2.1, appendix A). Borrowing the term from rugby (scrum is the circular formation of players that the team uses to move the ball down the field), scrum emphasizes the prioritization of work that most immediately matters while breaking it down into small, manageable chunks that team members are able to complete in relatively short timespans (usually two weeks to a month). It is about the swift delivery of project prototypes in order to receive feedback at every stage of the process, rather than only at the end as in traditional waterfall project management (Fig 2.2).

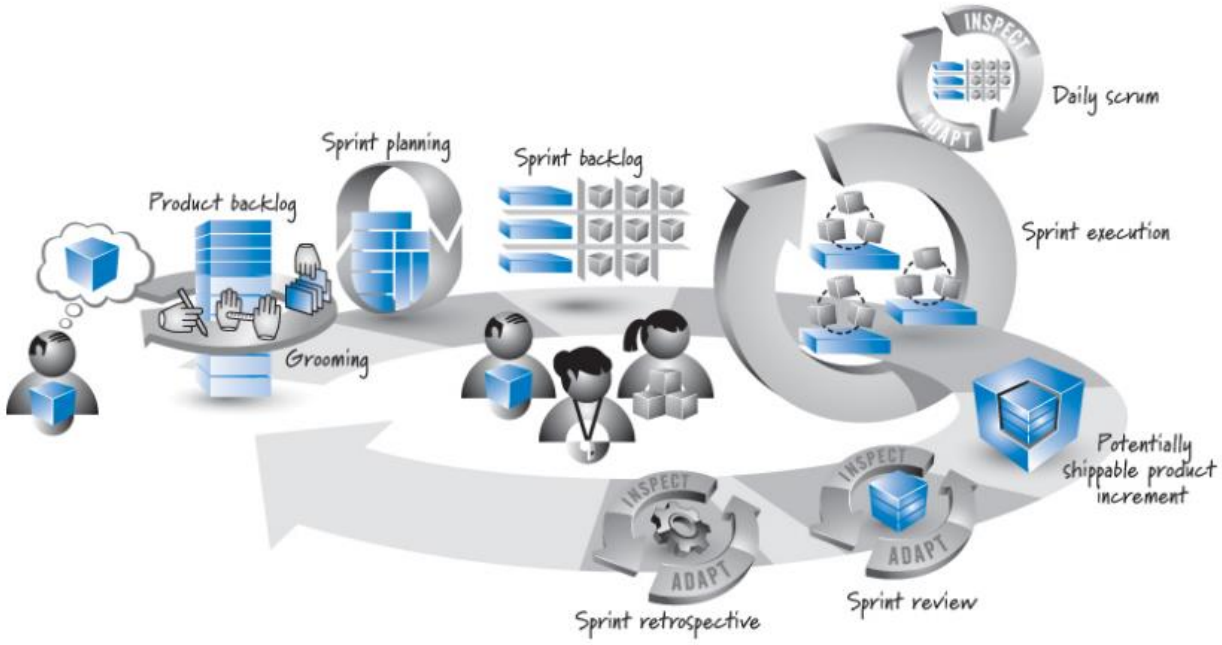

Fig. 2.1: Scrum project management process (Rubin, 2012, p. 14)

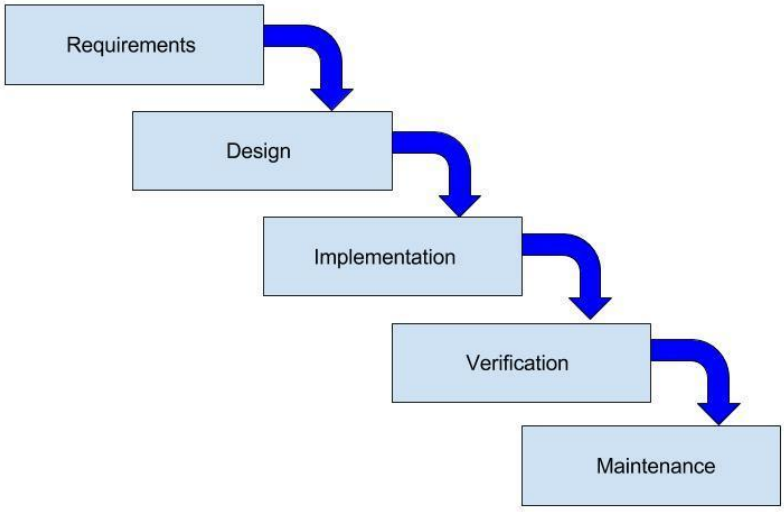

Fig. 2.2: Waterfall project management process

Ideally, agile is about frequent communication between teams, project managers, and the customer. The main activity in scrum is the sprint, which is a “time boxed iteration that usually lasts between 1-4 weeks, with the most common sprint length being two weeks” (What is Scrum Project Management?, n.d.). Each sprint involves the following stages:

- Sprint planning meeting: initial meeting to determine the highest priority work that needs to be done over the next sprint
- Daily scrum meetings: Daily 15-minute meetings in which team members identify what they worked on yesterday, what they will work on today, and any impediments they may face
- Sprint review: the teams demonstrate the functionality or contributions added to the project during the sprint
- Sprint retrospective: the teams reflect on the sprint and identify ways to improve with the next one

These activities provide the backbone of scrum APM and dictate the types of interactions and communications that teams will have with one another. Although team members are usually assigned tasks related to their background and specialization, scrum’s emphasis on the goal at the end of the sprint often means that team members complete tasks that require immediate attention rather than expertise. Artifacts of scrum APM that teams will use to determine the order of these tasks are the sprint backlog (a prioritized list of tasks the team must complete during the sprint), burndown charts (used to show the amount of work remaining in a sprint), and stories (the name for a specific task in scrum APM). In addition to the various team members, the roles specific to scrum APM team include the product owner (customer proxy) and scrummaster (responsible for implementing the scum). Team members in scrum APM are collectively responsible for getting

their work done, rather than having tasks dictated day-to-day by a project manager as in more traditional project management styles.

Despite its emphasis on individuals and people, the development of APM by the Agile group was not one of benign ideology. The authors of the Agile Manifesto, as CEOs, consultants, or directors of various operations in their respective organizations, had vested interests in seeing the growth and implementation of APM strategies in various organizations. Unspoken by the tenets of agile are employers who wanted better output from them employees in order to remain relevant in the shifting marketplace as the tech bubble burst at the turn of the century. The APM system cannot be entirely untangled from this origin, nor should it, despite its greater emphasis on self-described "human-centered production" than traditional manufacturing models. Many of the founders of the modern agile movement have written books about the process, formed workshops and conferences around it, and promoted themselves as agile coaches who can help save failing businesses by showing them how to integrate AMP into their companies. With this history in mind, I am not arguing that introducing APM to undergraduate technical communication students should valorize APM as a panacea for collaboration challenges or that it is without consequence, but I do argue that using a game-based approach to teaching APM permits students to understand the intricacies and interactions among the roles of APM more effectively than a traditional textbook can. I will rely on the instructors and professors who implement the game in their classroom to ensure that their students understand the problematic nature of imposing any type of project management system upon people and providing them an idea of the ways that technical language is used to impel workers to produce within the shifting workforce that they will enter upon graduation. Suggestions on how to address this will be included in a pedagogical packet that will accompany the final version of *Scrummage*.

Games in organizations

Games have been a part of modern organizations for decades and have functioned in spaces beyond only entertainment in human civilizations for even longer. Contemporarily, these organizational games operate under a number of titles: business or management games (Faria, 2001; Faira et al., 2009), policy games (Mayer, 2009), or the umbrella phrases simulation games or gaming simulation (Duke & Geurts, 2004; Greenblat & Duke, 1975, Warmelink, 2014). Regardless of the classification, it was the emergence of systems thinking in the 1960s and 1970s popularized the tradition of considering how games shared many of the same attributes and qualities of organizations (Mayer, 2009). However, the origin of simulation gaming practices can be traced back decades or even centuries earlier (Duke & Geurts, 2004; Egenfield-Nielsen, 2007). Richard Duke's work *Gaming, the Future's Language* (1974) argues that games essentially offer a lexicon for understanding the complexity of society and its organizations. He argues that "[gaming] can be usefully employed for gaining perspective on complex circumstances; it is particularly useful for guiding speculation about future circumstances" (Duke, 1974, p. 44). As they have grown in popularity, an extraordinary number of business, management, and policy games have been developed. Although digital versions of these organizational games may be the "default" presently, early iterations expectedly did not feature much, if any, digital technology. Warmelink explains how:

> [Organizational games] were and often still are physical board and role-playing games, at most computer-assisted. They nevertheless rely on high- or low-fidelity simulations of physical and/or social systems. They are known for allowing players to experience a certain system in which organization is required and from which players can subsequently learn. Many of these games have actually been

> applied in formal education rather than in organizations. Yet organizations have also applied games themselves as part of their internal education programs or to aid managers and employees in their daily jobs. (Warmelink, 2014, p. 4)

Typically, simulation games have been designed to produce or develop individual or organizational learning (or, at times, both). Individual learning involves cultivating the players' organizational skills, while organizational learning entails building "an organizational understanding and interpretation of [the] environment...to begin to assess viable strategies" (Fiol & Lyles, 1985, p.804). Games that target individual learning generally train players in leadership skills or specific management skills (e.g., understanding the "bullwhip effect" in the *Beer Game*, see Sterman, 1992). When focused on organizational learning, simulation games may be designed to allow players to develop a strategy or policy for e.g. rail cargo transport (Meijer, Mayer, van Luipen, & Weitenberg, 2012) or for obtaining licensing patents (Gasnier, 2007). Of course, games can also be designed to accomplish both types of learning objectives simultaneously.

An evolution of these organizational games can be seen in the practice of gamification. Gamification is the application of game-like principles on to traditionally non-game based activities. It can be seen in examples such as customer rewards programs from businesses or tracking workout data in an application to earn level-up progress and badges. The term was coined by Nick Pelling in 2002, but did not gain widespread popularity until 2010 when venture capitalists and software designers began to explore using it to retain users and customers. Some game scholars have criticized the practice of gamification, presumably to maintain that games have cultural and artistic value outside of merely being tools for the generation of capital. Ian Bogost (2011) famously declared that "gamification is bullshit" and suggested referring to it as

"exploitationware" to more accurately reflect its nature, while Jane McGonigal prefers to use the term "gameful design" in hopes to capture the nuances of play that games require. However, despite the resistance among scholars to the term, gamification practices are widespread throughout our culture: customer loyalty programs, certain fitness apps, earning badges at work for certain tasks, etc. Although it is easy to dismiss gamification as shallow, Ramierz and Squire (2014) remind us that "gamification principles aren't inherently good or bad. Rather, we can examine the consequences of their use and determine their value" (Ramirez & Squire, p. 631). The major concern of gamification in the classroom is that the accumulation of extraneous points will take precedence over engaging with and understanding the course materials and outcomes. My own project, *Scrummage*, elides this concern (hopefully) by tying any points to specific elements of SPM. The collaborative nature of the game means that any score accumulated will be for the good of the group rather than individual gain as well.

Many of us likely encountered numerous examples of gamification during our primary schooling. Classroom leaderboards for the student who cleaned up the most toys, a gold star for the student who asked the best question, an extra point for following certain classroom rules. Gamification can be an effective way of norming behavior using cognitive and behavioral psychology that gamifiers strive to reproduce. Identifying it as "pointsification," Robertson (2010) notes that, " [points and badges are] great tools for communicating progress and acknowledging effort, but neither points nor badges in any way constitute a game…They are the least important bit of a game, the bit that has the least to do with all of the rich cognitive, emotional and social drivers which gamifiers are intending to connect with" (qtd. Hung, 2017, p. 60). As we move into considering games in education and how scholars have considered their effectiveness as pedagogical tools, it is important to consider how they consider how they can be

reliant upon gamification practices, but also the qualities that distinguish them from being purely examples of such. Such "serious games," as they are referred, carry their own problematic histories and cultural expectations.

Games in education

Educational games, often labeled as "serious games," are typically held in higher regard in scholarly circles than gamification. It could be argued that serious games and gamification represent opposing ideologies regarding the use of games for instruction: whereas gamification takes principles of games and applies them to non-game activities, serious games use games to understand and teach activities or events that are not (or are not thought of as) games. While this may be an oversimplification, it allows us to explore the pedagogical and psychological histories to which educational games--serious or not--are indebted and how they are independent of gamification practices. Many contemporary approaches to about games and their use in education can be traced back to theories of Vygotsky and his theories on zones of proximal development (ZPD). The ZPD theory is driven by the idea that most higher learning occurs through social interaction. Specifically, learning is first observed by the pupil externally before being internalized (Vygotsky, 1978; Lave and Wenger, 1991). Later research expanded the theory and introduced the notion of "cognitive apprenticeships," a common process of modeling, coaching, scaffolding, and fading (Brown, Collins, & Newman, 1991). A hallmark of learning within the ZPD is that learning is organized around a mutually valued task (Ramirez & Squire, 2015). For advocates of the use of games in education, the central concepts within the ZPD theory tied closely to Huizinga's concept of the "magic circle." The concept of games as a magic circle (at least, as it is often interpreted in games in education studies) argues that games are delineated through circumscriptions on time and space. They are understood as self-contained

systems which, as Zimmerman (2009) states, “emphasize those meanings that are intrinsic and interior to games” (p. 24). In this classical interpretation of the magic circle, participants enter the magic circle, engage with the meaning and systems of the game, and, upon finishing the game, emerge to carry on with their day. Understanding the magic circle in this way is valuable to proponents of the use of games in education because of the presumed 1:1 relationship between the game and learned skills. It reduces the complex acts of learning, conginition, and transfer of skills to an easily digestible exchange of time and acts performed in the game. Even the name itself--“the magic circle”--seems to lend itself to an ultimately uninterpretable phenomenon for researchers: players enter this playspace and we are never *quite* sure what happens to them while they are there.

However, Huzinga himself recognized that the magic circle could not be divorced from the world around it. Rather than a demarcation to the outside world, as many scholars have classically understood it, he saw it as a palimpsest. Huzinga writes:

> All play moves and has its being within a playground marked off beforehand either materially or ideally, deliberately or as a matter of course. Just as there is no formal difference between play and ritual, so *the "consecrated spot" cannot be formally distinguished from the play-ground*. The arena, the card-table, the magic circle, the temple, the stage, the screen, the tennis court, the court of justice, etc., are all in form and function play-grounds, i.e. forbidden spots, isolated, hedged round, hallowed, within which special rules obtain. *All are temporary worlds within the ordinary world,*. dedicated to the performance of an act apart. (1949, p. 10, emphasis mine).

As Huzinga says, the magic circle does not leave the world behind. Instead, it resignifies the space and relationships within it. Rules may offer a fixed and rigid structure for the play itself, but when rules are adopted by the players and agreed upon by players who enter the magic circle, play happens. For example, consider computer games in the classroom. Computer games have had a place in the classroom in the form of popular titles like *Oregon Trail* (MECC, 1974) and *Where in the World is Carmen Sandiego?* (Broderbund Software, 1985). At the very least, games are teaching students how to play them through the rules, algorithms, and affordances of the games. Computer games also helped students understand parts of the technological infrastructure around the games, such as computer architecture, file structure, and actions like how to insert a floppy disk into the disk drive or turn on a computer monitor. These material moments of gameplay reflect the intersection of Huzinga's "play-ground" and magic circle. The magic circle of the computer game is dependent upon the social, economic, technologic, and logistic infrastructures that create the playground. The creation of the magic circle with knowledge of using the material spaces of the computer lab, computer desk, chair, monitor, keyboard, mouse, etc. to create the magic circle required for gameplay is an oftentimes under-considered aspect of considering early educational games.

Additionally, in the case of educational games, it is often easier and more convenient to ignore the production of play entirely in order to focus on the quantification of presumed and expected learning outcomes. This leads to an instrumental understanding of play (Taylor, 2006; Sicart 2011) in which the designer knows the path and outcomes of the game and the players are engaged only in reproducing and completing the rules sets of the game. An instrumental approach to play values the experiences and expectations of the designer and game over those of the player, a challenge than edutainment games often wrestle with. In these cases, the games are

more akin to a puzzle that can only be solved in one way rather than an exploratory exercise in play as learning. Instrumentalism and games considers the game as a designed artifact that deliver a learning experience with a clear start and ending. Instrumental play understands failure as a punitive measure for being unable to correctly "solve" the game.

Games such as *Oregon Trail* and *Where in the World is Carmen San Diego* are popular examples of what has come to be known as "edutainment." They helped ushered in the use of computer games in schooling, but exactly how and what games teach is still under scrutiny. Determining other types of content acquisition requires more traditional evaluation techniques such as reflections or exams. Fabricatore argues that "the purpose of teaching specific content makes the game too often considered a servant of the educational process which causes the gap (in terms of popularity and richness of learning experiences) existing between educational ludic applications and video games created merely to entertain" (Fabricatore, 2000, n.p.). Educational games can often be beholden to the required content of the lesson at the sacrifice of the engagement and player-centered game design. Conversely, popular games that may not claim to be educational are inevitably teaching the player *something*. At the very least, that "something" is the game teaching the player how to play it through explicit tutorials, color patterns, level design, player affordances, and obstacle construction. Cultural fears of simulations, however, typically result in attention to more assumptive and amorphous lessons of games, as the decades-long debate over whether or not first-person shooter video games cause players to act violently demonstrates (Anderson, 2004; Delisi et al., 2012; Granic, Lobel, & Engels, 2014).

The bifurcation of games for educational purposes and games for entertainment purposes echoes the debates over authorial intent in textual studies. Although the game may begin as a conceptual kernel within an individual game designer, it will go through various changes as it

encounters the programmers who will code the algorithms, artists who will conceptualize the levels and characters, publishers who will provide manufacturing and marketing, and retailers that will determine shelf space and visibility. The classification of a game for entertainment purposes or educational purposes requires the input of individuals from multiple organizational levels and various institutional knowledge. The games that, in theory, most effectively teach players about a larger problem or topic, or hone skills that are meant to be used outside of the game are typically classified as "serious games." However, Stuart Hall's concepts of encoding/decoding remind us that, while hegemonic institutions may classify artifacts one way, recipients of the artifacts may interpret the artifact in a "globally contrary way" (Hall, 1973, p. 18). A game like *Doom* (id Software, 2016) may be marketed as a game purely for entertainment purposes, but the player might approach the game with a serious mindset, taking great personal pride in their accomplishments in the game and feelings of intense frustration at their failures. Conversely, a game like *Oregon Trail* which is meant to teach children about 19th century pioneer life, may be taken less seriously by players if they play only to see how fast they can make their game characters die of dysentery. Seriousness is less about marketing classification and more about the attitude of the player toward the game.

Nevertheless, the term "serious game" is pervasive enough in the literature to warrant unpacking. Although the term "serious games" was popularized by Michael & Chen (2005), it was coined by Clark Abt decades earlier. According to Abt, serious games are "games [that] have an explicit and carefully thought-out educational purpose and are not intended to be played primarily for amusement. This does not mean that serious games are not, or should not be, entertaining" (Abt, 1970, p. 9). The fact that the games are still expected (and perhaps required) to be entertaining traces back to ideas and values about learning that were practiced in the

Renaissance: “Neo-Platonists use the term ‘serio ludere’ to refer to the use of light-hearted humour in literature dealing with serious matters” (Manning, 2004, cited in Djuati et al., 2011, p. 26). The term “serious game” reflects how “games may be significant without being solemn, interesting without being hilarious, earnest and purposeful without being humorless, and difficult without being frustrating (Abt, 1970, p. 10). Serious games might strive to inform players about the dangers of mountain top removal, train them about how to avoid sexual harassment at work, or teach them simple addition. They use their systems, rules, and media to impart a political, educational, scientific, or industrial end-goal for the user to learn beyond the scope of “having fun.”

Despite its fixture in both the popular gaming nomenclature and the academic field of game studies, the term “serious games” is problematic for several reasons. Ian Bogost notes that “serious games are created under the direct influence and guidance of external institutional goals” (Bogost, 55). However, this is true of any game, whether it has an explicit political or educational goal or not. Although the stated goals of serious games are usually associated with positive values and ideologies, Bogost reminds us that “serious games are video games created to support the existing and established interest of political, corporate, and social institutions” and instead forwards the term “persuasive games” (Bogost, 2007, p. 57). Bogost argues that games especially suited to procedural rhetoric, “the practice of authoring arguments through processes” (p. 29), stating that” if persuasive games are video games that mount meaningful procedural rhetorics, and if procedural rhetorics facilitate dialectical interrogation of process-based claims about how real-world processes do, course, or should work, then persuasive games can also make claims that speak past or against the fixed worldviews of institutions like governments or corporations (p. 57). Miguel Sicart, however, contends that a procedural approach to

understanding games privileges the rules and rule sets of the game over the player's experiences, arguing that "for the proceduralists, a game means what the rules mean, and understanding what games are is to understand what their rules describe. Players are important, but only as *activators* of the process that sets the meanings contained in the game in motion" (Sicart, 2011, italics original). Sicart fears that this rule-centric approach to interpreting games denies the uniques experiences and histories that each player carries with themselves. He writes, "the assumption behind mainstream proceduralism is that the meaning of games is contained exclusively in the formal system of the game. What players do is to reconfigure the meanings embedded in the rules defined by the designers" (Sicart, 2011). In resistance to the proceduralism narrative dominating game studies over the past decade, Sicart recommends that scholars, designers, and artists consider an orthogonal theory of play that augments and complements procedural discourse. Suggesting that the meaning of a game is located not in the rules but in the engagement with the rules by the player, Sicart reminds us that achieving a holistic representation experiencing a game requires "a balance between reason and ritual, between what players bring to the game and what players provide to the game" (Sicart, 2011).

Sutton-Smith (1997) describes the research literature about play and education as adopting a "rhetoric of progress" because there is a strong desire among scholars—even if empirically unsupported—to ascribe an extrinsic educative or training to the act of play. Authors such as Gee (2003), Squire (2002, 2006, 2011), Konzack (2007), Woods (2004), and McGonigal (2011) take a similar position in their discussion of games as "creators of ideological experiences with educational potential" (Warmelink, 2013, p. 6). Within this approach, there is an assumption that games offer a more effective learning experience than traditional educational methods. The act of engaging with the pedagogical material through the game space meets

learning outcomes more effectively than traditional educational tools. Squire interprets games as "possibility spaces," arguing that "researchers need to account for how players inhabit them and the mechanisms by which meanings becomes interpreted from these experiences" (Squire, 2006, p. 20). For educators creating games, he argues, this means shifting the goal from one of "delivering content" to one of "designing experience" (Squire, 2006, p. 20). However, divorcing content from experience is not so easy. Nor is suggesting that instructors who teach using more traditional methods do not consider the context, optics, and overall experience that students have in their classrooms.

Egenfeldt-Nielsen reinforces this approach when he writes "the computer game is not primarily about simulating, but rather about providing an interesting experience when the player fulfills certain explicit goals" (Egenfeldt-Nielsen, 2007, p. 15). Games with pedagogical purposes external from the game do not necessarily benefit from a direct simulative rendering of an event. Overemphasis on specific mechanical behaviors in a game can distract the player from the designer-presumed goals of the game. An example of a game of this nature is the *McDonald's Video Game* (Molleindustria, 2006) in which the player is responsible for operating sectors of the McDonald's corporation, from the farmlands where cattle and soy are produced to a restaurant chain to the corporate boardroom. The introduction text of the game states that the player will "discover all the dirty secrets that made us one of the biggest companies of the world" (Molleindustria, 2006). The *McDonald's Video Game* is designed to give the player an understanding of the stratification of labor, production, and capital that McDonald's considers while running a successful multi-billion dollar company while critiquing the negative environmental and economic impact the company's practices have on developing nations. Representing all of the nuances, motives, and activities that are part of operating a corporation is,

of course, impossible by a computer game. This means that designers must make choices about what to include and ignore in the representations of systems that they include in their game. In the case of the *McDonald's Video Game*, these choices include calling attention to the deforestation of the rainforests while ignoring the day-to-day management of running of McDonald's restaurant in order to make an argument about the company's ethics on a global scale. Succeeding in the game comes at the cost of the planet's ecosystems and consumers' health. The challenge in the design of such a game is whether or not players will reflect on the design of the game at the expense of their play session and success within the game. Design and mechanics can only encourage player behavior. The player's play context, technological options, comfort with devices and materials, decision to play the game alone or with friends, and other external, unmitigable factors affect how critically and readily the player considers the criticism of McDonald's. Factors such as these raise the question as to whether or not a game--instead of a video or essay--is the best medium for Molleindustria's message (Fullerton, 2008; Schell, 2014; Macklin & Sharp, 2016).

Games and technical communication

In the past decade, a number of scholars have begun to address the significant overlaps between technical communication and games. As perhaps the "quintessential intersection between technical and technological innovation and creative activity" (deWinter & Moeller, 2013, p. 2), computer games depend on a number of technical communication practices in their design, development, publishing, maintenance, consumption, and use. Scholars have acknowledged that games can serve as a training ground for corporate ideologies (McAllister, 2004; Wark, 2007; Rettberg, 2008; Moberly, 2010), eliciting behavior from players that is more

akin to tracking numbers on a spreadsheet than a playful pastime. Building on their work, Eyman identifies five elements within the "ecology of gaming activities" that supports such discourse:

1. Environmental action (what happens in the game)
2. Para-textual development (game interfaces)
3. Documentation (user and developer created texts about games)
4. Infrastructural processes (the game design itself)
5. Research (critical commentary and scholarly investigation of games and their relationship to "real life") (Eyman, 2008, p. 246).

Despite the problematic naturalization of defining the activities as an ecology, Eyman's framework serves more as an identification of rhetorical spaces in the computer game industrial complex relevant to the concerns and work of technical communicators than as a taxonomy. Mason builds on Eyman's work by focusing on the third element--documentation-- and tracing the use of technical communication genres via their rhetorical uses within online gaming communities (Mason, 2013). Using Miller's (1984) and Bazerman's (1997,1998) approach to genre theory, Mason argues that "being a successful gamer requires both thinking and acting as a technical communicator" (Mason, 2013, p. 220). The use of the phrase "successful gamer" is unfortunate, since it precludes an instrumentalist understanding of games which values the tool's presumed intentions over the user's personal experiences with it, nor does it take into account the degree to which failure is central to how games teach. As myself and my co-authors have argued, user documentation for online games can resist the communally accepted ways of play in favor of more nefarious ends (see Beale, McKittrick, and Richards, 2016). In our research, we discovered that a number of players of *Minecraft* utilized a host of procedural documentation formatting techniques in their creation of instructional guides to teach other ne'er-do-wells how

to effectively “grief” other players on the same game server. The technical communication that games facilitate--whether organizational or ad hoc--requires ethical context through which scholars resist the deliberative rhetoric that instrumentalism depends upon.

Other researchers have explored point four of Eyman’s elements: the infrastructural processes. In a case study of an independent game studio, McDaniel and Daer interviewed fourteen employees in order “document how [they] communicate and share knowledge” (McDaniel and Daer, 2016, p. 155). The authors provide evidence of the complex network of “technical communication texts, tactics, and tools in use within problem-solving scenarios” at work within the organization (p. 163). Further evidence can be seen at the website *Gamasutra*, a centralized hub of game development work. *Gamasutra* includes blogs and news articles from people inside of the game development industry. These frequently describe the pieces of technical communication that members of the industry are responsible for creating. One of the most popular pieces, Tim Ryan’s “The Anatomy of a Design Document” (1999) lays out the process and content of a game design document (GDD), the oft-central piece of documentation in game development which, ideally, “ communicate[s] the vision in sufficient detail to implement it” (Ryan, 1999).

Game design textbooks also offer myriad possibilities through which discursive practices of technical communication through games may be analyzed. In their review of game design textbooks, DeAnda and Kocurek (2016) identify the tensions within the current discourse of game design of coding and technology versus art. They argue that leading game design textbooks attempt to frame game design as a field of technical practice and artistic endeavor, situating it as a form of technical communication. DeAnda and Kocurek note how these textbooks summarize “games--digital and otherwise--as a process of engineering, translating, and communicating

experiences through iterative design and careful testing..., much like architecture, graphic design, and other fields that have long been accepted as technically oriented fields that rely on creativity and artistry" (DeAnda & Kocurek, 2016, p. 209). A quick Google search reveals that technical communication instructors have begun to see these overlaps. Several upper-level technical communication syllabi that instructors have posted online include at least one of the game design textbooks that DeAnda and Kocurek discuss in their piece.

Computer games are also well-suited artifacts to address topics commonly discussed in technical communication courses in the academy. Research suggests that they are apt for teaching traditional technical communication subjects such as usability (Vie, 2008), professional identity (Bay & Blackmon, 2013), and procedural writing (Custer, 2013), as well as demonstrating potential for critiquing the capitalist ideologies that are often embedded in the work associated with technical writing (Moberly & Moeller, 2013; Dyer-Witheford & de Peuter, 2009; Bogost, 2007). This research builds on the research that has already been done in composition studies on games in the first-year writing classroom (Shultz-Colby & Colby, 2008; Moberly, 2008; deWinter & Vie, 2008; Johnson, 2008). Whereas the research in composition studies in general suggested that games helped contextualize student writing with their built-in audiences, their connection to the field of technical communication values the inherent connections to procedural forms of writing. I would also add that games, with their emphasis on modeling systems and outcomes, are suited to displaying the routines of a collaborative project management system like SPM. Games give students the opportunity to see how the various roles and tasks of a project intersect, respond to each other, and possibly conflict.

Collaborative learning

The history of collaborative learning in the United States finds its origins in the pedagogical and philosophies of John Dewey. At the time, as Holt (1994) notes,:

> progressive educators viewed these practices with great promise. They saw them as a response to new scientific and philosophical knowledge, as an alternative to the deadening boredom of traditional recitation, as a way to teach students to work together in support of democracy, and as a sensitive approach to individual differences. (p. 73)

The 1920s saw a rise of "student-centered" practices among educators and discourse surrounding collaborative learning processes such as expressive and reflective writing (Berlin, 1987). In her review of the Project Method and the Dalton Plan, Holt (1994) uncovers a strong connection between collaborative learning and "scientific business management." Both the Project Method and the Dalton Plan offered early models of collaborative pedagogy. However, although both models borrowed from Dewey's philosophies on education, neither sufficiently addressed the problematic relationship between pupil and teacher in the collaborative setting. Ultimately, Holt argues that these early forms of collaborative learning "suggest a model of a benevolent dictatorship of elite experts, rather than Dewey's participatory democracy (Holt, 1994, p. 74). As she notes, "the 1920s were marked by a widespread faith in business and efforts to adapt business management techniques of "social efficiency" to the classroom (Holt, 1994, p. 73).

Collaborative learning practices of any era are entrenched in the ideologies of the time. Collaborative learning practices of the 1930s fell in line with leftist, Depression-era politics in the hopes of galvanizing socialist democracy, while the 1950s saw a distrust of collaborative learning and collective behavior in the wake anti-Soviet, pre-Cold War politics (Holt, 1993).

Following this, collaboration as a central approach within any form of project management cannot be disentangled from the era in which it is (re)produced. Although perhaps easily dismissed as a "natural" act of human development and behavior, as anyone who has worked on a team-based project can attest, dynamics of collaboration arrive with their own ideological and cultural challenges. To begin, consider how difficult collaboration is to identify, notably because it assumes such a wide variety of forms, actions, and practices across communities. Trimbur (1989) notes that "the aim of collaborative learning, its advocates hold, is to reach a consensus through an expanding conversation" (p. 602). In TPC textbooks, collaboration usually refers to how members of a team must interact in order to reach a particular outcome. Crook reminds us, however, that "the notion of shared goals(s) is one important feature of what is normally termed collaboration….Three lines of interpretation are prominent within the literature. The first stresses how collaboration inspired participants to articulate their thoughts publicly….The second line stresses the value of the conflict that can arise as partners negotiate a consensus. The third line of interpretation stresses the possibility of co-constructions within collaborative problem solving" (Crook, 1995, p. 542). Damsa supports this understanding of collaboration when he writes, "productive interactions are conceived as communicative encounters between collaborating individuals, which lead to a shared understanding of concepts and ideas , and the co-elaboration of the ideas into knowledge objects, and the sustained advancement of those knowledge objects. (Damsa, 2014, p. 273).

In the case of education, case-based problem solving has been a frequently used method as an introduction to collaboration. *Scrummage* uses this case-based problem solving in the form of scenarios that the players choose. Damsa writes that "learning in small groups that focuses on solving open-ended problems and on managing the collaborative process has been proposed as a

way to expose and enculture students to complex learning situations that stimulate engagement in collaborative knowledge production" (Damsa, 2014, p. 247-248). In technical communication, when students learn collaborative skills they are "developing habits and practices that are valuable for their future endeavors (e.g. how to plan, recognizing when a course of action is not working, becoming comfortable with learning how to use new tools, and learning how to negotiate and arrive at a shared understanding of how to solve complex problems)" (Barab et.al., 2001, p. 88). Trimbur reminds us that, "[students] can learn...not how consensus is achieved through collaborative negotiation but rather how differences in interest produce conflicts that may in fact block communication and prohibit the development of consensus" (Trimbur, 1989, p. 611).

Despite its generally positive associations, collaboration is not beyond critique. Classroom ethnographies have shown that children do not often describe it positively (Cullingford, 1991). Additionally, "observational studies of informal class group indicated that pupils may not readily or deliberately adopt collaborative modes of working" (Crook, 1995, p. 542). John Trimbur notes how collaboration and consensus are often tools for dominant ideological reproduction and control:

> Collaboration and consensual decision-making, after all, have become buzzwords for "new age" managers and technocrats. Part of the current conventional wisdom about the new information society is that cooperation and collaboration will replace the competitive and individualistic ethos of the entrepreneurial age of industrial capitalism. But finally what collaboration and consensus amount to are not so much new paradigms for a high-tech post-industrial order as new versions of an older industrial psychology adopted to late capitalism--human relations

> techniques to bolster morale, promote identification with the corporation, legitimize differential access to knowledge and status, and increase productivity. Even in the ostensibly disinterested realm of academics, the production of knowledge is motivated as much by career moves as by consensus, by the efforts of individuals to enhance their credentials and relative position in a field, to build up their fund of cultural capital. (Trimbur, 1989, p. 611)

Far prior to entering the workforce, children are encouraged to collaborate with one another with mixed results. Early childhood education studies find effective collaboration among students rare (Bennett, 1991). Other studies find forms of classroom collaborations difficult to generalize or practice in other situations due to the specific "material conditions under which they operate" (Bennerstedt, Ivarsson, & Linderoth, 2012, p. 58). Markel (2015) notes that collaboration can take more time than individual work, can lead to groupthink, produce a disjointed document, and lead to inequitable workloads (p. 60). Trimbur suggests that positioning consensus as a "utopian concept" and developing a "rhetoric of dissensus" for the collaborative classroom (Trimbur, 1989). In recognizing that collaboration and consensus depend upon forms of conformity, Trimbur suggests that we encourages students to resist them by understanding consensus as an "instrument for students to generate differences, to identify the systems of authority that organize these differences, and to transform the relations of power that determine who may speak and what counts as a meaningful statement" (Trimbur, 1989, p. 603).

Meanwhile, studies of collaboration and games reveal a bias towards games' ability to giving form to an otherwise abstract problem. Early research suggested that "Innovative software can assist such collaborators by casting otherwise abstract problems into formats that involve more visible and manipulable representations" (Crook, 1995, p. 546). Additionally, games can

"highlight the need to shift towards a view of collaboration that acknowledges and emphasizes the value of productive interaction in the context of knowledge-driven, technology-supported learning contexts" (Damsa, 2014, p. 277). However, as Cicchino reminds us, "while the implications of [problem-based learning] on critical thinking and collaborative discourse are well documented (see Hmelo-Silver & Barrows, 2006), research on [game-based learning] in this context is still limited" (Cicchino, 2015, n.p.).

Outside of the educational games sphere, research on collaboration and cooperative board games reveal an appreciation among players for the collective decision making that takes place during gameplay. Maynard and Herron state that:

> The rich communication and joint decision-making common to most cooperative board games also allow the player and her actions to become part of the collective whole. Although initial tactical options are usually generated by the player whose turn it is, this decision is ultimately chosen in consultation with her fellow player(s). We regularly experienced collective ownership over our entire play so that our failures were shared and exempt from the self-evaluative process that typically comes with active performance. (Maynard & Herron, 2016, n.p.)

Cooperative board games give players the opportunity to experiment with the process of making a decision as a group without the pressure of responsibility for being solely responsible for failure. Through their research on cooperative analog games and losing, Maynard and Herron found that "the collaborative nature of the activity reduces the sting of failure through a shifting of focus from the self to the group. These findings reject failure as inherently or wholly unpleasant, and align with Ruberg's point that, from the perspective of queer studies, winning is not even the goal for all players in the first place" (Maynard & Herron, 2016, n.p.). While

consensus in discourse refers to the arrival of a collective agreement and approach to a subject through dialectical work, consensus in a cooperative game is an agreement among players of what constitutes play, based on their understanding of the game's rules and objectives. Cooperative games include a designed consensus. That is, the mechanics, rules, and shared goals of the game assume a consensus among the players in order for the game to function. If a player breaks with the assumed consensus, say by intentionally rejecting the best possible movements for the team, the consensus among players falter, but the designed consensus of the game remains intact. Trimbur reminds us that "collaborative learning..seeks to locate authority in neither the text nor the reader but in what Stanley Fish calls interpretive communities" and "identification of collaborative learning with interpretive communities takes for granted the enterprise of interpretation as an end in itself" (Trimbur, 1989, p. 613). *Scrummage* attempts to facilitate an understanding of scrum project management via the interactions players have with one another during specific points of play. The players' understanding of how a scrum, backlog, and other elements of scrum project management operate are tied to the human interactions that accompany them.

Conclusion

In this chapter I have provided a literature review of the multiple disciplines upon which my project is built: agile project management, games in the contexts of organizations, education, and technical communication, and collaboration. The scholarship provided here is not meant to be exhaustive for any of these disciplines; rather, it creates a context and foundation for the research in rhetoric, game design, and technical communication that I will provide in the next four chapters. Each of these disciplines share much with the others, although the connections between some of them may be underdeveloped in the literature at the moment. Part of the aim of

this project is to begin to advance portions of these intersections across these disciplines, such as the rhetorical nature of project management and what game design can borrow from writing pedagogy.

The intersection of disciplines detailed in this chapter provides a topography through which we may consider the affordances of teaching scrum project management through games. Using *Scrummage* in the technical communication classroom to teach scrum project management games affords several potential possibilities. As a scalable space, games offer the opportunity for players to understand a world which they otherwise may not be familiar with. In the commercial games space, games such as *The Getaway* (2002) and *Grand Theft Auto V* (2013) famously recreated versions of cities (London and Los Angeles, respectively) with recognizable landmarks, streets, and buildings that allowed players to become familiar with their layouts even if they had never physically visited the locale. As *Scrummage* reproduces a version of scrum project management, it affords players the opportunity to immerse themselves in the structure of many modern workplaces, even if they have never had the opportunity to work in an environment which relies upon scrum. Evoking Warmelink's (2014) notion of "playful organizations," exploring scrum project management through *Scrummage* offers the chance for players to explore the flexibility and spontaneity valued by modern organizations (alongside teacher-led discussion).

Additionally, utilized as artifacts of technical communication in the TPC classroom, games can provide an opportunity for meta-reflection and analysis of multiple topics relevant to technical communication practices. These topics include concerns of design, accessibility, and usability. For example, in the case of *Scrummage*, students might not only play the game and consider the project management implications it includes in the gameplay, but also analyze the

text and font choices for readability. Or examine the cards to reflect on design choices involving color, proximity, and alignment. Students could then break into groups and use the knowledge of project management to design their own games as a course project, leveraging *Scrummage* as learning tool and artifact. Used in a technical communication classroom, games provide the possibility for multiple meta-reflective exercises that match likely course outcomes.

However, despite the advantageous potential of games in the technical communication classroom, we must work to avoid the pitfalls when introducing games as learning tools. Games are never just games, as the discussion of problematic ideologies embedded in various games have documented (Corneliussen & Rettenberg, 2008; Dyer-Witheford & de Peuter, 2009; Gray & Leonard, 2018). As we educators move to design and incorporate their own games for the classroom to meet learning outcomes, we must consider how the games that we use reinforce problematic or exclusive ideologies (as we should with any pedagogical practices). As discussed in this chapter, even "serious" games designed with positive social and educational values are subject to these critiques and concerns. Serious games may also suffer from the "puzzle-problem," which asks players to "solve" the game in order to learn the content. As the literature shows, this method of design is successful at teaching players how to win the game, but not well-suited for learning outcomes beyond gameplay. I will address these concerns in future chapters as I discuss the development and game design of *Scrummage* as a pedagogical tool and technical artifact.

CHAPTER 3

RHETORICAL NATURE OF PROJECT MANAGEMENT & FUNCTIONALLY APPLICATIVE GAME DESIGN

In the previous chapter I discussed the numerous fields that my project owes a debt to. That discussion serves as a foundation on which I will explore deeper connections among rhetoric, project management, games, and learning. First, I will discuss scrum project management (SPM) as a rhetorical practice and the affordances that understanding it as such permits. I will then move into a discussion about how specific fields-- game design and instructional design--consider learning with games. I will examine how these fields position learning through games via their ideological assumptions that their literature holds about the processes of acquisition, retention, and transfer. From this discussion, I will propose a set of rhetorics of educational game design that will offer instructors, scholars, and game designers to draw upon for designing and building games with stated educational purposes. My intention is to provide a set of questions which designers may ask themselves as they create games with educational goals in mind. Rather than a protocol or set of directives, I see these rhetorics of educational game design functioning as a dialectic for an educational game designer to have with her collaborators and team members, as well as the game itself and her process.

Scrum project management as rhetorical tool

The majority of scholarship on scrum is found in journals such as the *Project Management Journal*, *Information and Software Technology*, and *Academy of Management Review*. Discussion within these publications is, respectively, focused on the effectiveness of scrum as a management tool, technologies that enhance and facilitate scrum management, and the effects of scrum on an organization and its teams. Even within technical communication

journals, outside of Pope-Ruark's work about the effectiveness of scrum in the composition classroom, there is limited scholarship on the functionality of scrum as a rhetorical tool. I argue that our discipline, with its foundation in rhetorical theories, it well-suited to unpack the ways which scrum (and other project management styles for that matter) position workers, labor, management, and success to one another via verbal and material articulations of power. Approaching project management rhetorically offers several benefits to the field of rhetoric and composition, as well as our students. First, as scholars of rhetoric, we bring to bear our understanding of discursive practices, audiences, and purposes. The reciprocal, (re)productive nature of project management understood rhetorically allows us to understand it as a communicative practice which merits a response rather than a didactic. It positions subjects as agents with their own agencies. Secondly, stakeholders who are responsible for (re)producing the project management behaviors may inquire and respond to project management procedures when they are understood rhetorically. The approach invites inquiry. Finally, pedagogically this matters to our students as they move beyond our classroom and encounter various project management systems. Helping them see project management rhetorically will better position them to understand how these instruments are acting upon them and their colleagues in future workplaces.

Additionally, considering scrum project management as a rhetorical practice allows us to understand it as an ineluctable rhetorical event masquerading as an eluctable rhetorical event. Put more plainly, scrum often promises individual change and agency within its system when, in fact, it is dependent on specific behaviors, actions, and inputs of stakeholders and practitioners. A project management system cannot function if it is constantly insisting that its practitioners use

its practices to escape its practices. In rhetorical terms, McAllister (2003) explains ineluctable and eluctable events and their functions in the dialectic as follows:

> In terms of rhetoric...eluctable rhetorical events would be those that are offered by their creators in the spirit of ongoing struggle toward the resolution of a contradiction. Ineluctable rhetorical events, on the other hand, would be those that are offered by the creators in the spirit of a conviction in an abiding resolution. While eluctable rhetorical events always engage the struggle, ineluctable rhetorical events always refuse the struggle, even though they are entangled in it. Consequently, ineluctable rhetorical events have the effect of locally stabilizing the dialectic, essentially making dialectic nondialectical--at least from the position of the creator of the ineluctable rhetorical event. (McAllister, 2003, p. 207).

According to McAllister, these eluctable and ineluctable events exist within the dialectic, which he defines as "an existential condition in which struggle and change are the only constants and to which all materiality is subject," which we can understand as a "vast web of eluctable and ineluctable rhetorical events" (p. 29, 30). This dialect web contains antagonistic and nonantagonistic contradictions. McAllister classifies antagonistic contractions as "struggles that are closed off from the changes that make the dialectic possible," which form the basis for ineluctable rhetorical events (p. 29). Meanwhile, nonantagonistic contradictions are "struggles that are open to the changes of the dialectic," creating a foundation for eluctable rhetorical events (p. 29). Building on Brummett's work (1991), McAllister describes how ineluctable rhetorical events form the basis for ideologies, which are present on three levels: idiosyncratic (individual), homologous (communal), and inclusive (societal) (p. 30). Whereas ineluctable rhetorical events establish spaces where the conversation is closed off and ideology--at whatever level--has been

established, eluctable rhetorical events are positioned in a way to produce a "metanoetic experience," which McAllister classifies as "the experience of seeing a dialectical contradiction in a different way or when a struggle resolves into something new but with characteristics of the old" (p. 202).

With its emphasis on iterative processes and constant revision, scrum project management presents itself as the ideal system for adapting to the perceived fast-paced environment of the modern workplace. However, scrum, as a homologous ideology, presents this change as an inherent part of its ideology rather than as a way to reflect on the project management process itself. In its reaction to traditional waterfall and assembly line project management styles, designers of scrum noticed that the ad-hoc processes of labor utilized by individuals could be subjugated by the project management process. The flexibility afforded to labor processes that was, prior to scrum, the purview of the worker herself, became a part of the project management system via scrum boards, burndown charts, and review meetings. I argue that Scrum project management positions itself as what I would call a "metanoeic experience production system," although it is dependent upon ineluctable rhetorical events (ideology) as much as its project management predecessors.

As described in the previous chapter, scrum project management includes a plethora of steps: developing the product backlog, planning individual sprints, revising the sprint backlog, executing the sprint, participating in daily stand-up meetings, reviewing the sprint, and considering what could have been improved in the sprint retrospective (Fig 3.1). On a day-to-day basis, the morning stand-up meetings in scrum project management (the actual scrum part of scrum), require that individuals be accountable for their individualized work styles by reporting daily results and challenges to their colleagues. In other words, scrum project management, as a

process, absorbs eluctable moments of workers' idiosyncratic methods within a labor taxonomy (e.g. when a worker designs a unique method for completing a purchasing order for her team) and turns it into an ineluctable rhetorical event by requiring that she articulate her methods and how it benefits the team members (e.g. she must explain at the morning scrum how the process of writing the purchasing order in this specific way benefits other team members), building opportunities for metanoias. McAllister describes metanoias as "small changes [within the dialectic] that cause a person to see the world in a subtly different way, a difference so slight it may not even be recognized" (McAllister, 2003, p. 59). Scrum project management insists upon this change. In describing the tenants of the agile philosophy, the Agile Manifesto closes with the statement "At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly" (agilemanifesto.org). Scrum (along with other forms of agile project management like extreme programming and lean software development) presents itself as a vehicle for producing metanoias.

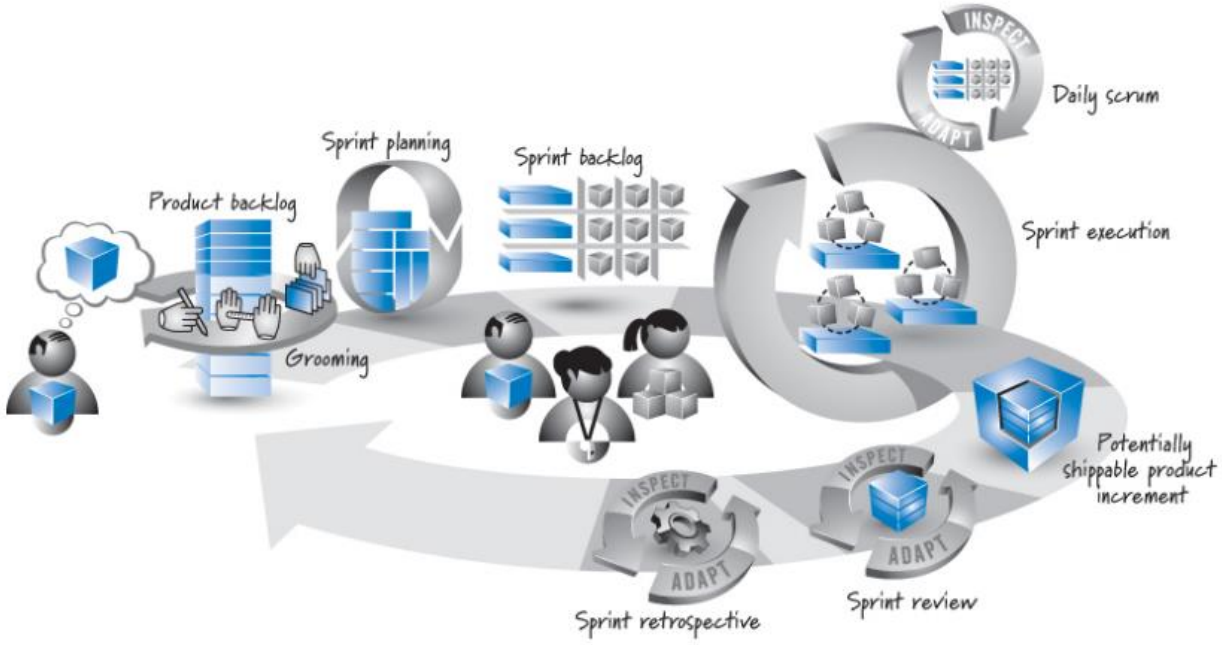

Fig. *3.1: Scrum project management process (Rubin, 2012, p. 17)*

As shown in Rubin's diagram of scrum project management (Fig 3.1), we can see the various cyclical arrows throughout the process that recurse back upon themselves. With the exception of the sprint backlog and the potentially shippable product increment, the process of a single sprint (usually between two weeks to one month) is a series of feedback loops, which contribute to one grand feedback loop of the sprint itself. Each of these loops entails multiple rhetorical events. However, the closed system of each individual loop suggests a site of contradiction rather than a site of struggle where change can occur. The entire sprint serves as one large ineluctable rhetorical event encompassing several smaller ineluctable rhetorical events. As McAllister reminds us, ineluctable rhetorical events are ideological foundations. Homologous ineluctable events form the communal system of scrum through the sprint, which in turn affirms and drives idiosyncratic ineluctable events that must be articulated by individuals in the daily scrum. Rubin notes that this "daily standup" (called such because it is encouraged to be held while everyone stands in order to keep it short) involves team members answering three questions for the benefit of the team:

- What did I accomplish since the last daily scrum?
- What do I plan to work on until the next daily scrum?
- What are the obstacles or impediments that are preventing me from making progress?

Rubin states that "The daily scrum is essential for helping the development team manage the fast, flexible flow of work within a sprint" (Rubin, 2012, p. 24). He also is clear that the daily scrum "is not a problem-solving activity. Rather, many teams decide to talk about problems after the daily scrum and do so with a small group of interested people" (p. 24). The daily scrum becomes a reification of processes that are already articulated by the overall process itself. The daily scrum is "inspection, synchronization, and adaptive daily planning activity that helps a self

organizing team do its job better" (p. 24). Although the process seems to encourage reflection, it is reflection upon the worker's ability to commit to the process of scrum itself.

The one moment in the process that encourages change is the sprint retrospective. Rubin notes that "Inside the timebox of the retrospective, teams are free to examine what's happening, analyze the way they work, identify ways to improve, and make plans to implement these improvements. Anything that affects how the team creates the product is open to scrutiny and discussion, including processes, practices, communication, environment, artifacts, tools, and so on" (Rubin, 2012, p. 375). However, if we consider how the scrum process as a homologous system, any proposed changes, recommendations, or "improvements" proposed by team members during the sprint retrospective will inevitably be confined by the scrum process itself. Changes in how idiosyncratic ideologies operate within the scrum process are encouraged, but disrupting the process itself is not. McAllister illustrates metanoia within the dialectic as moments of rhetorical struggle that move beyond dialectical stasis. Metanoic moments shift the very ideologies which make up the dialectic, while ineluctable rhetorical events are the foundation of the ideology. If we examine Rubin's depiction of scrum project management alongside McAllister's consideration of the dialectic and rhetorical events, we see that the scrum process much more closely resembles the dialectical stasis representations rather than the metanoic. These considerations and the relationship between scrum and rhetoric are concerns that I will keep in mind and return to when describing the design and development of *Scrummage* in future chapters. Before turning to that process, however, I must first establish how the fields of game design and instructional design consider the process of learning through games in order to construct a foundation and rationale for my approach to game design as well.

Games and learning in game design literature

Although I examined games and learning during the literature review in the previous chapter, I wish to spend more time now detailing the nuances between the approaches, interpretations, and understanding that differing fields have to games as teaching tools. In this section, I will discuss how the fields of game design and instructional design describe the process of building a game with expected learning outcomes. While these are not the only fields that are concerned with games and learning (as the long list in my previous chapter alludes), they are the fields that are perhaps the most explicitly interested in the ways that games can teach specific lessons or skills. My decision to focus on these fields in more detail stems from the fact that each of them deals more directly with how games operate inside of an academic institutional space than other areas of game studies. Since my project deals with building a game (game design literature), testing the game for presumed learning outcomes, and measuring whether or not students are actually learning and retaining those outcomes (instructional design), further exploring what each of these fields can offer my project is essential. While critical studies, psychology, computer science and other avenues of scholarly inquiry offer a lot of useful approaches to understanding games, their scholarly focus is more ancillary in the context of my project. After discussing how each of these design disciplines offer their own contribution to games as educational and training tools, I will aggregate their understanding and approaches into a collection of rhetorics of educational game design. I chose to consider these as rhetorics rather than guidelines, principles, or a didactic framework by another name in order to recognize that the process of designing, building, and deploying an educational game often requires significant struggle with various homological and inclusive ideologies. Understanding the process of game design as a rhetorical event offers a space to recognize the struggle across numerous eluctable

and inelucatable rhetorical events that the process requires. Positioning the process through a series of rhetorics gives the game designer/educator the opportunity to bring forth those institutional struggles through the process of their game design.

In his book *The Art of Game Design*, Jesse Schell discusses how games transform their players. Transformation can come in positive, negative, and neutral forms. Some people believe that games incite violence or lead to life-ruining addictions. Other people believe that games will become a cornerstone for educational revolutions and world-changing initiatives. Still others believe that the only thing games transform is the feeling of boredom the player had prior to playing a game--one that has the potential to return the moment he stops playing. Schell's discussion of change through games not as "games-based learning" or "education through games," but as a "transformation" is a useful approach to considering how games change players (Schell, 2015, p. 500). Instead of placing the emphasis on the game, as the former phrases do, transformation focuses on the change that is generated within the player/user/learner. It also belies the postivistic implications that learning theory and instructional design nomenclature typically favor. Schell's approach to building games for educational purposes positions the designer as only one component in a complex system of learning. In addition to the usual suspects of cognitive development, task-based learning, and simulation experience, he emphasizes the importance of understanding external constraints when implementing games such as class duration constraints, how the unexpected pacing of games can throw off the class structure, and the process of negotiating with administration who may have preconceived notions about allowing games to be used in the classroom. I also agree with Schell's assessment that "games can be excellent tools for education, but they work best as tools and not complete education systems" (Schell, 2015, p. 502). The game itself is only one node in a system of

learning that include educational institutions, teachers, parents, and media, as well as personal history and personal approaches to learning.

Schell's approach to transformative games is not without shortcomings, however. His discussion of potential negative transformations is underdeveloped, mentioning only possible inductions of violence or cycles of addiction that games may be responsible for. There is no discussion of the race, class, and ideological stereotypes that games frequently--if unintentionally--reinforce as they attempt to transform players in positive ways. Additionally, there is a privileging of "full engagement" of the player's mind and body that Schell assumes games will be capable of. Although he considers the venue in which a transformative game will be used and played, his assessment of their effectiveness assumes that "games excel at full engagement, occupying the eyes, ears, hands, and mind, often full of music and social activities. When every part of the mind is at a comfortable level of activity, there can be no level of distracting restlessness, and education can take place more easily" (Schell, 2015, p. 503). One could argue that learning to manage and overcome restlessness in order to focus on a lesson is part of the learning process and relying upon the design mechanisms of a game to do so for you is a crutch that will offer a short-lived benefit. Research in cognitive science (Erhel & Jarnet, 2013; Hawlitschek & Joeckel, 2017; Nebel, Schneider, Schledjewski, & Rey, 2017) suggests as much. Although Schell's approach to games and learning is more nuanced than many other game design textbooks, it still assumes an inherent glamour of games that learners will be irrevocably attracted to and learn from.

Schell's preference for the term transformative games warrants further inquiry as well. Schell argues that the phrase "serious games" is an "insult to entertainment (which is a serious endeavor)" because it "suggests that seriousness in the primary goal of games and that players

are discouraged from having fun while playing them" (Schell, 2015, p. 507). His preference for the term transformational games speaks to the primary purpose of games: "to change the player" (p. 507). However, if all games are transformational then defining a set of games as "transformational games" seems to be too inclusive to be productive. Instead, we need to classify the *intentionality* of the transformation. Intentionality is difficult to classify, especially in a medium that often has multiple stakeholders responsible for its production. Similar questions have existed in literary studies for decades: is the intention of the author or the reaction of the reader more valuable to the classification of a piece of literature? In considering the intended learning/education/transformative outcomes for a game, we ideally would need a way to access the process of creation of the game. Since it is unlikely that the design process would be documented and shared with the public in this way, I believe that we need to turn to the next best thing: marketing and promotional materials. Game designers give interviews where they discuss the thought process behind the game; advertising departments send out promotional materials to stores which they may use to set customer expectations; blurbs on a game's packaging or electronic storefront page are used to let the potential player know what they may learn about by playing the game. Developer interviews that describe the creative and technical processes that were used to create the game operate as marketing tools. For example, take the description of *The Migrant Trail* (Gigantic Mechanic, 2014) from the *Games for Change* website. In *The Migrant Trail*, the player assumes the role of either a migrant attempting to cross the U.S.-Mexico border or a border patrol agent who is responsible for finding, detaining, and offering medical aid to migrant groups. After describing the roles to the player, the developer description states:

> The multiple facets behind these two sides are constructed to be complementary rather than oppositional. When switching from migrant to border patrol, the focus on providing aid combined with an understanding of how brutal conditions are for migrant groups produces empathy and drives the player towards success from a humanitarian perspective." (http://www.gamesforchange.org/play/the-migrant-trail/)

The description provides a clear statement of what the designers of the game *expect* the players to experience. While we cannot assume that every player will read the synopsis before playing the game, it does represent an attempt by the designers to structure the player experience, much in the same way that artwork on the side of arcade cabinets were meant to supplement the abstract graphics of early arcade games. It also bears stating that these designer expectations may not be what the player actually experiences when she plays the game. However, the player's experiences do not matter in determining the game's intentionality; her experiences will be measured in playtesting and learning outcomes testing.

If we accept the premise that all games are transformative in some way, how can we establish the distinction between games that are transformative for entertainment purposes and games that hope to transform the player with skills or knowledge that can be supposedly be applied after the game is over? Assuming that is it worth making this distinction (which I believe we should), there are several assumptions of intentionality that must be accepted:

> Assumption 1: A designer has designed a game to teach X *or* a publisher has commissioned a game from a designer to teach X.
>
> Assumption 2: A game design document (GDD) has been drawn up which states the subject matter content the designer anticipates the player will learn by playing

the game, and which theoretically has an application external to the game itself. Even if it is an ad-hoc game created by an educator, we assume that he has drawn up a lesson plan with the game rules and anticipated learning outcomes.

Assumption 3: The intentionality of the game has been communicated to the player. In the case of a published game, this would come in the form of marketing materials or product blurbs. If it is a game designed by a teacher, camp counselor, manager, or other authority figure, the learning purposes of the game would be stated to the participants either prior to or after playing the game: "We are playing/played this game to learn about X."

Assumption 4: The player does not play the game accidentally. Even if she is required to play the game by an authority figure, she has accepted the premise of the game and understands that it is meant to teach X.

Assumption 5: Even if the game fails in its design to teach the player what it expects to, that does not invalidate the *intention* of the designer as long as the design of the game and outcome expectations *were made in good faith*. E.g. reskinning *Candy Land* with new artwork but without making any changes to its mechanics and then claiming that it could be used to teach students about the complex relationship between European nations between 1920-1940 would be a learning intention made in *bad faith*. Adding new artwork to the simple gameplay of *Candy Land* would not convey the instability and rise of fascist movements across Europe during the time period.

The intentionality of the presumably applicable skills outside of these games is what distinguishes them from transformations that take place in games for entertainment purposes.

Therefore, I argue that we should classify these games as *functionally applicative.* While not as marketable as simply calling them transformative games, I believe that this term specifies several qualities of about these games that the term *transformative* misses.

1. It introduces the presumed applicability of the game to a function (or task, lesson, or problem) outside of the scope of the gameplay.
2. It captures the intentionalities of the designer in their process to design and build a game with external goals
3. Understanding the gameplay as a function classifies the game as an instrument to form, shape, or complete an extrinsic task.
4. It reaffirms the effect the game has on the player and the change that the player presumably goes through upon playing the game.

This approach also responds to and distinguishes itself from Bogost's notions of games as procedural rhetoric in several ways. Bogost writes that "procedural representation depicts how something does, could, or should work: the way we understand a social or material practice to function." (Bogost, 2007, p. 58). As Sicart (2012) has previously argued, Bogost's advancement of procedural rhetoric emphasizes the systematic expressions of an event at the sacrifice of the player's experiences with and reactions to the game. My approach is an attempt to reconcile these two approaches. Identifying a game as functionally applicative places the player as the enactor of the presumed argument the game is making or transformation that it expects. Instead of situating the audience/player as an expectant recipient of the game's transformations, it accepts them as an engaged player of the game who is willing to accept the premise of the game and understands that it is serving a role related to a task outside of the gamespace. The changes

in behavior that the designers expect or hope for the player to undergo should be able to be traced back directly to the player's experience playing the game.

The second word of the classification, *applicability*, refers to the expected external adoption of the purpose of the game. This intended application may not be the only instance in which the player's experiences with the game proves useful, but it refers back to the assumptions which we must make about the design of the game. The marketing and design of functionally applicative games do not hide the ways they hope to change the player. Instead, players have some idea how they can expect to apply the rules and/or content of the game to external issues, such as being encouraged by *The Migrant Game* to "further engage conversation, investigation and inquiry, into the themes and questions raised by the documentary, [*The Undocumented*]" (http://theundocumented.com, 2014).

Conversely, *non-functionally applicative games* are games that are not reasonably expected to have had non-game applications of their mechanics and knowledge. For example, after playing the *Call of Duty* franchise, players may be able to identify different types of military weaponry (M1 Garand, Stg 44, etc.) or describe the use of various military call signs (alpha, bravo, charlie, etc.), but it is unlikely that the designers of the *Call of Duty* franchise intended this as a learning outcome for the player. No elements of the advertising for *Call of Duty: WW2* nor it box text suggest that the player can expect to learn this material or how it might be applied outside of the game. Instead, the back cover of the game lets the player know she can expect to "storm the beach and reclaim Europe," participate in "team co-op missions," and explore "deep multiplayer" (*Sledgehammer Games,* 2017). While knowledge acquired through playing the game may indeed be applied to a situation outside of the game, it is clear that this use was not at the forefront of the design of the game.

Just as it is unreasonable to expect people to remember everything in a textbook they read, it is similarly unreasonable to expect players to remember every piece of content or mechanic in a game after only playing it once. Time engaged with and playing the game may be the most important factor of any functionally applicative game. For this reason, scholars and critics cannot ignore established and affirmed game design principles in the creation of an intriguing and inviting game that will maintain the player's interest and keep them engaged with the game for a period long enough to actually learn the proposed content of the game. Functionally applicative games that do not engage the player effectively will ultimately fail in their end if the game does not make the players want to play it. To this end, Mihalyi Csikszentmihalyi's and others' work on flow state, which maintains that people achieve focus in an activity when they are in a state between anxiety (too hard) and boredom (too easy), is essential for keepings players invested over longer periods of time. Computer games achieve this via sequences of levels that gradually become more challenging, introducing stronger enemies or more complicated puzzles, and other designs that adapt new challenges to the player's increase in skill (Barton and Moberly, 2010). Board and card games can include different scenarios that challenge players at various skills levels. Usually, however, the challenge in analog gaming is generated by finding an evenly matched opponent and participating in a game in which a player's skills are not outweighed or overly affected by luck. There is a great deal of luck in poker in the drawing of one's hand of cards, but correctly playing that hand is a skill that can be practiced and improved. However, an idealized flow state in a functionally applicative game could be weaken the expected motor skills or cognitive abilities the designers hope that the player will achieve. A game that is *too* engaging has the potential to make the player focus only on the success in the game and not consider how it is attempting to influence them outside of the

game. See Gobet, de Voogt, and Retschitski (2004) for in-depth discussion of these phenomena, the psychology of board games, and the effects on players.

In another game design text, Brathwaite and Schreiber prefer to focus on the teaching element of games and discuss them as "teaching tools" (Brathwaite & Schreiber, 2009, p. 249). Unlike Schell, who is more interested in the changes that games can have on people after they play them, Brathwaite and Schreiber specifically discuss the process of introducing games and game design in the traditional primary and secondary school classroom. They recognize the generative nature of game design in their advocation of building educational games from popular games that students already play. In Brathwaite and Schreiber's text, learning from games takes the form of challenges that teachers and students can use to integrate various types of learning content into a game format. As a textbook, their evidence for games and learning is provided via a few popular news articles and some personal anecdotes from their parenting experiences. Their rhetorical approach to understanding games and learning focuses on the process of building the game, with the assumption that research and reflection about the content, context, and outcomes of the game will fall into place. Brathwaite and Schreiber prefer the language of action over reflection, although this is perhaps more indicative of their book title, *Challenges for Game Designers*, the genre requirements of textbooks, publisher constraints, and historical moment in which game design literature is operating. Compared to other game design books such as Chris Crawford's *The Art of Computer Game Design* (1984) and Raph Koster's *A Theory of Fun and Games* (2004), Brathwaite and Schreiber's discussion of the theoretical aspect of games is very limited.

Nevertheless, Brathwaite and Schreiber point out important details in our understanding of how game design literature approaches games and learning. They emphasize the systems at

work in various games. The authors write that “the simple atomic parts of the games (the players, mechanics, decisions made, and so on) interact with one another to form complex behaviors and results. Because of this, games are a natural fit for teaching content that is based on these same kinds of systems” (Brathwaite and Schreiber, 2009, p. 251). Learning through games for Brathwaite and Schreiber centers primarily on how the systems of a game interact with each other. Through the valuation of the learning systems within the game, Brathwaite and Schreiber note that “the tradeoff between games play and reality is difficult in educational games, and as both educator and game designer, you need to consider both” (Brathwaite and Schreiber, 2009, p. 255). Education content in the game is often both generative and static. The authors note that “some context needs to be preserved exactly in the game mechanics [while] other content can be simplified so that the game isn’t needlessly complex” (Brathwaite and Schreiber, 2009, p. 255). Throughout each of their game design challenges at the end of the chapter, the authors reiterate the connections between mechanics and content. Like Schell, the discussion of mechanics of games is central to their argument in how games teach. With their focus on the traditional classroom over transformative games for the general population, one would expect there to be more insight into how context and material space can affect gameplay mechanics concerned with learning. One of their challenges at the end of the chapter addresses LARPing (live action role playing) in the classroom. Even in a role-playing setting, the emphasis of the design influence pushes the game designer towards designing a game where “students understand that the event was complicated” (Brathwaite and Schreiber, 2009, p. 259).

Other game design books acknowledge that games are being used for educational purposes, but avoid covering the intricacies of game design learning. Fullerton (2008) relies upon what she calls a “playcentric approach” to game design. As fun is a core principle of her

approach, she recognizes that her model does not cover "the scope of...how your game can achieve such important goals as teaching an academic subject or raising players to activism" (Fullerton, 2008, p. 337). Perhaps due to the age of Fullerton's book, the bifurcation of fun and learning is not supported in the works of Schell or Brathwaite and Scheiber. As previously discussed, game design textbooks offer ways to *find* the fun within stated learning outcomes through the practice of game design. Fullerton's work does offer important discussions of accessibility issues for player though. Whether playing a game for entertainment, to learn about the effect of slavery on the economic opportunities for African Americans post-antebellum America, or to learn manual skills required for a new job, a member of the game's target audience should be able to pick up the game and play it without much outside input (save for the instruction manual). Fullerton concedes that "Accessibility is a strange paradox for the designer because the more you understand your own game, the less able you are to anticipate problems that players might have in encountering it for the first time" (Fullerton, 2008, p. 337). We see similar problems with poor lesson plans from educators who may have forgotten what it was like to be a novice rather than an expert in their respective field.

In this section, I have discussed the approach of game design literature to learning using games. Compared to the research from academic sources on games and education, game design literature reminds us of how to consider the materiality of the rules, mechanics, and playspace are acting upon the expected learning outcome. From Schell's notions of transformative games to Brathwaite and Schreiber's emphasis on the physicality of games to Fullerton's playcentric emphasis on fun first, it is understandable that the disciplinary approach to learning would be tied so explicitly to the play that emerges from the game itself. In order to measure the learning

impact and effects for an academic audience, however, I will turn to the instruments used by another discipline with a vested interested in learning through games: instructional design.

Games in instructional design literature

As the name of the field instructional design suggests, the measurement of effectiveness of games on learning outcomes within the field of instructional design is concerned with the design of the game itself, opposed to the critical, cultural, physiological, or psychological impacts of the game. Instructional designers consider how a presumed learning outcome is transferred into a simulation and made playable. Players should 1) be able to take roles in the game, 2) be incentivized into action, and 3) have a discernible impact on the state of the game. After this process, research focuses on an evaluation of the design's effects. Generally, instructional design research uncovers and reports results via one of two perspectives: design-scientific and design-analytical. A design-scientific researcher considers whether the design of the game has the desired effect or measures the effects of multiple designs against one another. A design-analytical researcher considers how the design affects the player or scientific theories, moving away from the specific design itself (Klabbers, 2006; Meijer, 2009). In this section, I will provide research from instructional design literature about the approaches to games and learning, concepts of transfer, and how the approaches vary from game design literature previously discussed. The evidence presented here provides support for the approach to survey design that I used for the learning outcomes portion of my data collection, which utilized an instructional design approach, as well as influence on the approach to my own game design from *Scrummage* when attempting to cover certain topics within the game.

Like popular and commercial functionally applicable games, a preference for causality is evident across the body of research. The preference for causality is evident from several authors'

efforts to determine the effectiveness of games as behavioral modification tools (Chin, Dukes, & Gamson, 2009; Dorn, 1989; Randel, Morris, Wetzel, & Whitehill, 1992). Additionally, it is evident through the numerous authors who have attempted to curate theory-based frameworks for game evaluation studies (Kriz & Hense, 2006, Tennyson & Jorczak, 2008). These authors argued that general conclusions about a game's level of effectiveness depend on the researcher's theories of learning as well as his or her criteria for effectiveness studies. Randel et al. (1992) were much more hesitant consider games generally effective than were Chin et al. (2009). It is possible that this is symptomatic of recent researchers being more open to the learning effects of computer games after having grown up playing them. Nevertheless, many researchers like to consider games as causes of a learning effect while recognizing the importance of game-related factors such as player demographics or the quality of a post-game debriefing (De Caluwe, Hofstede, & Peters, 2008; Kriz & Hense, 2006; Plass, Homer, & Kinzer, 2015).

Instructional design scholarship values quantifiable methodologies throughout its publications, requiring instructional design researchers to adopt a formalist definition of play and games in order to ensure that their research will be received by the fields established journals. According to Smith and Ragan, instructional design is the "systematic and reflective process of translating plans" for the variety of material used for learning and teaching (Smith & Ragan, 2005). Thus, instead of teaching, instructional design tends to focus on learning, focusing on the experiences that move the learner between processes and outcomes. For instructional designers, learning through games is a process focused around the engagement with games as a series of rule-based patterns (Ecker, Muller & Zylka, 2011) and interpreting the game as dynamic systems of signs in which the player acts, independently of any consequence outside of the system, in order to reach a goal assigned by the game (Sizlas and Acosta, 2011).

Within instructional design literature, researchers have addressed the numerous overlaps between game design and assignment design (Dickey, 2005; Keener, 2017; Khalid & Kameyama, 2010; Varonis & Varonis, 2015) and considered how games should model effective classroom practices for learning in order to teach students. The instructional design approach to functionally applicative games typically advocates for elements of learning techniques advocated by traditional educational patterns: formal aspects, aspects of content, conceptual aspects, and examples or references (Ecker, Muller, Zylka, 2011). Formal aspects include encyclopedic content such as names, dates, places, and facts about events. Aspects of content include the basic problem-solving approaches to which the content can be applied. Conceptual aspects are the overarching educational concepts, learning objectives, activated cognitive skills, and potential problems in the use of the educational skills. Examples and references demonstrate the educative properties at work to provide a model for the learners.

Games as a mode of learning transfer are also a pillar of research on game-based learning in instructional design scholarship. Throughout instructional design scholarship, games are identified as vehicles for learning transfer. In their discussion of foundations of game-based learning, Plass, Homer and Kinzer describe how games facilitate knowledge transfer through high road and low road learning techniques. High road transfer depends on "conscious abstraction and application of knowledge," while low road transfer refers to "automaticity through repeated practice of a skill" (Plass, Homer, & Kinzer, 2015, p. 266). Plass, Homer, and Kinzer argue that games:

> can facilitate both roads to transfer by giving repeated opportunity to practice skills and apply knowledge (low road) and by providing different, but related, experiences that facilitate the abstractions needed for knowledge to be generalized

> to novel situations (high road). Considering the functions of games just outlined, both the *teaching of new skills* and the *practice and reinforcement of existing knowledge and skills* have the potential to facilitate transfer. (Plass, Homer, Kinzer, 2015, p. 266, emphasis original)

The taxonomy of high road and low road learning is not relegated only to game-based learning, but instructional designers often use games an ideal medium for the overlapping of the two. Games can teach subject-matter expertise such as jargon and task management for specific scenarios (low road), but subsequently provide new scenarios to practice any gained knowledge. My terminology of "functionally applicative" games captures the concepts of low/high road learning; it insists on the game being able to walk the learner through the elementary aspects of the subject while providing them with the tools, skills, and knowledge to apply it to novel situations outside of the game. In *Scrummage*, for example, I strove to incorporate vocabulary that is relevant to agile throughout the text on the cards (low order), while the gameplay and interactions between players offers a scaled-down facsimile of seeing a project to completion using the machinations of scrum project management (high order).

Building from the discussion of games as potential vehicles of transfer, instructional design also examines how the act of designing a game can itself be a means of knowledge transfer. Anderson and Courtney (2011) found that, when asked to build computer games for the first time, indigenous Australian students were able to apply their culturally-relevant knowledge to the game design process to create a game that introduced players to the native people's methods of problem solving. The study revealed that the process of articulating tribal practices through game design led the students to a greater understanding of how the practices reflected indigenous peoples' histories and the culturally-relevant problem-solving skills. Anderson and

Courtney argued that utilizing design thinking skills through game design honed the students' understanding of these indigenous practices by integrating them into a game. Instructional design also values games as tools of engagement for struggling students (Carr & Blanchfield, 2011), socialization tools for younger learners (Aranda & Sanchez-Navarro, 2011), and as models to borrow from for assignment design (Schwartz & Bayliss, 2011; Mayer, 2016). Still others have documented the process of creating an instructional game (Warren, Stein, Dondlinger, & Barab, 2009) and questioning the semiotic requirements of educational game design via comparative analysis (Akerfeldt & Selander, 2011). Research in the fields of Instructional design and educational psychology are generally not concerned as much with the cultural identity or ideological positioning of games, but with how the game assists players and learners in processing the relevant target information.

According to Mayer (2016), across the multifaceted approaches to games in instructional design literature, three major lines of questioning present themselves:

1. Value added question
    a. What features make a game more effective for learning than others?
2. Cognitive consequence question
    a. What is the academic impact of a particular off-the-shelf commercial game compared to a game specifically designed for learning?
3. Media comparison question
    a. Do people learn academic content better with games than conventional media?
        i. An important caveat for this question is ensuring that the media is the only difference; the content should be the same in order to measure the learning impacts.

These lines of questioning help identify how the concept of "game" is regarded in instructional design literature. Question 1 addresses the concern over which elements in particular make for the most effective learning tools within a game. Could powerful graphics that allow players to see more detail be more useful than complex mechanics? Is high fidelity sound that gives players a sense of what it is like to be a doctor's office, warzone, or other highly contextualized space be more beneficial than long messages of text within the game? Still, should dialogue between characters use voice actors or is information better retained by players when they have to read the dialogue themselves? Tracing and identifying the root element(s) within games that permit them to function the most effectively as learning tools. Of course, the answer to this question will change dependent upon what the game presumes to teach, the learning context, expectations of instructors and course objectives, requirements and expectations of students *after* they finish playing the game, and a multitude of other concerns. While there might be a possibility of reaching a consensus on which features of games are *generally more* favorable for learning, attaining a consensus on features of games that are always inherently more beneficial to learning than others is unlikely.

Mayer's second question concerns how the academic impacts of a commercial game can be measured against those of a game designed specifically for learning. He does not clarify that educational and commercial games can often be one-in-the-same, so we must assume that he is referring to off-the-shelf games compared to games designed within a classroom context by the educators responsible for the institutional guidelines and learning outcomes. The significance of this question within instructional design identifies the concerns over the benefits to cognitive functions from games. Comparing a commercial game to a game designed specifically for learning assumes that the games intend to teach players the same content, can be measured using

an identical methodology, and are equally accessible in terms of their technology (thus limiting any technological orientation required in favor of the learning outcomes). For example, an off-the-shelf commercial game about the process of photosynthesis would (conceivably) have more refined visuals than an instructor-produced game about the same topic. But it may lack the ability to emphasize a problematic area of photosynthesis that the class is struggling with in the way that the instructor-created game is able.

Mayer's final concern about games as academic content conveyors wonders how they compare to other forms of media. As established in scholarship discussed earlier in this chapter, games are always teaching the player something, even if that "something" is not entirely clear to researchers (or players). Mayer's question reminds us to carefully consider if a topic is best served via game, or if another form of media is more appropriate for learners. Even if that media is more traditional and considered less exciting than a game. As with all three of these lines of inquiry, we must first ask ourselves what is the content that we expect the learner to acquire after the end of the particular module? A game or game-based learning system may not be the right approach for certain learning outcomes. Understanding complex relationships among European countries during World War I may be well served by a simulation of the political and economic stations present on the continent at the time, but, if the learning outcome is to learn each country's leader, the goal could conceivably become muddied by the extra systems in place and may better be served by reading a chapter about the various leaders and using flashcards for memorization.

Mayer's series of questions provide us with an important perspective of how instructional design and educational psychology understand the concept of a game. Ultimately, each of these questions denotes a measurable, quantifiable distinction. Question 1 focuses on measuring the act

of learning itself: what is the specific element of the game that is teaching learners? Question 2 seeks to measure the effect of a commercial game against an ad-hoc game, while question 3 focuses on measuring the educational impact of a game in relation to another form of media. Taken together, these questions provide a framework for approaching how the field of instructional design interprets and understands games. Compared to the fields of game studies and game design that we have already discussed, instructional design positions games within a pragmatist theoretical framework and quantitative historical method. Games are tools, apparatuses, and machines that can be broken down and divorced from other variables. In game studies games are ideological artifacts that cannot be removed from cultural, economic, and historical contexts. In game design, games and the player's positive experience with it is recognized as the end in and of itself. That end accounts for all of the variables that accompany that experiences, including other players, the space external to the game, and ease of use of the games peripheral equipment like controllers or game pieces. Instructional design research would prefer to isolate each of these components and variables in support of surveyable components. Such an approach is no doubt in debt to the historical precedent of instructional design, which measured the educational impact of specific lessons or textbooks against others. The scientific method preferred by instructional design lends a games and games research a credibility that their history with play, children, and toys may have been difficult to acquire within circles of scholarship. As games have developed alongside of the internet and more advanced methods of tracking users and acquiring user data, the preference for siloing specific elements of games and gameplay privileged by instructional design and educational psychology research journals has gained additional validation through the products themselves.

Rhetorics of functionally applicative game design

In the design and development of the game *Scrummage* with specific applicative outcomes and learning objectives, I sought to consolidate the approaches and understandings of game from the two fields I have discussed in this chapter, game design, and instructional design. From these fields, I designed a set of rhetorics of functionally applicative game design. My goal was to consolidate the varied approaches and interpretations of games from the fields of game design and instructional design into an applicable set of approaches for educational game designers. I titled these rhetorics of functionally applicative game design, instead attempting to present a framework, network, or some other systemic pattern that assumes primacy in the process, because the term rhetorics presents a mutable understanding of the process that is secondary to the design context. In other words, the spatial-temporal situation where the game will be played and functionally applicable skills that the game presumes the player to internalize take precedence over precise game development steps to be followed. I am modeling the approach that Sutton-Smith (1997) took when he developed his rheotrics of play. In my own case, I the word rhetoric here in its modern sense of being a persuasive, or implicit narrative, wittingly or unwittingly adopted by members of a particular affiliation to persuade others of the worthiness of their claim. In the Burkean sense, this approach signifies an identification with a particular cause, science, or ideology about the relationship betwixt the process of creating a game, the player, the designer, the subject matter expert, and the assumed outcome of gameplay. As Sutton-Smith writes of his rhetorics of play, what is talked about here as rhetoric is “the way in which the underlying ideological values attributed to these matters are both subsumed by the theorists and presented persuasively to the rest of us” (Sutton-Smith, 1997, p. 8). A rhetorical approach to the process allows us to map traditional concerns of rhetorical studies, like audience,

intention, attention, and message, onto the design process. These rhetorics of functionally applicative game design should be considered individually in the early stages of designing the game based on subject matter expertise. However, they can also be returned to throughout the process of the design, reaffirming or pivoting the design process as necessary. Ultimately, these rhetorics of functionally applicative game design serve as a value system to be used by designers in academia, government, or private enterprise as an alternative to popular but more limiting design philosophies.

Below, I have included the list of the rhetorics of functionally applicative game design and how each should be considered in the game design process. I then discuss how I used each of them in the process of designing *Scrummage*.

1. *Rhetoric of spatial context and play venue:* The space where the game will be played should drive the design.

A game designer needs to consider the venue in which the game will be played. The game is only a starting point for the learning process. While a designer might create an excellent mechanical game, if it is unable to be played in the spaces where the designer expects it to be used it will not be able to serve any of its intended learning purposes. Functionally applicative games should be designed with the learning venue in mind. Will players be expected to play in a traditional classroom? Will they have to move around during the play session? Is it important that a computer or phone nearby to access supplemental information? Should the players have access to the science classroom with laboratory equipment? Spatial considerations and expectations should serve as a foundation for the overall game design, as it provides the physical limitations placed on affordances available within the design of the game. Foregoing any digital technology required to play the game means that the game will be able to used in more contexts,

while designing a digital game will allow it to be updated more frequently and distributed more widely.

Considering the spatial context for the game encourages the designer to visualize how they expect the players to be situated in the world when interacting with the game. An analog game will probably have players sitting equidistant around a table while a digital game will position each of them facing a screen. The places that we play games exert tremendous influence on the design of our game and it is essential that designers are not designing in a vacuum. Design that encourages player behavior incongruous with the play space will likely create a rift between the player and the anticipated functional applications.

2. *Rhetoric of the tutorial*: The game should include instructions on how to play the game and also how to teacher others to play the game.

Beyond the instruction manual, the game should include a tutorial section that teaches the player the basic affordances available to them when playing the game. In the case of a digital game, this may come in the form of a level designed specifically for teaching the player how the controls and interface operate. In the case of an analog game though, this tutorial might come in the form of a pre-arranged scenario which asks the player to set up the game pieces in a specific order and then walks the player through the scenario, offering the player a chance to actualize the use to the physical pieces on the board before diving into the game. Additionally, if the designer anticipates that the game will be used in a classroom or scenario where a group leader will have to teach the game to others, the game manual should include a discussion about how to best teach the game to other players. A ‘how to teach this game’ section will assist the person they designer really needs to persuade (the teacher) about how they can smoothly integrate the game into their classrooms. It should lay out how to introduce each element of the game and what points to skip

over until the arise during gameplay. The goal here, again, is to help instructors teach the game so that their students can reach the learning objectives while minimizing the cognitive split that may occur between playing the game according to the intended rules and internalizing the intended/expected outcomes.

3. *Rhetoric of iterative functional application evaluation*: Functionally applicative games should include in-game assessment and feedback of the player's progress towards the anticipated functional applicative outcome.

While playing a functionally applicative game, players should receive feedback that assesses their progress towards the measurable outcome that the designer expects the player to possess after playing the game. It is important to note that this feedback is not necessarily the same as the gameplay feedback. Gameplay feedback may include failure or success states in the game based on the player's behaviors, but this iterative evaluation should strive to have the player reflect on their knowledge, understanding, and interpretation of the games' core functionally applicative intentions. For example, imagine a computer game that teaches players how to cook different types of soups by measuring ingredients, chopping food, preparing the stove, etc. While the game could (and should) include an assessment of the player's knowledge at the very end of the game, it can also include reinforcement of those concepts via text, audio, and video the goes beyond the actual gameplay mechanics. After learning the proper way to cut an onion, the game may remind the player of how this act is both similar and different from preparing a potato. Including feedback of this nature during the game, rather than only at the end, promotes player reflection of the functionally applicative components of the game during play and gives them the opportunity to alter them as necessary.

4. *Rhetoric of reflection*: In resistance to the flow state, meta-reflection on the behaviors and interactions are important in a functionally applicative game in order for players to reflect on why and how the game is asking them to do what they are doing.

Following from the rhetoric of iterative evaluation, the rhetoric of reflection identifies the need for functionally applicative games to pull the players out of the gameplay loop and reflect on their behaviors and actions within the game and in relation to functionally applicative outcomes. Although the concept of the flow state is frequently privileged as a mark of good game design within commercial game development, finding a balance between a flow state and a meta-reflective state for the player through game design is a mark of functionally applicative design. Players should be given opportunities to discuss their progress and actions in the game as they play it instead of only after the game is finished. While seeking to place players in a flow state may be a mark of good commercial game design, I would argue that it can serve as a detriment in functionally applicative, educational, or simulative game design because it privileges the mechanics and goals internal to the game over the anticipated and promised external skills gained by playing the game. Building meta-reflective moments into the design of the game that encourage players to step outside of the gameplay loop and consider how the information and gameplay prepare them for challenges external to the game can help players consider the knowledge and skills transfer of the functionally applicative game to situations external to the game.

5. *Rhetoric of accessibility*: Functionally applicative game design should follow not only established practices of accessibility for games, but also adhere to guidelines for creating accessible educational material.

Functionally applicative games need to be accessible to players of varied backgrounds, both as games to be played and as educational materials to be applied beyond the gameplay. Functionally applicative games should conform to the guidelines established by the National Center on Accessible Educational Materials (aem.cast.org). Options to play the game for the colorblind, visually impaired, hearing impaired, and with limited motor skills should be considered. It is imperative that these accessibility concerns included during the initial design and playtesting rather than after the fact. Playtesting questions should call attention to the accessibility design and attempt to identify any shortcomings. Alongside of these concerns, designers should give attention to the accessibility of the game as a tool of play as well. This includes designing mechanics, visuals, and narrative with accessibility in mind. The Game Accessibility Guidelines (http://gameaccessibilityguidelines.com) provide a foundational set of protocols for ensuring that digitally designed games are accessible to a wide audience. Similarly, the website Meeples Like Us (https://meeplelikeus.co.uk/) provides accessibility reviews of numerous board and card games, offering readers suggestions of how to approach accessibility concerns for players of analog games.

6. *Rhetoric of exception*: Information not included in the game can be just as useful as information addressed within the game (if not moreso)

Every game is ultimately a simulation of a limited set of interactions, responses, and behaviors that can be enacted and performed by the player. Designers have to make a choice about which elements to include in the game and which need to be culled for the sake of playability, time constraints, or for simply being extraneous to the vision of the game. Functionally applicative games are no exception to this rule. As they are designed to act upon the user and teach her the anticipated functional outcome, the designer will inevitably be forced to

determine which aspects of the functional application should be rendered by the game and in what ways, while also making the decision about which elements of the process can be simplified or removed entirely without sacrificing the functionally applicative nature of the game.

The decision by the designer on what elements to leave out of the game embody the rhetoric of exception. In this way, the process of discussing which aspects of the functionally applicative process to reduce or remove can serve as an important part of learning process. After playing the game, the facilitator and subject matter expert can address elements of the game that may have been discounted within the game's design. This discussion of the negative space, or what is absent from the functionally applicative content, within the design of the game can provide players with the opportunity to discover the limitations of the game as a method of knowledge conveyance. The community surrounding functionally applicative games--be it a class, a small group, or an online forum--is an essential part of the knowledge building process. Discussing the limitations of the system simulated by the game offers players an opportunity to reinforce the knowledge and skills of the functionally applicative aspects, as well as explore additional factors that may impact their application of those skills that could not be effectively rendered by the game system.

7. *Rhetoric of functionally applicative objective vs. game objective:* The functionally applicative objective should be established prior to the game objective. Although the game objective will probably grow out of the anticipated functionally applicative objective, they are not necessarily one in the same.

When designing a functionally applicative game, it is important to keep in mind that the functionally applicative outcome and objective of the game may not be the same thing. For

example, a game which intends to improve the speed and accuracy of the player's typing skills (functional application) may ask the player to use their keyboarding skills to help a colony of ants construct their burrow (game objective). Accurate keystrokes completed in a timely manner would yield a more structurally sound colony for the ants to live within. In this example, the designer has taken care to ensure that performing the functionally applicative outcome well supports the objective of the game. Positive reinforcement for the functionally applicative goal via the game objective should be designed into the mechanics of the game. This also works in tandem with the rhetoric of exception in that is can offer players an opportunity to consider how the game succeeds and fails as it marries the functionally applicative objective with the game objective.

8. *Rhetoric of time-on-task*: Keeping the player playing for long enough that they are able to engage with the game long enough to learn the assumed material or skills.

A functionally applicative game may do an excellent job of teaching the players the skills it anticipates, but if the player is not engaged with the game long enough for those skills to become routine and normalized in their behavior it will not matter. When designing a functionally applicative game, the designer should carefully consider the length of anticipated playtime for the game, along with any other temporal constraints that they would like for the game to work within. Should the game be able to be played from start to finish in 50-minute class? Does it need a two hour long workshop to be fully played and explored? The constraints will determine the form, mechanics, and playstyle permitted by the game. At the same time, the game needs to maintain the player's attention long enough to keep them focused on the task of playing the game for a time period long enough to comprehend the functionally applicative objective of the game. The length of the game and the time commitment expected from the

player should be positively correlated with the complexity of the anticipated functionally applicative outcome.

Rhetoric of spatial context and play venue	The space where the game will be played should drive the design.
Rhetoric of the tutorial	The game should include instructions on how to play the game and also how to teacher others to play the game.
Rhetoric of iterative functional application evaluation	Functionally applicative games should include in-game assessment and feedback of the player's of the player's progress towards the anticipated functional applicative outcome.
Rhetoric of reflection	In resistance to the flow state, meta-reflection on the behaviors and interactions are important in a functionally applicative game in order for players to reflect on why and how the game is asking them to do what they are doing.
Rhetoric of accessibility	Functionally applicative game design should follow not only established practices of accessibility for games, but also adhere to guidelines for creating accessible educational materials.
Rhetoric of exception	Information not included in the game can be just as useful as information addressed within the game (if not moreso)
Rhetoric of functionally applicative objective vs. game objective	The functionally applicative objective should be established prior to the game objective. Although the game objective will probably grow out of the anticipated functionally applicative objective, they are not necessarily one in the same.
Rhetoric of time-on-task	Keeping the player playing for long enough that they are able to engage with the game long enough to learn the assumed material or skills.

Table 3.1: Rhetorics of functionally applicative games

Conclusion

In this chapter, I have considered how project management functions as a rhetorical tool via McAllister's theories of rhetoric and the dialectic. I argued that a rhetorical understanding of scrum provides scholars with new approaches to considering how it uses the language and

presentation of an eluctable event while depending upon ineluctability to maintain control over projects and workers. I then examined how two major fields related to my project--game design, and instructional design--approach the concepts and practices of building and designing a game. I have examined how each field deploys varied rhetorical approaches to learning through games and how those approaches configure a relationship among game design process, designer, player, and learning within their fields. From the intersection of these relationships, I developed the notion of functionally applicative games as an alternative classification for what are traditionally considered educational or transformational games. The term functionally applicative game places the focus of the game on the impact that it will have on the user/player and makes the intentions of the game clear. The rhetorics of functionally applicative games provide designers, educators, and scholars a lattice upon which they can build their functionally applicative games for any number of subjects and learning outcomes. In the next chapter, I will pause the discussion of game design and rhetoric to turn my focus to the discussion of collaboration and project management within technical communication textbook. This will provide a groundwork of mainstream pedagogical ideas about teaching project management skills within a technical communication undergraduate classroom to which *Scrummage* responds. This discussion is a critical part of my methodology that will provide a better understanding of how ideas of teamwork, collaboration, and project management in technical communication are being defined and disseminated by textbook publishers.

CHAPTER 4

TECHNICAL & PROFESSIONAL COMMUNICATION TEXTBOOK ANALYSIS

In this chapter, I will describe my review of technical communication textbooks and their approaches to discussing project management styles and collaboration. I analyzed the textbooks for a variety of topics and approaches to project management and, ultimately, found that a good sample of contemporary technical communication textbooks do not have or adequately discuss project management. They often a lack of specific activities, proceduralized steps, or modeling workflows. This is concerning since, as I detailed in my literature review, many employers strongly value project management skills for their new employees and found them to be underdeveloped. Although a corpus analysis of textbook does not tell us everything happening in the technical communication classroom regarding project management pedagogy, it can provide us with a sense of how the field as a whole is addressing the topic and sees it connecting to undergraduates.

In order to determine the state of the field of how project management styles and collaboration were positioned in the field of technical and professional communication, I conducted an analysis of ten technical communication textbooks that were published between 2010-2016 (see Table 4.1). I used this method to determine if and how the field of technical and professional communication (TPC) is teaching students about project management. The textbooks were chosen using the following criteria:

- Printed between 2010 - 2016
- Released by a mainstream textbook publisher: Bedford/St. Martin’s, Pearson, Pearson-Longman, Prentice Hall, or Wadsworth

- Indicate a focus on technical communication, technical writing, business communication, or business writing in the title of the textbook.

According to a survey of publisher websites and textbook sales webpages, the ten textbooks selected represent approximately 32% of all technical communication textbooks published between 2010-2016. After selecting ten textbooks, I examined the table of contents of each for instances of the keywords "project management," "collaboration," and/or "teamwork." I did not use the index in the textbooks to find every instance of the keywords in each textbook because I was interested in seeing if discussions of the keywords were substantial enough to merit their own chapter or subheading in the table of contents. I then categorized the textbooks into three groups:

- Includes a full chapter on at least one of the keywords
- Includes a partial chapter or subsection in a chapter on at least one of the keywords
- No mention of keywords in the table of contents

Of the ten textbooks, five included a full chapter on collaboration, teamwork, or project management, four include subsections inside of chapters, and one did not include any mentions of the keywords in its table of contents.

After categorizing the textbooks, I read the respective chapters or sections related to the keywords in each textbook and codified them for the following topics (Table 4.1):

- Instances of proceduralized methods of how to organize and approach a large-scale project using collaboration
- Exercises or activities in the chapter that explicitly state a focus on one of the keywords as the goal of the activity (e.g. improving collaboration, using collaborative techniques from the chapter in the activity)

- Discussion of specific forms of collaboration or project management (Agile, Xtreme, etc.)
- Discussion of scrum or agile methods of project management

Table 4.1 displays the codified information found in each text of the corpus. Six of the ten textbooks contain a proceduralized method for collaboration or teamwork while seven of the ten textbooks include at least one exercise or activity in which the stated goal is to practice collaboration.

	Full, partial, or no chapter on collaboration	Proceduralized methods of collaboration	Exercise/activity with stated goal of collaboration	Discussion of specific forms of collaboration (e.g. Agile, waterfall, Xtreme, etc.)	Discussion of scrum or agile methods of project management
Gurak, L. J., & Lannon, J. M. (2010). Strategies for Technical Communication in the Workplace (1st ed.)	Full	✓	✓		
Johnson-Sheehan, R. (2015). Technical Communication Today (5th ed.)	Full	✓	✓	✓	Somewhat
Lannon, J. M., & Gurak, L. J. (2014). Technical Communication (13th ed.)	Full	✓	✓		

Markel, M. (2015). Technical Communication (11th ed.)	Full	✓	✓		
Pfeiffer, W. S., & Adkins, K. E. (2013). Technical Communication: A Practical Approach (8th ed.)	Full	✓	✓		
Dobrin, S. I., Keller, C. J., & Weisser, C. R. (2010). Technical Communication in the Twenty-First Century (2nd ed.)	Partial		✓		
Searles, George J. (2014). Workplace Communications: The Basics (6th ed.)	Partial				
Gerson, S. J., & Gerson, S. M. (2014). Technical Communication: Process and Product (8th ed.)	Partial	✓	✓		
Kolin, P. C. (2012). Successful Writing at Work (3rd ed.)	Partial				

Munger, R. (2013). Document-based Cases for Technical Communication (2nd ed.)	None				

Table 4.1: Corpus of project management material in TPC textbooks

Collaboration/teamwork/project management in technical communication textbooks

It appears that current trends in TPC textbook publications point towards acknowledging the importance in TPC work. Overall, the textbooks approached collaboration as positive element of technical communication. They acknowledged that any student who goes into the professional side of technical communication will inevitably be working in a team at some point in their careers. Each of the textbooks that had either a full or partial chapter on collaboration offered a description of collaboration and several tenants of effective collaboration or suggestions for working in teams. As Table 4.1 displays, many of the texts include proceduralized steps for collaboration. In this instance, I defined proceduralized steps as examples as actionable tasks that readers of the textbook were explicitly told to perform when engaging in collaboration. They were either numbered or used bullet points to set themselves apart from the paragraphs in the their respective textbooks. I specifically searched for proceduralized steps in the textbook since they struck me as the most direct example of whether or not the textbook writer attempted to explicitly teach project management or collaborative skills to readers. As a genre that often determines its value based on actionable takeaways, measuring proceduralized steps within a textbook that a student could then turn around and use is a reasonable, measurable point. In qualifying these proceduralized steps, I examined each textbook for instances in which they provided explicit instructions for how to collaborate. I did

not classify descriptions of collaboration or ideas about what good collaboration in this category that the textbooks may have mentioned. I was solely interested in actionable guidelines for collaboration that the textbooks provided to readers.

Within the textbooks, I identified the closest equivalent to the process of playing *Scrummage* in the textbooks: actionable, procedural advice on collaboration. Textbooks that include usable strategies of collaboration for technical communicators feature explicit steps that readers can use to scaffold group work. Gurak and Lannon (2010), Johnson-Sheehan (2015), Lannon and Gurak (2014), Markel (2015), Pfeiffer and Adkins (2013) each feature a methodology for collaboration. For example, Gurak and Lannon (2010) describe "strategies of organizing a team project" in their chapter titled "Teamwork, Ethics, Persuasion, and Global Issues in Technical Communication" that feature tips such as "define a clear and definite goal, divide the tasks, establish a timetable, establish procedures for dealing with interpersonal problems, and select a group decision-making style" (Gurak & Lannon, 2010, p. 21-22). Similarly, Johnson-Sheehan (2015) describes Bruce Tuckman's stages of teaming—forming, storming, norming, and performing—and uses them as the basis for describing to readers a strategy for teaming. He proceduralizes the forming/strategic planning stage into six explicit steps and intended outcomes:

- Define the project mission and objectives
- Identify project outcomes
- Define team member responsibilities
- Create a project calendar
- Write out a work plan
- Agree on how conflicts will be resolved (Johnson-Sheehan, 2015, p. 40-44)

Each step includes a breakdown and description of what the reader should do to achieve each step of the planning process. The language is instructive and insistent in its tone, in addition to providing description where necessary. In discussing how to create a project calendar and use backward planning, Johnson-Sheehan writes, “A reliable time management technique is to use backward planning to determine when you need to accomplish specific tasks and meet smaller and final deadlines. To do backward planning, start out by putting the project’s deadline on a calendar. Then, work backward from that deadline, writing down the dates when specific project tasks need to be completed” (Johnson-Sheendan, 2015, p. 42, italics original). Backward planning is first suggested as a method and described before its practice is explained to the reader. From a pedagogical standpoint, this is an effective approach to explaining the concept to readers; it lets readers know that this particular method can be an effective approach before demonstrating to them how it is done. By providing readers with the potential advantages of the technique before the details the process, learners are able to conceptualize how the model could be applied to their own projects.

Of the textbooks I examined, several discussed inner-team conflict and potential resolutions (Gurak & Lannon, 2010; Johnson-Sheehan, 2015; Lannon & Gurak, 2014). These texts provided a view of collaboration that demonstrates how the practice is rarely one without faults. They place the human participants (rather than digital tools, as several of the other textbooks did) at the center of collaboration. Only Markel (2015) acknowledged that collaboration itself has inherent weaknesses when compared to individualized work, although he still insisted that it resulted in a stronger finished project. Gurak & Lannon (2010) and Markel (2015) both acknowledge the role that gender can play in collaboration and suggest methods to

mitigate the ways in which stereotypes and gender expectations can disrupt teamwork. None of the textbooks discuss what role race might play in collaboration.

A criticism I had of several of the textbooks is that they conflate using tools of digital technology with collaboration. Several of the texts provide lists of software that users may access for collaborating at a distance, but do not effectively discuss the shortcomings of these technologies or acknowledge that simply using a digital technology to meet online does not equate to useful collaboration. There is also an oversight of the various EULAs, privacy concerns, and intellectual property that might be troubling when utilizing collaborative software to discuss projects. The texts that focused their discussion of collaboration on human behavior, in general, tended to have more nuanced approaches to the activity.

Conversely, only one of the ten textbooks—*Technical Communication Today*—included a discussion of a specific style of project management. The same textbook also briefly approaches describing scrum-style project management (although it never uses the term) in its discussion of Demming's principles of Total Quality Management (TQM) and Continuous Quality Improvement (CQI). Johnson-Sheehan writes "How can you improve quality in your team? While performing, a helpful technique is to develop quality feedback loops in which you team regularly compares the team's outcomes to the mission statement of the project" (Johnson-Sheehan, 2015, p. 55, emphasis original). However, Johnson-Sheehan does not provide readers with additional details such as a concept of what a quality feedback loop looks like or how a team might implement one.

Discussion of specific project management styles

Aside from Johnson-Sheehan, none of the textbooks approach a description of specific project management or collaboration styles. Instead, they provide a more general overview of

what constitutes collaboration, why it is important for technical communicators, perhaps some of the tools that can be used of online collaboration, and several of the textbooks offer a list of steps or a checklist to follow for productive teamwork. Addressing this more generalized approach to project management is a concern that I seek to address through *Scrummage*. I argue that more discussion of specific forms of project management is important for technical communication classrooms and textbooks in order to explicitly demonstrate how principles of collaboration are put into practice. Agile project management has been shown to have a benefit for teamwork abilities (Lindgard & Barkataki, 2011) and benefit team members (especially women and minorities) from the more social aspects of the project management style in relation to more traditional workflow practices (Slaten et al., 2005). Providing students with models of collaborative systems that have worked in the past may give them the opportunity to explore the strengths and weaknesses of different approaches to teamwork. Class discussion can include how project management grew from a corporate culture and how implementing these types of systems among classmates and peers can be problematic and may need to be refined. Specific forms of project management also give students a sense of the history of the practice and prevent them from seeing group collaboration as a "one size fits all" process.

Activities and exercises on collaboration

While not all of the textbooks in this corpus featured activities that could be used to apply collaborative skills, those that did included exercises that usually fell into one of three activity categories: case studies, performance reviews (individual and team), and checklists. While each of these activities carry their own values and benefits for understanding working in teams, they also have their limitations. Case studies are popular pedagogical approach in technical communication for several reasons. They feature "real world" concerns, a quality that technical

communication values as a discipline that establishes a significant portion of its academic identity on the connections between the workplace and the classroom. Case studies offer students the opportunity to role-play in the same way that many games do. The case studies presented in these textbooks are presented as a way to "apply your knowledge" to readers and tend to focus on interpersonal conflict. For example, Gerson and Gerson (2014) offer a case study where the reader is a team leader for an architectural firm and multiple team members have been causing problems within the team with their behavior (p. 23). Similarly, Johnson-Sheehan (2015) presents a case study titled "Not a Sunny Day" in which readers are asked to put themselves in the shoes of Veronica, a university student who joins a club to build solar-power motors (p. 59). During the project, team members begin to squabble and ultimately the project comes to a halt after a big fight results in a team breakup. The case study asks readers to put themselves in Veronica's shoes and figure out how to get the project going again. Each of these case studies asks readers to consider how they would approach these uncomfortable situations and what methods of collaboration from the chapters could be used to address the concerns. This is an effective method of teaching how to deal with interpersonal conflict. Since every instance of it is unique to the participants and context, creating a space where students can explore the myriad solutions works well for learning this form of collaboration.

Another form of project management activities that are supported by the textbooks are models of performance reviews through which readers can evaluate themselves, their partners, or their teams as a whole. These performance review sheets are rubrics which establish specific ideas and values about what should be happening in a collaborative project. They introduce students to the concepts of human resource metrics in the workplace, asking the student in a way to role-play as an evaluator of team dynamics and collaborative experience. For example, the

"team performance review" sheet that Johnson-Sheehan includes in his text features three sections. In the first section, the participant defines their role in the team and describes their contribution to the project. In the second section, the participant describes the role of the other team members and their contributions qualitatively. The third section of the performance review shifts to a quantitative system which asks the participant to evaluate their partners on a scale of 1-10 in several categories such as "did her/his share of the project" and "contributed good ideas." Markel (2015) and Lannon and Gurak (2014) also have models of similar performance reviews. Privileging the use of performance reviews by the textbooks as an activity to better understand collaboration and teamwork makes sense. The textbook form and genre readily support the replication and dissemination of the performance review models. Markel (2015) includes marginalia beside the sample review with arrows indicating strengths and weaknesses of a sample "team-member evaluation form" (p. 64-65). The blank performance review model sheets can be easily copied by students to use for their own projects in class. Although many companies are moving away from top-down performance reviews (Dishman, 2018), the textbooks use of peer-to-peer based performance reviews makes the argument that self-reflection and peer-reflection are both essential components of collaboration. This more generalized approach to collaboration that focuses on the interpersonal aligns with the textbook data described above. As we saw in table 4.1, only one of the textbooks in this corpus discusses a specific style of project management. However, the emphasis on being an active and reflective team member via peer-to-peer performance reviews is a technique that can potentially be applied to all styles of project management.

Lastly, several of the textbooks provide checklists as a method to help readers organize their collaborative behaviors. Lannon and Gurak (2014) include a 32-item checklist for

"teamwork and global consideration (p. 102). The topics in the checklist include teamwork, running a meeting, active listening, and peer review and editing. Each checklist item also includes a relevant page number with more information about that topic. Markel (2015) features a "writer's checklist" at the end of each of his chapters. His 36-item writer's checklist at the end of the "writing collaboratively" chapter includes questions related to managing the project, running team meetings, communicating diplomatically, and critiquing other team members' work (p. 78) Markel also includes page numbers adjacent to each checklist item as a reference to readers. Finally, Gerson and Gerson (2014) incorporate a 10-item checklist specifically titled "checklist for collaboration" (p. 22). Their questions are more generalized than those found in Lannon and Gurak and Markel that may be more difficult for novice technical writers to reflect upon. Their checklist is also much shorter than the others and lacks any referent page numbers that we see in the other two textbooks. Considering that Gerson and Gerson do not include a full chapter on collaboration as Lannon and Gurak and Markel do, this truncated checklist is unsurprising. These checklists strongly tie to the proceduralized notions of collaboration and teamwork that the textbooks posit. They serve as review mechanisms for the chapter material and suggest an ordering that is possible to the process of collaboration. Rhetorically, they function as chapter information reinforcement tools and potential confirmation bias of learning for the reader. That is to say, if a reader is able to move down the checklists during their collaborative project and check off a significant number of the boxes, he or she may be convinced that they now "understand" collaboration. Checklists offer a readymade method for readers to operationalize collaboration and confirm that they are "doing it right."

Conclusion

This chapter provides an overview of the project management content of multiple technical and professional writing textbooks. It establishes the methodological framework for the foundation and pedagogical context of the development of *Scrummage*. Upon analyzing the textbook data, I established that there was little content in the pedagogical literature that described specific project management techniques to undergraduate technical communication students. I discuss the strengths and weaknesses of the approaches that the textbooks use to teach collaboration by analyzing the common activities found in many of them: case studies, sample performance reviews, and checklists. Using the chapters of these textbooks as heuristic for typical topics taught in undergraduate technical and professional writing courses, I argue that specific project management styles should be taught within undergraduate technical and professional writing classes. Offering students the opportunity to engage with specific project management techniques such as scrum aligns with the *Society for Technical Communication's* objectives for technical communication to "[provide] *instructions about how to do something*, regardless of how technical the task is or even if technology is used to create or distribute that communication" ("Defining Technical Communication," n.d., italics original). As discussed in chapter 2, project management functions as a rhetorical schema through which technical and non-technical projects are classified, ordered, categorized, and negotiated by human beings. Reminding us of Miller's (1979) call for a humanistic approach to technical communication, scrum project management emphasizes the role of people in this process.

Whereas textbooks excel at describing and explaining the procedures of project management, a game provides scenarios and interactions that allow players to explore those procedures in practice and identify strengths and weakness in the process. *Scrummage* aims to

provide this type of instructive functionality by providing the players/students an accelerated microcosm of agile project management. As I will describe in more detail in the upcoming chapter, when playing *Scrummage*, students will be responsible for completing a project within a simulated calendar year. A textbook cannot simulate the experience of assuming roles, working within a team, coordinating resources, and implementing strategies, but a game can provide players with contexts and goals that are inherent and explicit in the design that can move them towards these behaviors. *Scrummage* is not meant to replace the value that a good technical communication textbook can provide to students; rather, it is meant to augment the textbook's weakness as a medium in replicating specific types of procedural information. The next chapter will describe the development and playtesting methods of *Scrummage* while also addressing how it builds off of the pedagogical approaches and activities to project management and collaboration used by the textbooks in this.

CHAPTER 5

SCRUMMAGE DESIGN & PLAYTESTING METHODS

In this chapter I will discuss the design and development of *Scrummage*, the board game I constructed as a result of the research covered in the previous three chapters. I will articulate the iterative process of conceptualizing, prototyping, playtesting, and revising *Scrummage*. The process of detailing this information serves as a set of game development and playtesting methods. In order to describe these methods, the chapter will take cues from the game design document (GDD), a common writing genre in the game design industry that primarily serves two purposes: memory and communication (Schell, 2008, p. 426). GDDs for computer games describe the game's story, mechanics, art direction, level design, sound and music, obstacles, and rewards. Sansone (2014) notes that "Any consideration of game design methodology must be...a discussion as to how game design documents should be written and organized. GDDs appear to be a standard methodology to accomplish that organization, yet what constitutes a GDD is often debated" (p. 110). Regardless of the form, GDDs give a repository for ideas as they develop and grow from the initial conception and they provide a way for team members to talk with one another about design decisions.

Perhaps most importantly though, is that a GDD is a living document. It exists with the expectation that revisions, strikethroughs, edits, additions, and other changes will be constant elements of its life cycle. Jason VanderBerghe describes misinterpretations of GDDs as such:

> The trouble with GDDs is that they are literally out of date the moment you write them. Design documents are an expression of your current theories about what will make your game good...but until you see those theories in practice, you cannot know. Unfortunately, it is in our nature to treat official documents as

> though they were specifications, or scripts, or blueprints. They are not--they are theories. Evil abounds when you have a document that some people think is a plan, some people think is a theory, and some people think is a blueprint. (qtd. Schell, 2008, p. 426).

Designer Daniel Cook has an even harsher opinion of long, bullet-pointed design documents:

> They promote an insidious worldview [when they] make the false claim that the most effective way to make a game is to create a fixed engineering specification and then hand that off to developers to implement feature by bullet-pointed feature. Great game development is actively harmed by this assumption. Pre-allocating resources at an early stage interrupts the exploratory iteration needed to find the fun in a game. A written plan that stretches months into the future is like a stake through the heart of a good game process. Instead of quickly pivoting to amplify a delightful opportunity found during play testing, you end up blindly barreling towards completion on a some [*sic*] ineffectual paper fantasy. (Cook, 2011, blog post).

The content of the GDD is not the only thing that shifts: the purpose of a GDD changes with its intended audience as well. Art, engineering, writing, and production teams will mostly likely be working from different sections of the GDD that includes information relevant to their members. Effective GDDs will recognize this and seek to exist in a space where one team easily see what another team's design specifications look like, if necessary. In recent years, wikis have become a popular medium for publishing internal GDDs due to their collaborative capabilities and up-to-date information dissemination. Sasone (2014) notes that more and more companies, in recognizing the flexible requirements of game design, are moving away from prescriptive design

documents and adopting iterative development processes in service of an overarching vision (p. 110).

In the methodology section below, I attempt to describe this iterative development process. Iterative design values the process of documenting while developing, rather than the process of documenting and then developing. The reader will find explanations of the design of the game at various stages, changes that were made to elements of the game as I read more and playtested the game with colleagues and students, and explanations for those changes. My purpose for structuring the methodology in this is to demonstrate the cyclical, reflective process of designing and building a game that aims to impart specific, actionable knowledge to its players. Although game design is a methodological process, each game is different and will require edits and alterations in unexpected areas throughout its development. Schell (2008) describes the process by saying "You must build the game, play it yourself, and let others play it. When it doesn't satisfy (and it won't), you must change it. And change it. And change it again, dozens of times, until you have created a game that people actually enjoy playing" (p. xliii-xliv). In addition to being compelling enough to engage with for the duration of the game, *Scrummage* also needed to reflect and confer principles of scrum to its players. Before providing the details of *Scrummage*, I offer several of Jesse Schell's (2008) "lenses of game design" to help elucidate why I have made certain choices and what I hope to accomplish with those choices. Schell's lenses serve a method of develop and articulate the vision and central concept for *Scrummage*. Through game developer interviews, Hagen (2010) found that game design has become about considering how games will be played rather than how they could be designed. As Sansone (2014) notes, describing for the player with this philosophy comes down to four steps: create and communicate vision, prototype the concept, playtest, and build early and often (p. 116). Schell's

113 lenses of design serve as perspectives from which to view the design of the game and come in the form of "small sets of questions you should ask yourself about your design. They are not blueprints or recipes, but tools for examining your design" (Schell, 2008, p. xi). I present four of the lenses here along with their questions to demonstrate how the central concepts of *Scrummage* tie back into concepts about scrum project management and learning via games that I have discussed in previous chapters.

The lens of emotion

This lens asks the question, "What emotions would I like my player to experience? Why?" (Schell, 2015, p. 19). Presented as the first lens in his book, Schell draws a distinction between what is definitely true in the world of objective reality and what seems to be true in the world of subjective experience. He insists that game designers should be more concerned with the latter rather than the former (although, in designing a functionally application game, the former is quite important). Schell argues self-reflection and the ability to critically evaluate our feelings are essential for creating the foundation of a memorable experience (p. 18). With this is in mind, I want *Scrummage* players to experience feelings of cooperation, teamwork, expertise, and success or failure as a group. I want them to feel both satisfaction as a collective unit when they make good decisions together and then they make a successful die roll and I want them to feel distress/anxiety when they make poor decisions or when the die roll goes against them. As discussed in chapters 1 and 2, this is important because scrum is reliant upon each team member completing their role within the sprint together. I want them to experience near-constant communication as a group, as teamwork and agile project management value communication among members. In order for players to experience a feeling of expertise, they will assume one of several roles (researcher, designer, writer, or developer). Each of the roles provides different

advantages to the group as a whole, allowing for members to contribute to the overall goal of the game in unique ways. I also want them to experience the struggles that come with collaboration, recognizing when they must work together on a task and when they need to divide their resources to work individually. Scrum depends upon team members assuming tasks that need covering even if it is not their field of expertise, so *Scrummage* allows players to address any type of project on the gameboard even if it does not match their color.

The lens of essential experience

The second of Schell's lenses asks, "What experience do I want the player to have? What is essential to that experience? How can my game capture that essence? (Schell, 2015, p. 22). Schell writes that "as a game designer, your goal is to figure out the essential elements that really define the experience you want to create and find ways to make them part of your game design" (p. 21). At its core, the intent of *Scrummage* is for players to experience solving a problem using a system that captures certain elements of scrum project management. While I recognize that the game cannot replicate every facet of scrum, I have attempted to create a game that reflects the essential experience of using the style of project management to complete a project. I want my players to have the experience of participating in simulated scrum meetings, which will be provided by the cards that are laid out each round. The discussion that surrounds the allocation of worker pieces each round is important because it is the equivalent of assigning team members to various tasks for the upcoming sprint. The players will experience working within the constraints of a deadline (the number of rounds) and being mindful of the workload (managing the backlog). As I discussed in the overview of scrum in chapter 2, all of these elements are components of putting together a project using scrum.

Another part of this essential experience the mitigation of chance and risk during project management. Scrum project management does not privilege specialization (everyone is expected to be able to work on any task), but I included specializations in the game because, despite the emphasis on general performance in agile, specializations and prior experience still allow people to complete certain tasks more effectively than others. Players can play to their roles' strengths, but they must also be able to operate beyond them. Players also need to be prepared with unfortunate dice rolls. Even if a player makes the "perfect move" with their player tokens, they still might come up short in successfully completing their task if they dice roll does not land in their favor. In an antithesis to the checklists posited by some of the textbooks discussed last chapter, the use of chance in *Scrummage* is a way to remind players that they cannot control every aspect of a project.

The lens of curiosity

The questions that stem from the lens of curiosity ask, "What questions does my game put into the player's mind? What am I doing to make them care about these questions?" (Schell, 2015, p. 40). These questions arise from Schell's definition of play, which he defines as "manipulation that indulges curiosity," encouraging player to freely seek answers to questions (p. 40). *Scrummage* is designed to prompt three main questions about scrum:

1. How can we most efficiently allocate our resources during this round while mitigating potential pitfalls?
2. How can we adapt to negative event card effects?
3. How can we use positive event cards to our greatest advantage?

As discussed in chapter 3, question 1 forms the basis combining limited time and resources to handle the product backlog and sprint backlog of a single scrum (a scrum is usually two weeks to

one month). In *Scrummage,* the players need to consider where the ideal cards to place their worker tokens on in order to give themselves the best chance of clearing as many tasks as possible. Cards with high required efficiency rolls will be more difficult to complete and require a greater allocation of resources, which may leave other cards without player coverage. Players will need to discuss what risks they are willing to accept each round based on the task cards that they need to cover for a particular round of play. Players may take a chance by placing only one or two worker pieces on these more difficult cards and spread their resources out more, or they may load the card up with the maximum number of workers to give themselves a higher chance to obtain a valuable card at the risk of spreading themselves too thin across other required task cards.

Question 2 refers to the flexibility of scrum. As discussed in chapter 2, scrum was developed as a way to respond to ever-changing requirements of software development. These shifting requirements are represented by event cards in *Scrummage*. The event cards provide an unknown element to the game. The players know that, eventually, something negative will happen because of them--sometimes it trickles in (if only one negative card is drawn), other times pours (if all players draw a negative card). Learning to mitigate these challenges as a team is meant to help with the bonding experience among players.

Lastly, question 3 reflects the opposite side of scrum's flexibility. In addition to knowing how to overcome negative obstacles, working together to best utilize positive, unexpected events an important component of scrum as well. Drawing a positive event card gives the players the opportunity to discuss how best to apply the new windfall to their team. Each of the event cards is meant to prompt a brief discussion among the team about what the best course of action should

be. Although the event card sometimes only directly affects one person, the effects will always resonate to the team as a whole.

The lens of the problem statement

The final lens I used to articulate the vision of *Scrummage* is the lens of the problem statement. This lens asks, "What problem, or problems, am I really trying to solve? Is a game really the best solution? How will I be able to tell if the problem is solved?" (Schell, 2015, p. 74). Essentially, the problem that I am trying to solve is how can undergraduate technical communication students learn and understand scrum-based, agile project management over the course of long-term project with limited resources. *Scrummage* is not the only possible solution to the problem, but as one that could be useful for many technical communication educators and students as it streamlines the process of agile project management by presenting it within the constraints of a single simulation. As I discussed in chapter 3, technical communication textbooks frequently used one of three forms of activities to help students understand collaboration and project management: case studies, sample performance reviews, and checklists. I want *Scrummage* to address is the shortcomings of each of these methods as a way to learn project management. *Scrummage* can help students see the potential solutions to a problem that they may be unaware of when participating in a case study. Collaborating as a team while playing *Scrummage* offers the chance to work together to ensure everyone is performing their role, rather than grading each other after the project as a performance evaluation would. And whereas checklists suggest that project management can be organized in a way that will ensure success by completing a set number of tasks, the elements of chance in *Scrummage* are used to deemphasize the ideas about A-to-Z project completion via a set of steps.

Thus, the advantage that my game has over other methods of teaching agile project management is that it provides a low-stakes medium that permits students to focus on how scrum develops over time as opposed to concerns over the exact content of the project. In other words, although their stated object may be to "build a website," the purpose of the game is not to evaluate students on their hypothetical website but rather their understanding of the operation of scrum as a project management tool. As Schell mentions, "the purpose of design is to solve problems," and part of the problem-solving design of my game is in the medium itself (Schell, 2015, p. 73). A game gives the option for educators to introduce students to new concepts without attaching it to a graded classroom project. It is a chance for students to negotiate the process and systems of agile project management in an environment that is free of, at least, grade-based classroom consequences. *Scrummage* also gives students the opportunity to explore mechanics and dynamics of agile and critique and compare them to ways they have worked in teams in the past.

Using these four lenses of design, I have provided the central vision for *Scrummage*. During the various stages of playtesting, I would return to the question presented here as a way to check if the changes I made to the game served the central purpose. With this central vision for the game in place, I was able to move into the playtesting stages. Before I discuss the playtesting of *Scrummage*, however, I would first need to lay the foundation by defining what playtesting is and why it is critical to iterative game design.

Playtesting methods

Tracy Fullerton (2008) writes "playtesting is the single most important activity a designer engages in, and ironically, it is often the one designers understand the least about" (p. 248). Although it is often an unnerving experience for game designers, it is nearly universally agreed

upon by designers that playtesting a game is essential to the process of making a good game (Fullerton, 2008; Brathwaite & Schreiber, 2008; Schell, 2015; Chamberlain, Trespalacios, & Gallagher, 2012). Allowing people to play the game throughout the design process gives insight into whether or not the game is achieving the player experience goals that lead back to the established vision. In the case of *Scrummage*, these experiential goals include the cooperation among players, internal team conflict mitigation, and resource and time management. In educational and training games with intended behavior changes, the experience goals are separate from the educational goals, although in well-designed games they will inevitably support one another. See Table 5.1 for a breakdown of the experience goals and the educational goals of my game.

Scrummage experiential goals	Scrummage educational goals
● Player cooperation ● Internal team conflict mitigation ● Time management ● Resource management	● The ability to articulate how scrum project management functions ● The ability to identify how scrum project management could be used to organize tasks for a project ● Understanding of scrum project management's underlying philosophies re: teams, roles

Table 5.1: Scrummage *experiential and educational goals*

Approaches to playtesting can vary widely. Some playtests can be more informal and qualitative, while large game studios may conduct more data-driven and quantitative playtests. Brathwaite and Schreiber provide a useful definition that considers the complex nature of playtesting. They state that it is "the systematic testing of gameplay, systems, balance, and interface to find all the errors, inconsistencies, or issues" with a game at a specific stage of

development (Brathwaite & Schreiber, 2008, p. 12). This systematic testing to unearth the errors, inconsistencies, and issues can be a tumultuous process, though. As Tilley, Blandino, and deWinter (2014) discuss, playtesting does not operationalize as cleanly as its methodological cousin, usability testing. They note that "usability has concrete, measurable aspects and therefore has a foundation based on numbers. However, when applied to the testing of games and play, this type of usability test does not account for the experiences encoded into the design" (Tilley, Blandino, & deWinter, 2014, p. 125). Playtesting questionnaires may use Likert scales or other number-based measurements, but it does not ask players to perform specific use-case scenarios that are common in user-testing. These more holistic metrics, however, mean that players will often uncover unexpected connections and insights about the game through play that the designer did not account for.

The primary concern of playtesting, as Schell (2015) writes, is to have people "come play your game to see if it engenders the experience for which it was designed (p. 434). Whether the experience is meant to evoke feelings of subterfuge, horror, or cooperation, playtesting is about checking the player experiences against the tenets of the central vision for a game. A playtest is a kind of prototype, and every game prototype is designed to answer a question. The playtesting method I used is a modified version of Schell's approach, which relies on four key questions when playtesting:

1. Who will be playtesting?
2. Where will the playtest take place?
3. How will you conduct the playtest?
4. What are you looking for when playtesting?

Questions 1, 2, and 3 are addressed below in the "playtesting participant selection" section, following a standard IMRAD protocol. Question 4 will be discussed in more detail throughout the description of the playtesting process, but ultimately through playtesting I was watching to ensure that the act of playing *Scrummage* reflected the experiential goals of the game described in Table 5.1. In addition to observing and measuring the experiential goals of the game, the description of playtesting will reflect the time and resource constraints of this project such as access to players (the game is designed with a specific academic audience in mind) and time constraints (the game should be playable within a 50-minute class). When possible, I will indicate when these constraints are made manifest through limitations of the project's design and articulate how I revised various iterations of *Scrummage* to address the issues.

Why an analog game?

Before I discuss the participant selection, I want to pause and briefly address the decision to build a tabletop game instead of a digital game. Although I initially considered designing *Scrummage* as a computer game, I ultimately decided to build an analog tabletop game for several reasons. This may, at first, seem antithetical to the best practices when designing a game to teach scrum. Afterall, scrum was designed as a system to help produce better computer software more quickly, so it could be argued that a computer game would make the most sense as the best medium for a game based on those practices. However, after some consideration and reflection on the central visions for *Scrummage* that I previously discussed, I reached the conclusion that an analog game would be a better medium for the experiential and educational goals.

First, accessibility issues. Board games have a lower technical barrier for entry than computer games. While many players/students who play *Scrummage* may have limited

experience with computer games, it is not unreasonable to assume that they have played with a deck of cards, rolled a pair of dice, or moved a top hat around a Monopoly board. While *Scrummage* features mechanics and rules that they may be unfamiliar with, I would not want the technology to be the reason that a player was uncomfortable or hesitant to try the game. If I were to adapt the game to a digital version, I envision using graphics that replicate a game board, dice, and cards so as to be more welcoming to non-digital game players. Additionally, building the game as a board game will give instructors the option to use it in their courses even if they do not have access to a computer lab.

Secondly, the communication and negotiation between players during the scrum round is more apparent. The platform of a board game means that players will sit face-to-face in the same space to make decisions during the game, acting as an antecedent to the role of the scrum meeting in agile project management. In this way, the scrum will be easier to identify for the players/students and the instructor can use these moments to discuss how making decisions in the game mirrors the way that scrums work organizationally: as daily meetings among team members. A physical game allows the steps of the agile process to be laid out much more clearly as the players themselves enact the process rather than running the risk of being hidden behind the technology of computer processes. While a board game still, of course, uses technology to function, the players must perform the algorithm of them game using their appendages, voices, and wits, instead of allowing a piece of software to just as would be expected of them as a member of a company adapting agile management systems.

Third, the adaptability of board games also give the players the option to break, bend, and manipulate rules for their own ends more easily that digital games. If the players or need to revise or change a rule, or if instructor would like to modify the game to make it align more

closely with her pedagogy (or even design and build additional scenarios that will apply directly to her class), the platform of a board game will permit them to do so much more easily than a computer game would. The rules of computer games are written into the code of the game, which means that in order for them to be altered the player needs access to the source code as well as knowledge of that particular programming language. On the other hand, board game rules, while written down in the instruction manual, are a social contract agreed to among players when they gather around the table. If they do not like a rule or think it is unfair, they are free to ignore or alter it. By contrast, the rules of computer games are much more static and dependent upon specific types of knowledge (programming languages, hacking, cheat codes, etc.). Board games, I would argue, give the players more agency to adapt the game to their particular communal needs, desires, and playstyles.

Lastly, board games emphasize the players and how their relationships between one another permits the board game to function. A board game allows players to gather around and watch one another more easily than a computer game. While it is certainly possible to have a group gather around a computer monitor, there remains an obvious “alpha-player” who is making decisions: the person at the keyboard. Conversely, a collaborative board game invites players to gather around the table in equal distance from and with equal access to the game. The open space of the tabletop is a medium that invites players and onlookers to circle around and discuss moves, strategies, and options as a group, giving instructors the option to run a class-wide session of the game if she believes that suits her students. While computer games could certainly be used for this as well, the board game medium forces players to gather into a circle in the same way that a scrum would. A board game has the potential allow groups of two or three players to control one game character, adding yet another layer of collaboration necessary for

success. Although eliminating the alpha-player role is dependent upon more than just the game design (personality types and moods of the players will trump even the best game design), each member of the group controlling one character will be able to find a role for him or herself (for example: one draws the cards, one places the workers, and one rolls the dice).

Next, I will discuss the details of the first build of *Scrummage,* which I refer to as the alpha build. The next section will describe the overall goals of *Scrummage* and how I initially conceptualized and designed the game's mechanics to meet those goals. After discussing the alpha build, the conversation will move into discussing how the playtesting of the alpha build led to changes in the game's beta build, which is the version that was used for the learning outcomes testing (which is discussed in the next chapter).

Scrummage **alpha build**

Game description.alpha

Scrummage is a cooperative board game that asks four players to work together and use scrum project management to solve a task designated by a specific, player-chosen scenario. They do this by drawing scrum cards during the scrum round and then placing their worker tokens around the game board in order to simulate the allocation of resources to specific tasks during the upcoming game round. The game is played over the course of X number of rounds, where X changes based on the scenario that the players chose for that game. For example, a scenario might ask the players to design a website, publish a coffee table book, build a greenhouse, any other large, multistage project. The purpose of having multiple possible scenarios is twofold: to show the players how agile project management can be applied to multiple situations and to act as a difficulty setting for the game (i.e. some scenarios will be harder than others). To win, the

players must achieve the required number of victory points before the deadline tracker reaches the end.

A round consists of six steps:

1. Each player draws an ‘event card’ (except for the first round)
2. Players draw four story cards from the story deck
3. Players allocate worker tokens to the various story tasks
4. Players make their efficiency dice rolls
5. Players add successful story cards to their victory point total
6. Players move failed story cards to the backlog area

Setup.alpha

Since project management cannot take place without a project to manage, the game begins by players selecting a scenario card. Each scenario card represents a project that, while maybe not requiring scrum, benefits from its application. The variety of scenario cards reflect Pope-Ruark’s (2015) revelations discussed in chapter 2 that scrum is now applied to many more types of projects that only software development. Scenario cards include several pieces of information:

- The description and goal of the scenario (e.g. design a website, publish a book, etc.)
- The duration of the game: How many rounds (sprints) the game will take place over. This serves as a difficulty curve, with some projects being easier to complete and others more difficult. Players can start at the easier projects and move up to the more difficult ones in future play sessions.

- Which role cards are part of the scenario. Each scenario limits the players to specific roles. For example, publishing a book does not require a tester, so that role is not available for players during that scenario.
- The number of victory points necessary to win the game. Easier scenarios require fewer victory points, while more difficult scenarios require a higher number of victory points.

Gamespace.alpha

Early in development, I conceptualized that *Scrummage* would not use a physical game board. Instead, the game would use a deck of cards that the players would lay out as they played and would build the gamespace on the table as time passes. My initial thinking in arriving at this decision was that I wanted players to reach their own understanding about the relationship between the required tasks that game presented to them rather than follow the steps on a gameboard. I expected the players to read the instructions, see the examples in the manual, and be able to follow along with their own placement of the cards. In practice, it led to a lot of confused players. To reduce the cognitive demands on *Scrummage* players by asking them to construct their own game board via card placement on the table, I developed a game board for players to use instead of asking them to use the ad-hoc method (fig. 5.1). This led to the development of a game board to help guide the players with where cards should be placed at certain times. The board also included some of the scrum terminology so that players could more easily see the connections between the various stages of scrum. There were still many problems with this game board (only one draw pile, no space for the event cards, no space to place dice except on top of the cards, to name a few), but those will be discussed further in the post-playtesting beta section below.

During the alpha stage, there were two decks that made up the game: the story deck and the event deck. The story deck (story is the agile terminology for a task) contained cards which are one of four colors: red, blue, green, or yellow. These act as the tasks that the players must complete during the game. Further iterations of the game will identify them with more a more meaningful name than red, blue, green, and yellow tasks. Players shuffled the decks of story cards all together and place them in the story deck draw pile. The event cards were then placed one pile and put them within easy reach of all of the players.

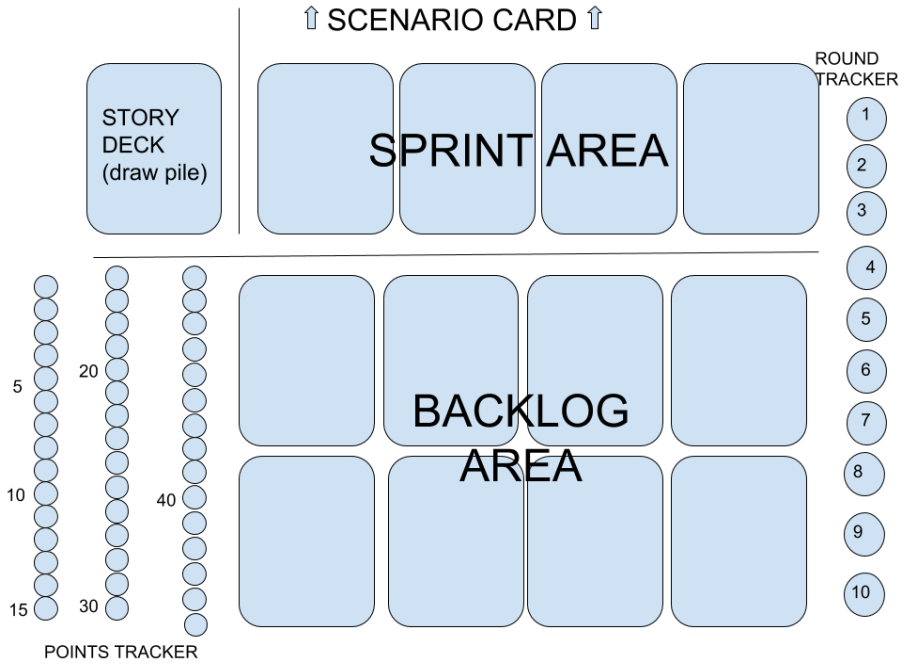

Fig. 5.1: Scrummage gameboard alpha prototype

Character-building phase.alpha

As discussed in chapter 2, people from various disciplinary backgrounds participate in scrum. To reflect this multiplicity, players have a variety of player-characters from which they

can select when playing *Scrummage*. After organizing the decks of cards, each player selects one character role card for that scenario. The roles include positions such as:

- Researcher
- Designer
- Writer
- Developer
- Editor
- Programmer
- Tester

Each of the roles includes specific abilities that augment the base rules of the game and help the team reach its victory point quota. Each role comes with a set of four initial worker tokens that the players will place on the gameboard to indicate where they are allocating resources for that particular round. After choosing their roles, the players conduct the character builder phase.

In the character builder phase, each player rolls a four-sided die to determine their character's knowledge bonus for their character specialization (color) for that gameplay session. For example, in figure 5.2, Alice is playing as the Writer for this particular gameplay session. The Writer gets an initial bonus to yellow knowledge. Alice rolls the four-sided die to determine the bonus. Alice rolls a 3 and then she takes the die and places it on the character card for the remainder of the game to remind her of the stat bonus. All of the Writer's other types of knowledge (red, green, and blue) begin at a value of 1.

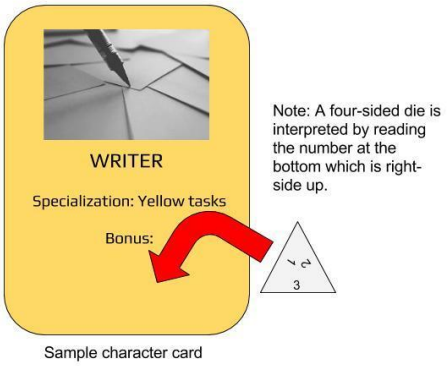

Fig. 5.2: Character building phase (alpha build)

The purpose of this character-building phase is meant to act as an antecedent to having novice and expert workers working on the same project. Sometimes organizations must make do with the limited experience of newer employees (the equivalent of a player rolling a 1 for their knowledge bonus) while others other times they may be able to allocate employees with a greater breadth of experience to a project (the equivalent of a player rolling a 4 for their knowledge bonus).

Gameplay.alpha

Players begin the game by drawing four story cards from the story deck and laying them face up in the sprint area of the board so that each player can see them. An example of a story card from the alpha build is available in figure 5.3. Story cards contain the following information:

- Name of task
- Color(s) of knowledge work required
- A number to determine the efficiency roll required to complete the task
- Empty spaces for worker placement
- Victory points awarded for completing the task

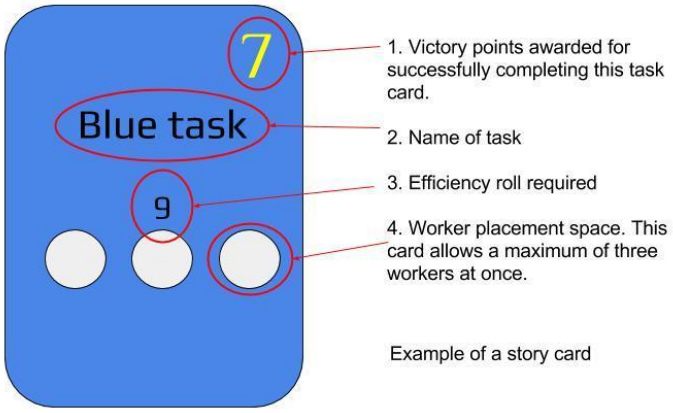

Fig. 5.3: Story card (alpha build)

The players then discuss and debate over who should take on which story card. Or they may decide to share resources to complete the tasks more quickly. Players must collaborate and strategize on what they feel would be the most effective allocation of resources. This process and part of the gameplay is meant to reflect a morning scrum meeting among team members and the discussion of "who will be doing what" for the day that arises from them. While players may suggest moves for one another, it is ultimately each player who decides where to allocate his or her workers. The players then place their worker pieces on the cards and roll the number of dice equal to how many resources they have allocated for that scrum card.

For example in a two-player game seen in figure 5.4, Alice and Jasper are deciding how best to allocate their resources for the round. Alice is playing as the Writer who receives a +2 bonus to yellow tasks while Jasper is playing as the Designer who receives a +1 bonus to blue tasks (recall that the bonuses come from the character building round based on what the player rolled on their four-sided die). They draw the following story cards for this scrum round: a red story card, a yellow story card, a blue story card, and another red story card. Each of the players have four worker resources (indicated by cubes in the figures below) that they may allocate to

the tasks. Alice decides to place two workers on the yellow task card and one on each of the red task cards. Jasper decides to place two workers on the blue task card and one on each of the red task cards as well. Alice and Jasper then make their efficiency rolls to determine their productivity on the card during that round (sprint).

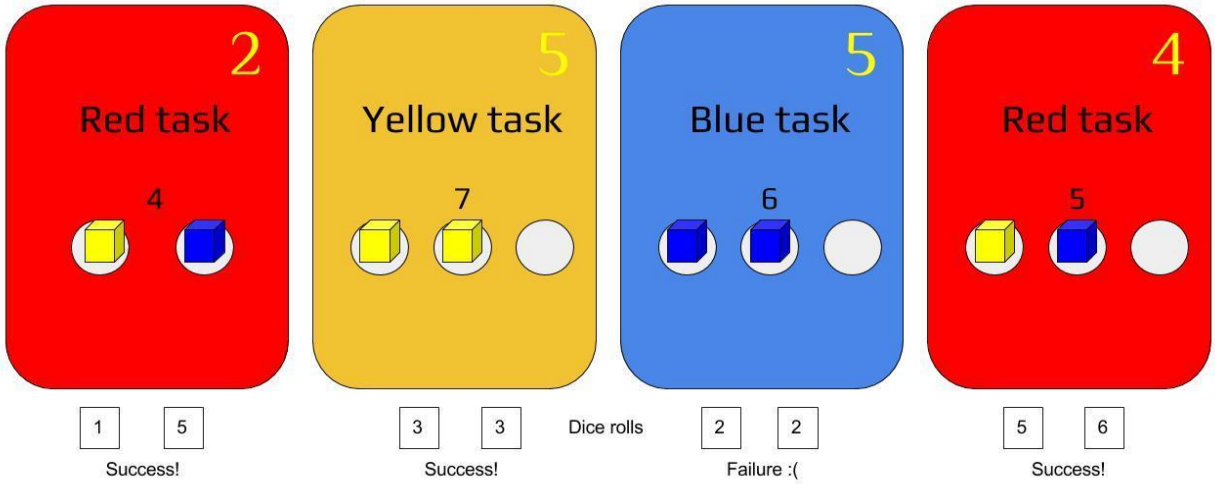

Fig. 5.4: Sprint draw (alpha build)

- The first red task card has an efficiency target of 4. Since Alice and Jasper each have one worker allocated to this task, they each roll one die simultaneously. Alice rolls a 1 and Jasper rolls a 5 for a total of 6, meaning that they successfully clear the efficiency target for this task and earn 2 victory points.
- The yellow task card has an efficiency target of 7. Alice has two workers allocated to task, which means she rolls two dice by herself (one for each worker). She rolls a 3 and a 3, meaning she misses the efficiency target on the dice roll. However, since her character receives a bonus of 2 to yellow tasks (from the character-building round), she actually has a total of 8 efficiency points, meaning that she successfully completes the task and

earns 5 victory points. The character bonus is only applied once to a task card. It is not based on how many workers the player has on the card. As long as they have one worker, the bonus is applied.

- The blue task card has an efficiency target of 6. Jasper has two workers allocated to the task, so he rolls two dice by himself. He rolls a 2 and a 2 for a total of 4, meaning he misses the efficiency target on the dice roll. When he applies his bonus for blue tasks (+1), he still only reaches a total of 5. This means that the task card is not completed and will be moved to the backlog at the end of the round. The backlog is explained below.
- The second red task card has an efficiency target of 5. Alice and Jasper each have one worker on the task, they each roll one die simultaneously. Alice rolls a 5 and Jasper rolls a 6 for a total of 11, meaning that they easily clear the efficiency target for this task and earn 4 victory points.

The three tasks that Alice and Jasper successfully completed are moved to the side to begin a "completed tasks" row created by the players. The cards should be laid out and organized so that their victory point numbers are still readable so that the players can keep track of how many victory points they have achieved (fig. 5.5). The worker pieces that were on the completed tasks return to their owner's hands. The players then slide the blue task card (that was not completed) down a row on the table. It is now part of the backlog. The worker pieces from this card also return to their owner's hand.

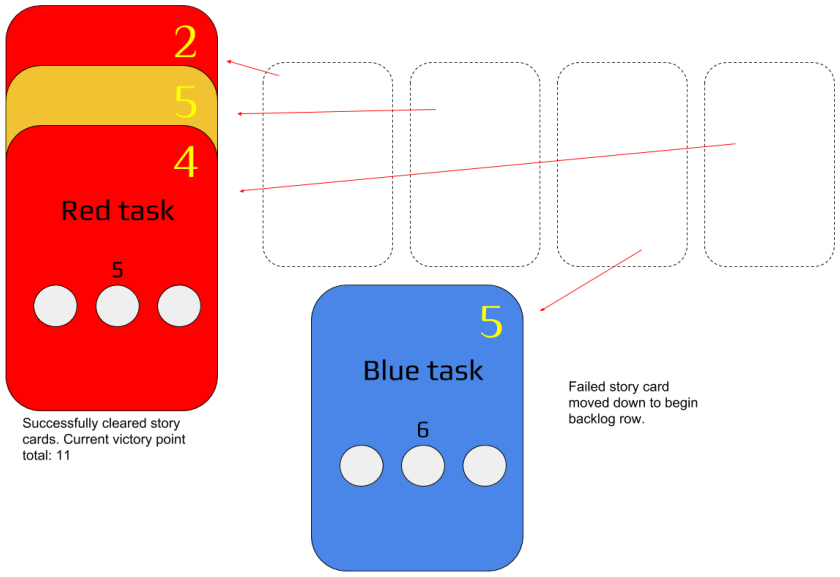

Fig. 5.5: Victory point stack and backlog placement (alpha build)

Sprint backlog.alpha

When organizations use scrum project management in their workplace, project tasks that need revisions, edits, or were not completed during their initial sprint are moved to the sprint backlog. As discussed in chapter 3, the sprint backlog contains tasks that were not completed during the last sprint or tasks that arise as primary tasks are being worked on. Not to be confused with the project backlog, which include *all* of the tasks for a given project, the sprint backlog serves as a method of categorizing and prioritizing in-process tasks.

In *Scrummage*, the sprint backlog gives a penalty to victory points at the end of the game if the players do not attend to it. Players need to manage and complete the tasks that end up in the sprint backlog as they complete the scrum cards that are drawn for each new round. In the example above, Alice and Jasper only have one blue task card in the backlog, but it can quickly get out of hand if they do not address it. Task cards that are left in the backlog at the end of the game will deduct points from the victory point total that the players earn.

In the upcoming round, they can decide to try to clear it by allocating some workers to it or risk ignoring it based on what the new scrum draw looks like. It the players' prerogative and something that, as a group, they will discuss as they play.

Event cards.alpha

As discussed in chapter 4, one of the shortcomings of the current model of teaching project management and collaboration is that they do not account of obstacles to project completion beyond the scope of interpersonal conflict. In order to help players explore how interference beyond the scope of their control can affect the overall project, I have included an "event card" system in *Scrummage*. At the beginning of each round (except for the first round), each player simultaneously draws one event card from the event card deck. Event cards can have a range of effects--good, bad, or neutral--and might affect only the upcoming round or the remainder of the game. The event cards are meant to reflect moments in life, organizational policy, or technology that are out of the player/student's control. Sometimes good things happen, sometimes bad things happen. Either way, players have to adapt as best they can and continue with the project in accordance with the best principles of agile development

Some examples of event cards and their descriptions are listed below:

- Nothing happens - A neutral event card in which things proceed normally for the player. No effect. (These cards form between 60-70% of the event deck, making them the most likely to be drawn).
- Crunch time - Your client just made some outrageous demands and your team now has to put the pedal to the metal! Draw the top five task cards and add them to your sprint backlog.

- Worker quits - One of your workers found a better opportunity at another organization and decided to leave your team. Discard one of your worker pieces for the remainder of the game.
- New hire - Your team's job ad has been answered by a talented individual. Add one worker token to your hand for the remainder of the game.
- Sickness - One of your workers came down with the flu and is temporarily out sick. Set this worker piece aside for the upcoming sprint. You may not assign it to any tasks this round. You may use it again at the end of the round.
- Red/blue/yellow/green training - Your team attends a red/blue/yellow/green training workshop. Gain a +1 bonus to red/blue/yellow/green tasks for the remainder of the game.
- Contractor - Your organization hires temporary outside help to relieve some of the stress on your team. Remove one task from the sprint backlog. You may hold the contractor until you decide to play it. Once played, discard it.
- Organizational pressure: The higher-ups are looking for more output. Draw one extra story card for the upcoming round.
- Computer failure: The cloud storage service that your organization uses to store its data suffered a brute-force DDOS attack. Discard the card with the highest victory point value from the completed tasks row.

Game end.alpha

A game of *Scrummage* ends in one of three ways:

- Players reach the required number of victory points as designated on the scenario card before the last sprint of the scenario. Since players completed the project ahead of schedule, the backlog does not count against them. Great job!

- The sprint backlog is full and requires that players place an incomplete task from the sprint round. If there is no empty space in the sprint backlog to place the failed task card, the players lose the game due to falling too far behind schedule.
- The final sprint (round) of the scenario occurs. Once players play their workers and make their efficiency rolls for the round, the game ends. If the required number of victory points for the scenario has not been met, then the players lose. If the required number of victory points was met during the final round, players then take the total number of victory points they earned and subtract one point for each task in the backlog. If the total number of victory points still exceeds the required number, then the players win! If not, the project fails and players lose.

Playtesting results and *Scrummage* beta build

Participant selection

In order to determine that the player experience with *Scrummage* evoked the experiential goals described above, three separate *Scrummage* playtest sessions were held during Fall 2017. Participants were solicited from Old Dominion University from three second year technical writing classes. Several instructors offered extra credit to their students for participation in the playtests as an incentive to attend the optional class sessions. Participants were all college students aged 18-24. Each playtest had between three and five concurrent games of *Scrummage* running simultaneously, dependent on how many participants were available in each class. Each session of *Scrummage* included between two to four players (four players is the maximum number of players supported by *Scrummage*). Each playtesting session lasted 50 minutes.

Each playtesting session began with the facilitator (myself) explaining the purpose of the project. Participants were notified that they would be playing a game and then providing

feedback about their experiences with the game via survey responses. Participants then signed a consent form agreeing to participate in the study (appendix B). The facilitator then passed out copies of the game and its components and organized the participants into groups of two to four, dependent upon the number of participants in a particular session. The facilitator then followed a script to teach the participants the rules of *Scrummage* while using a copy of the game to demonstrate the explanations. Participants were encouraged to ask questions during the rules explanation if they needed further clarification about a certain point. Once participants began playing *Scrummage*, the facilitator did not speak any further unless it was to clarify a question about a game rule a participant posed. After playing the games, the participants completed a playtesting questionnaire about their experiences (appendix C).

In order to present the iterative approach I used to the development of *Scrummage*, I have divided the process into three sections: the alpha build, playtesting, and the beta build. Whereas the alpha build section details the initial conception, design, and rationale for the game, the *beta* and playtesting sections show how playtesting participants responded to elements of the game and led to changes in the *beta* version of the game was ultimately tested during the learning outcomes phase (the results of which will be discussed in the next chapter).

I have structured the playtesting results below using the same format as the description of the alpha section of *Scrummage*. In this section, I will provide responses from playtesters about various aspects of the game and discuss how those responses shaped the changes made to the beta version of the game. I have decided to integrate the playtesting discussion with the beta build description so that the reader can more clearly see how the results of playtesting were then applied to the beta build of the game.

Game description.beta

Over the course of playtesting the alpha build of *Scrummage*, the central tenet of the game did not change; any changes that were made to the beta build were done in the interest of reinforcing the collaborative nature of using scrum project management to achieve a common goal. However, significant alterations to the gameplay that were discovered through playtesting include changes to the number of rounds played in each scenario, the number of cards drawn in each sprint, and the removal of victory points as a metric of success.

Instead of having a unique number of rounds for each scenario, each scenario was given a total of 24 rounds, which were coded at two week increments in a 12-month calendar year for players. This change emanated from observing the players struggle with understanding when their game would end based on the round number listed on the scenario card. In the alpha build, having a different number of total rounds for each scenario was meant to offer a means of increasing or decreasing difficulty. However, norming the total number of available rounds for each scenario allowed me to manage difficulty in other ways that gave players more agency (which, in doing so, came with new challenges). The varied round lengths for each scenario in the alpha build created a balance issues within the game in which scenarios were either too difficult or too easy. I intend to reintroduce varied scenario lengths in future iterations of *Scrummage* in order to represent how various projects have various time constraints, but for the present build it is not central to the game's experience or the intended educational outcomes.

One of responses from the playtesters who was in a group with only two players wrote, "It's hard to play without all the players." This encouraged me to rethink the rule that players would always draw exactly four cards each round. Instead of drawing exactly four story cards each round, players draw a minimum *N* number of story cards based on the number of players in

the game. The minimum number of drawn cards for one round is three cards, while the maximum number is six. The option to move away from a standard, four card draw each round worked better for several reasons. Providing a more flexible option for the number of draw cards for each sprint better accommodated the variable player numbers. It also offers more player choice, giving teams the option to "press-their-luck" for a given round or back off based on how other factors of the game affect them during a round. Additionally, it supports the team-based interactions more effectively by asking larger teams to draw more cards, thereby always having more "work" to handle each round.

After watching players struggle to keep track of their total number of victory points, I opted to remove them as the measurement of success for a scenario. Winning a scenario now involves collecting the appropriate number of task cards required by the scenario, an easier metric for players to keep track of. Although victory points are a common board game design trope, particularly in European strategy games, I also found them to be incongruous with a simulation of agile project management practices. As I searched for means to ensure that my representation of agile project management in *Scrummage* aligned with its actual counterpart, it became clear that victory points offered limited ways for players to consider how smaller tasks ultimately added became part of a larger project through agile. While victory points are a familiar mechanic in terms of game design, they offer a narrow way of conceptualizing the varied means of labor that are included in project management. Instead of achieving a specific number of victory points, I modified the win conditions for each scenario to require players to obtain a specific number of each card type. Instead of players wondering why a certain card is worth X number of victory points, I attempted to shift the focus for players to consider how all of

the required cards for a scenario come together to form a whole project instead of meeting a decontextualized ‘victory point’ win condition for the game.

Setup.beta

The setup was overwhelming for some of the playtesters. In response to the question, “What was the most confusing part of the game,” one playtester wrote, “The set up...once the game got started, it was very easy to understand.” Another wrote that the “The start and learning the rules” were the most confusing, while another added that, “getting started” was the most confusing part of the game. The beta build of *Scrummage* still asks players to begin by selecting a scenario card (fig. 5.6). However, to streamline the setup and reduce the barrier to entry, some of the language on the cards was changed. It also prompted me to create a video tutorial for playing *Scrummage* that includes the setup the game. The video can be seen here: https://www.youtube.com/watch?v=GqOYx3llPGI. With the removal of victory points and a standardization of the round structure, the content of the scenario card underwent some changes to its content. The revised scenario cards include:

- The description and goal of the scenario (e.g. design a website, publish a book, etc.)
- The required minimum number of each card type to complete the scenario

The number of rounds was removed (because all scenarios now take place over 24 total rounds) and the specific type of roles for a scenario were removed. Originally, I intended to only permit certain roles be used for certain scenarios, but that brought up too many game balancing conflicts and led to confusion among players. Allowing any player to use any character for a given scenario permitted an easier set-up process. Additionally, it allows players to build their own team of roles for the project and strategize based on the roles’ abilities.

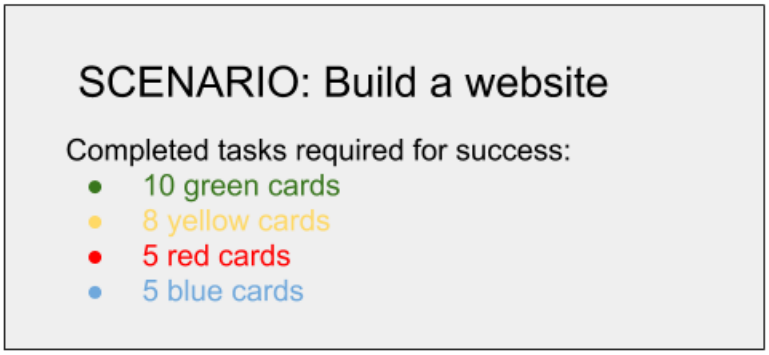

Fig. 5.6: Scenario card (beta build)

There are still plans to revise these scenario cards further beyond this project. One playtester gave the insightful feedback that "the situation cards (the 'create a website' versus 'write a grant proposal') should have more explanation. Not everyone knows what a grant proposal is." Although time constraints prevented the changes she suggested, future iterations of *Scrummage* will feature a short narrative on each scenario card to help contextualize each project.

Gamespace.beta

The gameboard prototype (fig. 5.1) needed a major overhaul. It lacked clear spaces for dice placement and featured poor balance between the number of card placement spaces between the sprint and backlog areas. The amount of space that the point tracker area occupied also helped me arrive at the decision to remove victory points as part of the game. One playtester simply thought that having "A bigger board would be better." In addition to redesigning the board based on much of the other feedback, this suggestion encouraged me to ensure that the updated game had large enough spaces for all of the pieces the game includes. The feedback from another playtester, "I'd make a place on the board for the cards at the end of each round," served as another helpful piece of input to ensure that players are not fiddling with the pieces

outside of the gameboard. Playtesters also noted that “There should be a spot for the second deck of cards (the event cards) because we forgot to use them,” a helpful reminder that the game board functions in the service of memory and rule-keeping.

The revised game board (fig. 5.7) includes spaces for the story card draw piles (which have now been expanded to allow for four separate draw piles), spaces where players will lay out the cards for the current sprint, spaces for the backlog, spaces for the completed story cards, and a draw pile space and a discard space for the event card deck. The dotted dividing line down the middle of the scrum area was a last minute addition before playtesting which is meant to notify players of how far they must move the round tracker token at the end of the round based on the number of story cards drawn into the current sprint during that round. Playing more cards means working on more tasks, which will take longer and make the round track move further.

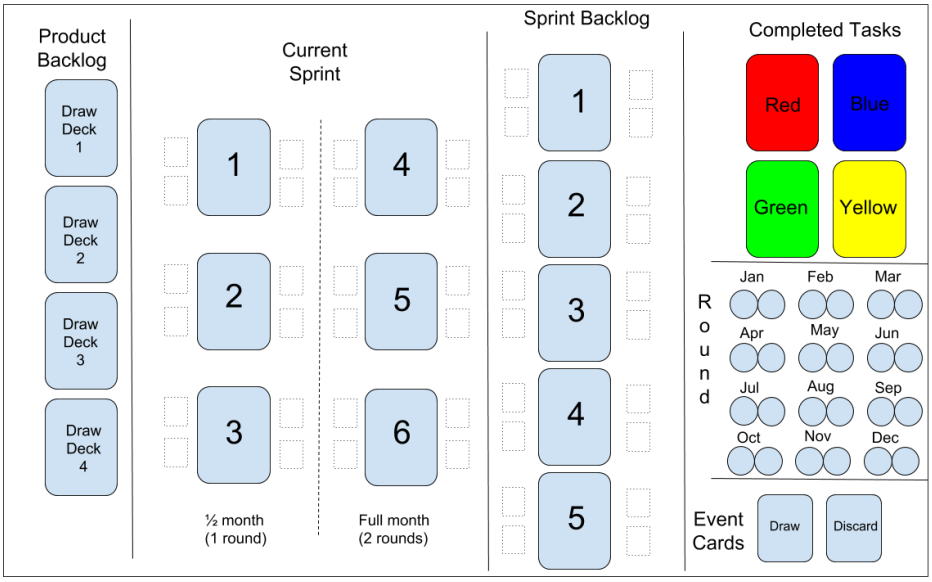

Fig. 5.7: Revised Scrummage game board (beta build)

In addition to helping players understand the setup of *Scrummage* more easily, the revised game board also becomes serves an instructional function. Instead of asking players to determine how the drawn and discarded cards relate to one another, the game board demonstrates to players how tasks move from the product backlog to the sprint to the sprint backlog to the completed tasks (and part of the whole project). While I did not measure the specific effects or impact of the game board in my data, anecdotally I can report that the overall experience of players was more positive and more closely aligned with my intentions of "player experience" when playing *Scrummage*.

Character-building phase.beta

Of all the takeaways from playtesting, removing the character-building phase was the most immediately apparent. Players disliked it immensely. Keeping track of how many bonuses a character did or did not receive for a particular story card was taxing on players and, frankly, not enjoyable for them. One playtester said that the character-building phase "did not make sense and was borderline game-breaking." Another playtester noted that it was difficult to "understand some of the language used to describe abilities." Playtesters also reported that they did not experience a stronger bond with their characters and "didn't care about them because of the character builder phase," which I was one of my design goals for including it. I also simplified the character selection process by reducing the total number of available roles for playtesting purposes to the researcher, designer, developer, and writer.

In place of the character-building phase, I streamlined each of the four roles by giving them each a "specialization" and an "ability." The specialization provides the role with a +1 bonus to the total dice amount of cards of a certain color, while the ability allows the player with that role to manipulate the gamestate in a unique way. For example, the player who assumes the

role of the Writer has the specialization of adding +1 to the dice totals on any yellow cards and the ability to reroll any one of their own die once per round (fig. 5.8). The simplified version of the specialization made it easier for players to keep track of what bonuses their role has for which color, while still highlighting the fact that, although team members are expected to work outside of their specialty in scrum project management, they can arrive to the project with a history of expertise in a particular area.

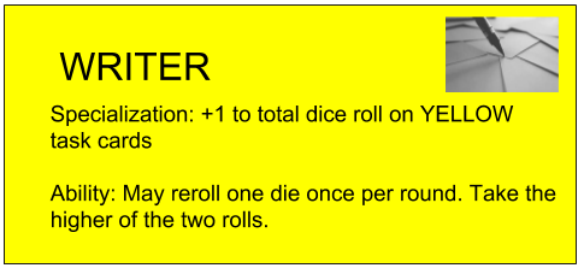

Fig. 5.8: Revised Writer character card (beta build)

Gameplay.beta

The gameplay loop has not changed drastically since the alpha stage. The gameplay still requires players to debate, discuss, and collaborate to achieve victory, but the explanation of where to move cards at the end of each sprint is helped by the layout of the updated gameboard. As previously discussed, the game board acts as a heuristic for scrum project management. To outline the changes in gameplay, I offer an updated version of the sample round of play from the *Gameplay.alpha* section. I have used underlined type and text strikethroughs to highlight the changes between the alpha and beta gameplay descriptions.

In a two player game seen in figure 5.9, Alice and Jasper are deciding how best to allocate their resources for the round. Alice is playing as the Writer who receives a +1 bonus to

yellow tasks while Jasper is playing as the Designer who receives a +1 bonus to blue tasks (the bonuses originate from the character specialization on the role card). Randomly selecting from the four draw piles on the left side of the board, they draw the following story cards for this scrum round: a red story card, a yellow story card, a blue story card, and another red story card. Since this is a two-player game of *Scrummage*, Alice and Jasper were only *required* by the rules to draw a minimum of three cards (number of players plus one), but opted to press their luck and draw four cards since they felt confident about their ability to cover the story cards. Each of the players have four worker resources (indicated by cubes in the figures below) that they may allocate to the tasks. Alice decides to place two workers on the yellow task card and one on each of the red task cards. Jasper decides to place two workers on the blue task card and one on each of the red task cards as well. Alice and Jasper then make their efficiency rolls to determine their productivity on the card during that round (sprint).

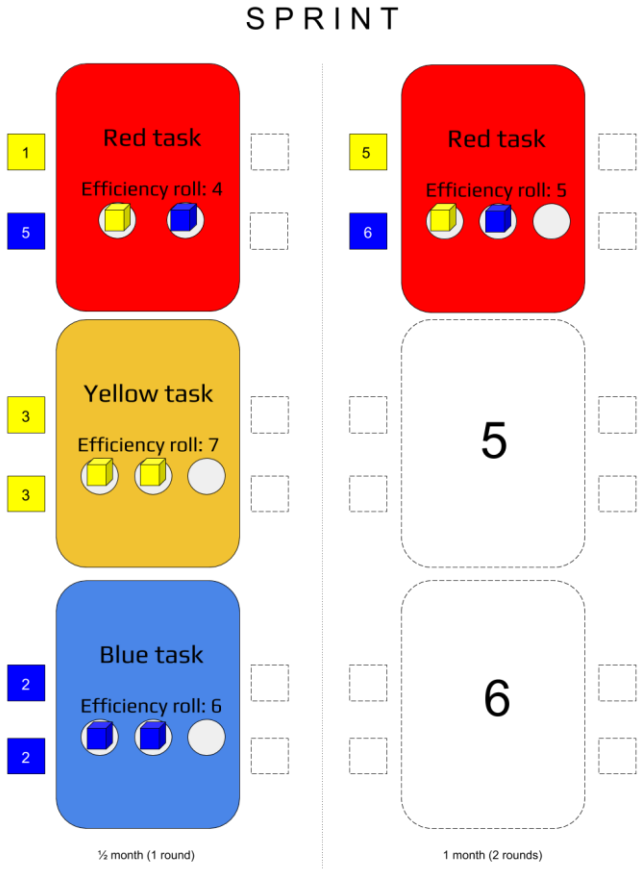

Fig. 5.9: Sprint draw (beta build)

- The first red task card has an efficiency target of 4. Since Alice and Jasper each have one worker allocated to this task, they each roll one die simultaneously. Alice rolls a 1 and Jasper rolls a 5 for a total of 6, meaning that they successfully clear the efficiency target for this task. ~~and earn 2 victory points.~~
- The yellow task card has an efficiency target of 7. Alice has two workers allocated to task, which means she rolls two dice by herself (one for each worker). She rolls a 3 and a 3, meaning she misses the efficiency target on the dice roll. However, since her character receives a bonus of 1 to yellow tasks (from her character specialization), she actually has a total of 7 efficiency points, meaning that she successfully completes the task ~~and earns~~

~~5 victory points~~. The specialization bonus is only applied once to a task card. It is not based on how many workers the player has on the card. As long as they have one worker, the bonus is applied.

- The blue task card has an efficiency target of 6. Jasper has two workers allocated to the task, so he rolls two dice by himself. He rolls a 2 and a 2 for a total of 4, meaning he misses the efficiency target on the dice roll. When he applies his specialization bonus for blue tasks (+1), he still only reaches a total of 5. This means that the task card is not completed and will be moved to the backlog at the end of the round. The backlog is explained below.
- The second red task card has an efficiency target of 5. Alice and Jasper each have one worker on the task, they each roll one die simultaneously. Alice rolls a 5 and Jasper rolls a 6 for a total of 11, meaning that they easily clear the efficiency target for this task ~~and earn 4 victory points~~.

The three tasks that Alice and Jasper successfully completed are placed on their respective color spaces under “completed tasks” on the right side of the board (figure 5.10). ~~The cards should be laid out and organized so that their victory point numbers are still readable so that the players can keep track of how many victory points they have achieved~~. The worker pieces that were on the completed tasks return to their owner’s hands. The players then move the blue task card (that was not completed) It is now part of the backlog. The worker pieces from this card also return to Jasper’s hand.

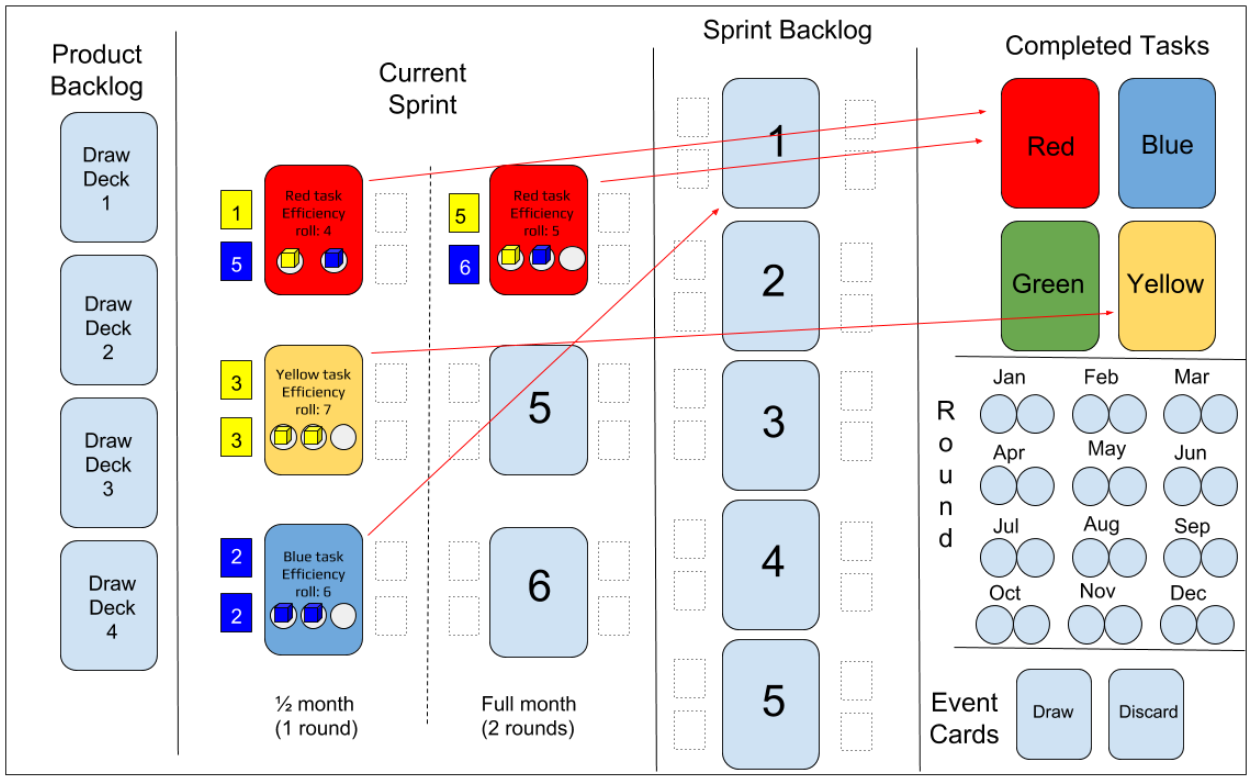

Fig. 5.10: Movement of cards to completed tasks or backlog

Sprint backlog.beta build

Given the importance of the sprint backlog as a key component to scrum project management, it was essential that it remain in the beta version of *Scrummage*. The interaction between drawn cards and the movement of the cards to the 'completed task pile' or 'sprint backlog' areas of the game board did not change drastically between alpha and beta stages. Playtesters found that "clearing up the backlog was satisfying" and noted that "analyzing the backlog and deciding if they need more of your attention" than the sprint was a critical element of *Scrummage*. In fact, the relationship between the sprint and backlog was one of the earliest organizational structures of the game and, I would argue, the design backbone of *Scrummage*. Mapping the relationship between the placement of the task cards in the daily sprint area of the

board and their subsequent movement to the sprint backlog or completed tasks pile was one of the most readily accessible structures of scrum project management that could be "gamified." Alistair Cockburn (2007) describes the process of agile software development as a "cooperative game." He writes, "Software development is a (resource-limited) cooperative game of invention and communication. The primary goal of the game is to deliver useful, working software. The secondary goal, the residue of the game, is to set up for the next game (p. 37).

In the context of scrum project management, Cockburn is articulating the sprint cycle. Sprints can last from two weeks to a full month, but regardless of their length the end goal of a sprint is to present a working prototype of the project, software or otherwise. Capturing the iterative approach to scrum project management meant featuring the sprint backlog as a central piece of *Scrummage's* design. While the function of the sprint backlog did not shift between the alpha and beta versions, the placement of the sprint backlog between the original 'sprint' section of the board and the 'completed tasks' section of the board was intentional. The placement signifies the intermediary role that the sprint backlog often occupies during the completion of numerous tasks.

Event cards.beta

The event cards were well-received by players across the multiple playtesting sessions. They were described as "fun," "really cool," and "my favorite part of the game" by playtesters, although some players wished they "could have drawn different event cards instead of 'nothing happens.'" Players responded positively to the act of drawing cards that would unexpectedly alter the game state. Negative event cards provided an opportunity for discussion, reflection, and strategizing, while positive event cards provided the feeling of reward and achievement for the team.

The only alterations made to the event cards between the alpha and beta builds were edits to the language on some of the cards. Some of the text was edited for clarity or to remove references to victory points. For example:

- Crunch time - Your client just made some outrageous demands and your team now has to put the pedal to the metal! ~~Draw the top five task cards and add them to your sprint backlog~~. Draw as many cards as needed to immediately fill up your sprint backlog.
    - Players were confused as to what to do if they already had cards in the sprint backlog, as drawing five would make it "overflow."
- Red/blue/yellow/green training - Your team attends a red/blue/yellow/green training workshop. Gain a +1 bonus to red/blue/yellow/green tasks for the remainder of the game. <u>This is in addition to your starting bonus and might be a different color than your starting bonus</u>.
    - The underlined language was added to clarify that this bonus did not replace the starting bonus, but added to it. The new text also clarifies that the bonus applies to any character regardless of their starting bonus color.
- Computer failure: The cloud storage service that your organization uses to store its data suffered a brute-force DDOS attack. ~~Discard the card with the highest victory point value from the completed tasks row.~~ Remove three cards of your choice from the completed tasks section.
    - Removed the language referring to victory points and made the card slightly more detrimental to the players when drawn.

Rescue mechanic.beta

The rescue mechanic was introduced as a way for players to save themselves from losing the game due the sprint backlog filling up with task cards. In the alpha version of *Scrummage*, some teams of players would find themselves in a gamestate that was unwinnable due to available resources. Understandably, this discouraged the participants from continuing to play the game with much thoughtful mental investment or enjoying the game experience. During playtesting, one player noted that he wished he could have "traded completed cards not needed for ones that are needed." I used this feedback to generate the rescue mechanic to give players the option to counter a dire gamestate.

The rescue mechanic allows players to use cards from their 'completed tasks' to "buy" cards from the sprint backlog and add the card to the matching 'completed task' color pile. Players may not "buy" cards from the 'sprint' section--only from the 'sprint backlog.' Cards from the sprint backlog may be purchased by discarding *X* number of cards from their completed tasks pile, where *X* is the number of worker placement spaces +1 on the sprint backlog card the players wish to buy.

Game end.beta

The end-game state of a game of *Scrummage* has not shifted dramatically from the alpha build. However, the removal of victory points meant that a new measure of victory needed to be established. As discussed in the 'setting up the game' section above, each scenario now requires a minimum number of each color of task card to be added to the 'completed tasks' section of the gameboard. Removing the ambiguous victory points as a win condition and making success a direct result of how many individual tasks the players complete via their scrums aligns the gameplay more closely with organizational practices that that use scrum.

Conclusion

After establishing lack of specific project management instructional content within contemporary technical communication textbooks in the previous chapter, this chapter presents the playtesting methods through which I developed the tabletop game *Scrummage*. *Scrummage* was designed through a series of playtesting methods utilized within the gaming industry. While methods in a traditional academic disciplines do not typically share the revision processes that researchers use to arrive at the final form of their methods, my goal in this chapter was to detail the iterative process of game design. Unlike other experiments which demand a steadfast set of methods in order for the data to be applicable, the iterations of the game design are central to my project. Utilizing playtesting methods outlined by game designers such as Jesse Schell and Tracy Fullerton, my goal in the second half of this chapter was to illustrate the changes that *Scrummage* underwent during development and justify the major changes made to game mechanics and content between alpha and beta builds through several criteria:

- Adherence to scrum's methods and principles
    - Does the gameplay closely mirror the process of scrum project management?
    - Are participants using the language of scrum while they play?
    - Is there enough encouragement for reflection upon the principles of scrum within the game design?
    - Does the text of the game's artifacts (cards, board, etc.) accurately depict principles of scrum where relevant?
- Participant engagement
    - Do participants remain engaged with *Scrummage* during the entire length of the game?

- Is the game overly/unnecessarily complex at any point?
- Is there sufficient player interaction?
- Does each player feel like they are able to meaningfully contribute to the outcome of the game?

There are still more changes to make to *Scrummage* that I was not able to address in the timeframe of this project. There are alterations and additions I want to make to the cards and gameboard of *Scrummage* to help players better understand the parts of scrum project management that the game emphasizes. These changes will include adding more language to help players acclimate to the vocabulary of scrum and how one stage leads to the next. I also intend to change the name from "efficiency rolls" to "efficacy rolls" to tie the value of the roll more strongly to the idea that it is the player's character putting forth the effort on the task idea of over-valuing efficiency in project management. Additionally, worker tokens will be renamed "focus tokens" to better emphasize how the player is shifting their focus across multiple tasks during a sprint. Identifying the pieces focus token addresses how much emphasis is being placed on one task and, subsequently, is unavailable for other tasks during that sprint. I also intend to produce a "teaching script" that will help guide an instructor when teaching the game to students in her classroom. While contemporary digital games regularly include a built-in tutorial, learning an analog game in a more effective way that reading a rulebook can go overlooked. More than just a rehash of the rules, this teaching guide will lead instructors through two rounds of gameplay, specifying which elements to emphasize, pointing out mistakes that players regularly make, and including a series of questions to assist with scrum knowledge acquisition. Lastly, it became clear during playtesting that a more explicit sprint retrospective round in *Scrummage*. The sprint retrospective in scrum project management occurs at the end of each sprint in which

participants reflect on what could have been improved during the previous sprint. While it became clear during playtesting that players were engaging in this behavior at times throughout their gameplay, I want to add a dedicated retrospective round to emphasize its importance in the scrum process, which *Scrummage* in its current state does not do.

Scrummage went through a series of playtests in order to ensure that it was effectively functioning as an engaging, working game before moving onto the learning outcomes testing. The upcoming chapter will outline the methods used for the learning outcomes testing, analyze the data obtained, and discuss the implications of the findings and how they can help us understand the use of tabletop games as teaching and training tools for project management.

CHAPTER 6

LEARNING OUTCOMES METHODS, RESULTS, & CONCLUSIONS

The previous chapter discussed the development of *Scrummage* from its initial conception through the various versions of the game. I discussed how the game underwent multiple iterations as I attempted to balance player engagement, complexity, cooperation, and communication while retaining the foundational elements of scrum project management through the gameplay. The chapter described the playtesting and summative assessment methods used to reach the conclusions regarding specific choices of game design for *Scrummage*. As I previously discussed, the methods utilized in the playtesting phase were based on the work and research from game design textbooks and scholarship. Traditional academic research methods that emphasize strict procedures and replicability do not fit the requirements of play and game design. However, the formative assessment (learning outcomes) that I will discuss in this chapter *do* demand a more academically familiar methodology and methods. After arriving upon a version of *Scrummage* that satisfied the playtesting and experiential outcomes that I set forth, my project moved forward to the learning outcomes testing stage.

This chapter will cover the learning outcomes methods that were used to collect data about the efficacy of *Scummage* as an instructional tool with regards to it intended functional applicability. I will describe the selection of learning outcomes participants for both the experimental (*Scrummage*) and control (textbook) group. After discussing the methods used to collect data from each of the groups, I will discuss the most pertinent and statistically significant results of the learning outcomes surveys. The discussion section of the results will describe the overall trends within the data and what these trends suggest about the potential usage of *Scrummage* in educational settings beyond the learning outcome sessions I arranged. In other

words, the chapter will discuss whether or not undergraduate technical and professional communication students learned the expected material after playing a gameplay session of *Scrummage*. Generally, the learning outcomes testing found a positive correlation in understanding the concepts of scrum from both experimental and control groups. Overall, the control group performed slightly better on the learning outcomes post-test, but this may also be due to several methodological factors. To highlight these issues, I will describe some of the shortcomings and problematic structures of the methods and how I intend to improve upon them for future data collection sessions.

Learning outcomes testing methods

After playtesting of *Scrummage* was complete (summative testing), the project moved into learning outcomes data collection (formative testing). The learning outcomes testing included two groups: the experimental group (*Scrummage*) and the control group (textbook readers). Before beginning the data collection, each participant completed a voluntary consent form and received a copy of the form for their personal records (appendix D). Participants in both groups completed the same pre-test survey (appendix E) before participating in the test and the same post-test survey (Appendix F) after completing the test. The pre-test survey asked participants about their knowledge of scrum project management, attitudes towards group projects, and how they manage workloads in group project. The post-test survey asked them to describe scrum project management, to define the terminology of scrum, about their confidence in apply scrum project management to their own group work, and how they would apply scrum to a sample scenario. These questions arise from the goals of scrum as a project management system which were discussed in chapter 1 and 2, as well as the projected educational goals of *Scrummage* described in the previous chapter (see Table 5.1).

I contacted English department faculty members at Old Dominion University who were teaching at least one of the following professional writing courses: Scientific and Technical Writing, Technical Writing, or Digital Writing. I received a response from one faculty member who allowed me to visit one of her class sessions of Digital Writing in which I could conduct the experimental group test using *Scrummage*. However, because I did not receive any additional offers to visit a classroom session for the control group testing, I had to revise my approach. Instead of visiting a classroom session to conduct the control group testing, I offered faculty members the chance to send their students to my lab during a four-hour time frame where they could participate in the data collection. These less restrictive time and space constraints solicited a higher number of participants for the control group (n=24) than the experimental group (n=12). Faculty members (for both the experimental and control groups) offered their students extra credit for participating in the data collection. Participants for both the experimental and control groups were also entered into a drawing for a $75 gift card for www.amazon.com.

Experimental group

The experimental group learning outcomes testing took place during a 75-minute Digital Writing class. Students in the class were given the option to participate in the data collection by their instructor or work on classwork for their course. Twelve students chose to participate, which allowed me to run three separate games of *Scrummage* with four players each. After signing the voluntary consent form and taking the pre-test survey, participants learned the rules to *Scrummage* via video (available here: https://youtu.be/GqOYx3llPGI). I showed participants the video as they played their first round of the game, stopping it at appropriate moments to allow them to set up the game and follow the gameplay on their own before continuing. Once the first round of their games were completed and I finished the rules explanation and video, I

refrained from speaking any further unless to clarify a question about the rules. Participants proceeded to play *Scrummage* in their groups until fifteen minutes of the class session remained. At that time, each participant completed the post-test survey and returned it to me, the test administrator.

Control group

The original research plan was to also conduct control group testing in a traditional classroom setting. However, because no other instructor responded to my call for participants, control group testing took place in a separate lab area. Rather than visit a classroom, I asked instructors to send students from their technical communication classes to the lab as an extra credit opportunity. Instead of playing *Scrummage*, the control group participants read Chapter 2 from Kenneth Rubin's book *Essential Scrum: A Practical Guide to the Most Popular Agile Process* (2012). After reading many textbooks on scrum project management, Rubin's chapter was selected as the text for the control group for several reasons. First, it is written for a layman audience unfamiliar with scrum or other forms of agile project management. Secondly, it outlines the roles of scrum, how it functions, and defines the key terms of the process. All of these were goals of *Scrummage* as well. Lastly, the length of the chapter (12 pages) was short enough to be read and responded to within a 75-minute class session. Participants came to the lab, received and signed the voluntary consent form (appendix D), completed the pre-test (appendix E), read the Rubin textbook chapter, and then completed the post-test (appendix F).

Results and discussion

The experimental and control groups completed the same pre- and post-test surveys. The development of pre- and post-test surveys arose from the research conducted on game-based learning discussed in chapter 3. The survey questions were generated from the research on scrum

and attitudes towards project management as an educational subject as described in chapters 2 and 3. The pre-test surveys measured participants self-reported knowledge of and attitudes towards the following items:

- group work in classes
- knowledge of scrum project management and its terminology
- ability to scaffold large scale classroom projects
- experience with learning project management in their college classrooms.

The post-test surveys measured participants knowledge of the following items:

- ability to describe scrum project management in their own language
- ability to define terminology of scrum project management
- self-reported overall understanding of scrum project management
- self-reported opinion on applying scrum project management to their own group work
- tenets and underlying philosophy of scrum project management
- ability to apply scrum project management to a scenario

Before I provide the results and discussion of the data, it is important that I discuss several criteria which may have skewed the results in order to help the reader interpret the findings.

First, the post-test survey results of the experimental group suggest that there was some confusion about the distinction between scrum project management and *Scrummage*. When asked about scrum project management in the post-test survey, many participants responded with information about *Scrummage* and its gameplay rather than scrum, the project management style. This confusion most likely arose during the description of the game at the outset of the experiment. Participants only learned that they would be playing a game about project management. I did not tell them what they could expect or hope to learn from the game.

However, because the purpose was not clear and the name of the game (*Scrummage*) could be easily confused with the phrase "scrum project management" when encountering it for the first time, several respondents completed the post-test survey questions about the practice of scrum project management with information about *Scrummage* gameplay.

Second, time constraints of the experimental testing limited the amount of time that experimental group participants had to respond to the post-test survey. Due to the 75-minute class session length, by the time the participants finished playing *Scrummage* and moved onto the post-test surveys they had only approximately 12 minutes to complete the survey. Compared to the control group, which had more flexible time due to individual lab attendance for testing, the time constraints of the experimental group led to many incomplete or responses to the write-in questions on the post-test survey. This also speaks to the greater time commitment for incorporating games into the classroom. Beyond just the playing of the game, there is the learning of the game, the troubleshooting of the game, and the packing away of the game to take into account. In an actual course, reading the game's rules and learning how to play could be done outside of class, but that was not an option during my data collection. There is a high probability that the divergent time allowed for post-test completion by the experimental and control groups skewed the results of the post-test survey in terms of quality and quantity of writing in favor of the control group.

In describing the results, rather than discuss the pre- and post-test results separately, I will discuss three overarching topics that developed from my coding schema during the data analysis: attitudes toward project management, knowledge of scrum, and the ability to apply scrum to a project scenario. Pre-test results will be described holistically across experimental and control groups, while post-test results for each group will be described independent of the other group.

The experimental group had 12 participants (n=12) and the control group had 24 participants (n=24), bringing the total number of participants to 36 (N=36).

Attitudes toward project management

The pre-test measured respondents attitudes towards project management and their experiences with project management in their college careers. When asked if they felt project management is an important skill for technical communicators, participants across experimental and control either strongly agreed (16) or agreed (20) (Table 6.1). The overwhelming support from participants for the instruction of project management aligns with research examined in earlier chapters (Meloncon & Henschel, 2013; Whiteside, 2003). Even as non-experts, the participants in both the experimental and control group agreed that project management is a critical skill for students of technical communication to learn. Since the question did not specify the type of project management, it allowed participants to respond using their own understanding and interpretation of project management to bear upon their response. The support for its importance in their eyes is perhaps even more valuable in consideration of this fact, since they recognize that project management in at least *some form* is worth discussing.

Strongly agree	Agree	Disagree	Strongly disagree
16	20	0	0
44%	56%	0%	0%

Table 6.1: Project management is an important skill for technical communication and technical writing

When asked about whether or not they had a system for dividing tasks among group members during group work, participants responded as follows: strongly agree (7), agree (21), disagree (7), and strongly disagree (1) (Table 6.2). While the majority of participants feel that

they have a system for group work that they rely upon, responses to other pre-test questions suggest that these strategies may not have been explicitly taught to them via coursework (Table 6.3).

Strongly agree	Agree	Disagree	Strongly disagree
7	21	7	1
20%	58%	20%	2%

Table 6.2: I have a system to divide tasks among members that I encourage my group to use

Participants had mixed experiences with project management instruction in their college careers. Five (5) participants strongly agreed and fifteen (15) agreed that they had been taught how to manage a project through their college courses, while fourteen (14) participants disagreed and two (2) strongly disagreed that they had been taught instruction on project management within formal higher educational settings (Table 6.3).

Strongly agree	Agree	Disagree	Strongly disagree
5	15	14	2
14%	42%	39%	5%

Table 6.3: My college classes have taught me how to be a good project manager

Strongly agree	Agree	Disagree	Strongly disagree
22	13	0	1
61%	36%	0%	3%

Table 6.4: I think project management will be important in my future career

Overwhelmingly, participants anticipate that their post-college careers will require they are able to effectively manage projects. Only one (1) participant across both groups strongly disagreed that it would be a requisite for their work (Table 6.4). Responses seen in Table 6.3 and 6.4 suggest a negative correlation among participants between the pedagogical input they have received about project management in their classes and the fields that they anticipate entering in their post-collegiate careers. The disproportionate overlap between how many participants feel they received sufficient project management experience in their post-secondary education and their belief of the import it will hold in their future careers is concerning. Only 56% of participants felt that their college courses had taught them how to be a good project manager, while 97% of the respondents felt project management would be important in their future careers. These results are reminiscent of Whiteside's (2003) findings. In her study, Whiteside found that 33% of recently graduated technical communication majors' project management skills "needed work" (Whiteside, 2003, p. 310). Sixty percent of the managers Whiteside interviewed felt that "newly-graduated technical communicators lacked project management experience" (p. 312). Although her study was completed fifteen years prior to this work, my own research findings suggest that there is still much work to be done in the education of technical and professional communication students with regards to project management pedagogy (at least based on self-reported student perception).

After finishing their respective tests, participants for each group completed the post-test survey and were asked how confident they felt about applying scrum project management to their own group projects in the future. Responses for the experimental and control group have been separated and are provided in Table 6.5. Percentages have also been included for responses due to the discrepancy in participant numbers between the experimental and control group. The

hope is that these percentages will help the reader more easily interpret the number of responses to a prompt in relation to the rest of the participant group.

Strongly agree		Agree		Disagree		Strongly disagree	
Exp.	Ctrl.	Exp.	Ctrl.	Exp.	Ctrl.	Exp.	Ctrl.
2	5	7	14	3	4	0	1
17%	21%	58%	58%	25%	17%	0%	4%

Table 6.5: After this activity, I feel I could apply scrum project management to my own group projects

In total, 75% of the experimental group strongly agreed or agreed that they could apply scrum project management to their own group work after the test session, while 25% did not feel the activity provided them with enough groundwork to do so. In similar fashion, 79% of the control group strongly agreed or agreed that they could apply scrum to a group project after reading the second chapter of Rubin's *Essential Scrum*. However, 21% of the control group did not feel that they chapter alone gave them the knowledge and practice to apply it to their own projects. Although the percentages of positive and negative responses across both groups is similar, it is important to remember that several of respondents from the experimental group conflated scrum (the project management system) and *Scrummage* (the game). Therefore, when responding that they did or did not agree that they could apply scrum to their group projects, it is not entirely clear to which they are referring. They may have been considering how the game would operate in a group in their other class projects, or possibly they felt confident that they could teach it to other players in a group. Resolving this issue in future testing will require clarification and testing of the experimental testing script.

Knowledge of scrum project management

When asked about their knowledge of scrum project management in the pre-test survey, all of the participants in both the experimental and control groups, with the exception of one participant in the experimental group, reported that they were unfamiliar with the concept. In the post-test survey, participants were asked to describe scrum project management to a friend in three to six sentences of their own language. Participants were not permitted to refer back to the test material (*Scrummage* for the experimental group and Rubin's chapter two for the control group) while providing their answers to the post-test survey. Participant responses were coded using a schema that analyzed them for keywords and concepts about scrum project management and then categorized as viable or unviable. For the control group, 50% (12) of the responses were coded as viable explanations of scrum project management, while the other 50% were coded as unviable. Conversely, only one of the participants from the experimental group constructed a response that satisfied the viable coding schema. When asked to craft a description of scrum project management to tell to a friend, eleven of the twelve participants of the experimental group instead provided descriptions related to the game of *Scrummage* instead of the project management system. Indeed, the only participant of the experimental group who presented a *viable* explanation of scrum project management was the participant who was familiar with scrum prior to playing *Scrummage*. As previously stated, I see these results of the experimental group as a product of unclear data collection materials rather than a failure of the participants to grasp the concept of scrum project management. Many of their responses to the prompt were impressive articulations of how *Scrummage* functions as a cooperative group building exercise, but did address the underlying project management framework it was built upon.

On the other hand, an example of a viable response to the prompt came from Kaitlyn in the control group. She responded with:

> "The scrum project management system is a way to break up a project into smaller sub-sections or tasks to accomplish [sic]. The tasks are broken down into smaller, more manageable task [sic] that can be completed in a shorter timeframe. This allows everyone on the team to give their focus to that one task without feeling overwhelmed by the entire project."

Kaitlyn's response successfully explains how scrum is a way of managing time and resources. It attends to how the system is useful for prototyping (although she doesn't use that language) with a focus on a working product, if not necessarily aesthetically satisfying. Conversely, an unviable explanation for this question can be seen in Kirsten's response from the control group. She wrote:

> "Scrum is a process that can be implemented when managing a project. It involves a Project owner, ScrumMaster, and a development team. Each play a specific role to help organize and manage projects."

Kirsten's response does not fulfill the coding schema due to the tautological nature of the explanation. Despite the identification of scrum project management team members, she does not explain how they relate to one another or how scrum stratifies the tasks and goals for a particular project.

Participants were also asked a series of multiple choice questions about some of the underlying philosophies and organizational structures of scrum project management. When asked, "What is Scrum," participants selected from the following choices:

- a process framework with a standard set of process prescription (correct)

- a software development methodology
- a philosophy or way of thinking based on some principles
- delivering products frequently, conducting daily meetings, and having demos

A majority of both groups correctly identified scrum as a process framework (Table 6.6). However, it remains unclear if the experimental group was identifying the board game as a process framework or the project management system itself.

Correct		Incorrect		N/A	
Exp.	Ctrl.	Exp.	Ctrl.	Exp.	Ctrl.
8	17	2	7	2	0
66%	71%	17%	29%	17%	0%

Table 6.6: What is Scrum?

Participants were then asked to "select the most *correct* statement" regarding scrum. Their options included:

- Scrum improves the productivity of project members (correct)
- Scrum reduces the cycle of time for projects
- Scrum requires less effort to deliver a project
- Scrum is inexpensive

The experimental group performed exceedingly well on this question (Table 6.7). Ninety-two percent of the experimental group participants answered correctly while 71% of the control group correctly identified the answer. The high number of correct responses to the question by the experimental group may have been skewed due to the knowledge that *Scrummage* was designed to be used in group classroom setting. However, being cognizant of this knowledge

may also help players of *Scrummage* be more reflective of how the game is acting upon them as a learning tool and critical of the concepts it is attempting to teach them.

Correct		Incorrect		N/A	
Exp.	Ctrl.	Exp.	Ctrl.	Exp.	Ctrl.
11	17	1	7	0	0
92%	71%	8%	29%	0%	0%

Table 6.7: Select the most correct statement

Subsequently, participants were asked about the characteristics of scrum project management. Of the following options, they were asked to select which is *not* a characteristic of scrum project management:

- Leadership at the top (correct)
- Culture of empowerment
- Continuous learning (keeping up to date with skills)
- Responding to new concerns with speed

Both the game and the textbook did a moderate job of conferring the structure of scrum to the participants (Table 6.8). The experimental group was nearly split with 58% correctly identifying the lack of top-down leadership for scrum. The control group performed slightly better with 67% responding with the correct answer. It is possible that the diagrams from the textbook chapter displayed the relationship among managers and employees more coherently than the current version of *Scrummage* was able.

Correct		Incorrect		N/A	
Exp.	Ctrl.	Exp.	Ctrl.	Exp.	Ctrl.
7	16	5	8	0	0
58%	67%	42%	33%	0%	0%

Table 6.8: Which of the following is not a characteristic of Scrum project management?

The final survey question about the participants direct knowledge of scrum asked participants to determine which of the following four qualities is not part of scrum project management:

- Design up front (correct)
- Flexibility
- Embracing change
- Self-organized project teams

As I have described in previous chapters, scrum relies on rapid prototyping cycles to achieve a working product. Design happens during the development cycle rather than at the beginning of development as with traditional waterfall models of project management. Sixty-seven percent of the experimental group correctly identified that ‘design up front’ was not a quality of scrum project management, while 54% of the control group selected the correct answer (Table 6.9). Although inconclusive, it is possible that the gameplay of *Scrummage*, which allowed for players to assign their respective worker tokens across a variety of tasks in any format they saw fit to complete the tasks, permitted the experimental group participants to experience the flexibility and team self-organization of scrum as they played and performed the game more so than reading about the ideals in a textbook.

Correct		Incorrect		N/A	
Exp.	Ctrl.	Exp.	Ctrl.	Exp.	Ctrl.
8	13	3	11	1	0
67%	54%	25%	46%	8%	0%

Table 6.9: All of the following are part of Scrum project management except?

Ability to apply scrum to a project scenario

The final question on the post-test survey asked participants to respond to a scenario using scrum project management. The scenario prompt was presented as follows:

> Norfolk snow day and Scrum project management: The parking lot of the local Target store has been covered in snow and needs to be shoveled. Using what you have learned from your activity, write a proposal for using scrum project management to remove the snow. Assume that you have two colleagues to help you, that you each have your own shovel, and that the project will take one week. How would you sort the tasks required and remove the snow using Scrum project management?

The responses were coded for the following information and ultimately determined to be *effective* or *ineffective* applications of scrum project management:

- Use of sprints
- Breaking down tasks in the method of scrum
- Scrum vocabulary and accurate use of its application

As indicated above, due to the time constraints of the testing there was a discrepancy in the quantity of words per response to this scenario between the experimental and control group. On

average, the control group participants wrote 37 more words for this response than experimental group participants, leading to much more detailed answers.

The time constraints coupled with the conflation of scrum project management and *Scrummage* led to only one of the ten responses from the experimental group being an *effective* application of scrum to the scenario (it was--once again--the participant who was already familiar with scrum prior to the experiment). Two of the experimental group participants opted-out of the prompt. Within the control group, 11 participants crafted responses that were coded as *effective*, 12 were coded as *ineffective*, and one participant abstained. While many of the responses across both groups would, in reality, work perfectly well in servicing the requirements of the hypothetical parking lot, it was coded as ineffective if it did not include a sufficient use of scrum based on the coding schema.

We can see an example of an effective response to the prompt from Kirsten of the control group. Although, as we saw previously, Kirsten had difficulty displaying her knowledge of scum beyond the roles that were included, she presented an exceptional response to the shoveling prompt. She wrote:

> I would start by making a list of the areas that need to be shoveled (Ex. parking lot, walkway, doors, etc.) I'd determine the importance of what should be shoveled first, and how long each task will take. Then, I would segment the task in to spirits [sic], probably by days because the project will only take one week. Each day, I will meet with the other two colleagues to discuss the progress. At the end of the week when we're done, I will review the work and determine if there are any sections we missed or need to do over. If so, I'd start the process again.

In this response, Kirsten successfully utilizes the elements of scrum to break down the job of clearing the parking lot of snow. She begins by setting up the product backlog ("making a list of areas that need to be shoveled") before moving into prioritizing the tasks ("determine importance of what should be shoveled first") and making estimates for how long each task will take. She then determines that each sprint will last one day and establishes daily scrum meetings with her colleagues to update each other on their progress ("each day, I will meet with the other two colleagues…"). She concludes her response with a sprint review in order to reflect upon progress of her team and establish if they need to redo any of the sections of the parking lot. While Kirsten does not use a substantial amount of scrum terminology to describe her process, the way in which she structures the work, assigns tasks to team members, and meets to review and reflect upon progress demonstrates a sufficient understanding of how scrum can be utilized to manage a variety of tasks and an effective application of scrum to the scenario.

Conversely, Kaitlyn, who previously presented a viable explanation of scrum, struggled to apply the explanation and knowledge to the snow day scenario. In her response to the scenario, she wrote: "I would divide the lot into seven sections and work together to have one of the seven sections cleared each day to spam [sic] the week long timeframe." While, in theory, this could be a perfectly acceptable method for clearing the hypothetical snowed-in parking lot, it does not apply scrum project management to the scenario in a way that demonstrates an acceptable level of post-test knowledge. While Kaitlyn does create a product backlog ("divide the lot into seven sections"), she does not apply sprints, scrum meetings, or reviews to the scenario. It does suggest the use of a team-based problem-solving methodology, but not one that is dependent on scrum.

Whereas the limited number of effective responses from the experimental group was due to the confusion over *Scrummage* and scrum as a project management style, the near 50/50 split of effective and ineffective scenario responses for the control group could have been dependent on a number of factors. The chapter from Rubin's textbook which the control group read situated its discussion and explanation of scrum project management in the context of a corporate office setting. It is possible that many of the participants had difficulty translating the project management style from a corporate solution to a solution for a physically-demanding outdoor task. The choice to use shoveling snow, an activity that many participants were most likely familiar with either firsthand or through another source, was due to the familiarity of the activity. It would not require the obscure subject matter knowledge or vocabulary. However, the fact that it was a familiar activity may have worked against the participants in crafting a viable response to the prompt. Participants may have relied upon previous knowledge and methods of shoveling snow and may have developed their solution to the prompt based on past experience and strategies. In future testing, the scenario will likely be changed into one that reflects a corporate setting that connects more explicitly with the information from the Rubin chapter and *Scrummage*. There is also a reasonable expectation that the scenario could have been unfamiliar to participants due to their ages (18-24) or the region of the country they are from, so they would be less likely to rely on past experience, encouraging them to reflect more directly on how the information about scrum from the experimental materials (game or book chapter) could be used as a solution.

Scrummage response and limitations

Despite the limited amount of information I was able to collect due to the problems with the data collection methods, experimental group participants were generally positive about their experience with *Scrummage*. In response to the post-test survey prompt "describe scrum project management to a friend in 3-6 sentences," one of the experimental group participants, HopeAnn, described her experience with *Scrummage* as "a game that seems overly complicated at first, but is actually incredibly riveting once you get used to the mechanics. Would 100% recommend." Andrew, another experimental group participant, also wrote that *Scrummage* is "a team board game, complicated but fun and educational." Although the phrasing of the survey questions and testing script may have been confusing or misleading to the participants in the experimental group, their survey responses nevertheless demonstrated that they could see the application of both scrum and *Scrummage* to a group project at a rate comparable to that of the control group.

The quality of responses from the control group compared to the experimental group suggests that there needs to be a greater integration of pedagogical materials related to scrum within the game itself. Featuring more pieces of information about scrum project management on the playing cards or as marginalia on the gameboard would offer *Scrummage* players greater context for the movements, actions, and content discussions that they are performing in the game and how those mechanics connect directly to scrum project management. The concerns over decontextualized pedagogical testing tools have been well-documented (Abell, Jung, & Taylor, 2011; Jang, 2011; Fry & Villagomez, 2012) and *Scrummage* would benefit from several more rounds of testing with more explanatory materials "baked into" the game itself. For example, instead of only including a single label for each section of the gameboard (sprint, product backlog, etc.), additional language and artwork on the gameboard could help draw distinctions

about the various stages of scrum project management. For future testing, I will revise the gameboard and card design of *Scrummage* to include more information about scrum project management and then run two gameplay sessions with pre- and post-tests again. My goal will be to see if the updated designs improve understanding a retention of information about scrum project management. My own data collection process faced concerns about context as well since, ideally, students would encounter *Scrummage* as part of unit on project management and scrum. It would potentially be augmented by the Rubin reading presented to the control group which would provide a greater context for some of the gameplay as well. Introducing participants to a process as complex a scrum project management and asking them to process and apply that knowledge while also (in the case of the experimental group) learn the rules of a new game may have simply asked too much of them for such a short timeframe.

Beyond the design, development, and testing of *Scrummage,* there were some early stage challenges in moving this project through the Internal Review Board (IRB) at my home institution. I discovered that using a playtesting methodology and the IRB approval process are in conflict. In playtesting, the researcher/designer expects the methodology to change through player use, refining and honing the rules, mechanics, and aesthetics of the game through the various versions. However, the IRB approval process at Old Dominion University requires that the protocol be explicitly stated ahead of time. This becomes problematic when the entire intention of the methodology is to solicit opportunities for change through the participants experiences with the game. Providing appendices with protocols explicitly stated circumscribes and truncates the benefits of playtesting before they have the opportunity to take shape. For example, I was restricted in how specific my playtesting questions were permitted for each version of *Scrummage*. While I would have preferred to ask participants about specific updates

and changes to each version of the game, I would have had to return to IRB for each round in order to obtain approval for each round of questions in order to include the data in this dissertation. Instead, my playtesting questions were limited to more general inquiries about the participants' response to the game, which sometimes made it difficult to determine if the changes between the versions of *Scrummage* were meaningful or not. As such, I was unable to delve into significant detail regarding many of the developments during the playtesting sessions prior to the learning outcomes testing. Even beyond the playtesting stages, early on I had to create a learning assessment survey when I was not yet sure exactly *what* the final game would look like or *how* it could potentially teach scrum project management.

The conflict between IRB and playtesting data collection for this project is indicative of the larger questions surrounding the design, development, and deployment of games in academic institutions. There is no space in the protocol for *play* or, subsequently, *playtesting*. Play certainly needs limits to function, but it also requires leeway to explore the multitude of paths and boundaries within those limits. While incorporating premade games into the classroom fits within traditional IRB approval processes as most other learning tools do, designing and playtesting a functionally applicative game which purports to change in the player requires development and testing through several iterations. If the academy truly wants to explore the possibilities of games within its institutional culture and organization, then individuals within it must insist on creating space for the forms and avenues that the medium may take.

Regardless of these institutional restrictions that need to be navigated for game design testing, this project and these challenges I have outlined are an important reminder of how the methods *themselves* for game design projects which intend to report out player data and responses are dependent upon iteration. From a design perspective, the data collection methods

become a guiding hand which guides game designers choices surrounding mechanics, dynamics, and systems of their game. Data collection methods become part of the game design process, and subsequently, part of the game itself. In this way, the IRB process and its methodological approval serve as an unwitting collaborator in the design process. Although it will vary by institution, since my IRB was approved during the very early stages of *Scrummage* development, the reminder of the game design operated through the constraints laid out by the approved data collection methods.

Just as I have argued for the iterative nature of game design in this dissertation and demonstrated it through the design process of *Scrummage*, we should consider how the development and dissemination of a set of methods is iterative as well. As the shortcomings of the current data collection process that I have discussed in the chapter suggest, future testing and data collection will require significant restructuring. For future data collection, I will update the methods in the following way. First, I will update the pre- and post-test data collection surveys. Their language will be updated for clarity and I will obtain feedback from other researchers to ensure that the instruments are coherent and collecting the appropriate and relevant information. In particular, I will update the scenario prompt about shoveling snow to one more closely situated in the corporate environment, which will (hopefully) encourage participants to role-play as a scrum project user more easily. Secondly, I will add a short introduction, summary, and history about scrum project management to the beginning of both the experimental and control group. This introduction will provide more context to *Scrummage* and the reading, giving participants in both groups more guidance in its distinguishing features from other forms of project management and why it was created. Third, instead of single testing session for data collection, I will run multiple data collection sessions of both *Scrummage* experimental group

and the textbook chapter control group. The sessions will all run for the same amount of time (120 minutes). Having a wider set of participants while controlling for experimental testing time ensures data metrics that will offer greater reliability. Lastly, if resources allow, I will include one or two additional observers to take observational notes during data collection. Particularly during the *Scrummage* group testing, observational notes will be useful for tracking and measuring actions and engagement of participants that the pre- and post-test surveys may miss. In particular, field notes can record when participants are verbally making connections between elements of game and aspect of scrum project management.

Conclusions and future directions

Based on the findings of the experimental and control group testing, I would recommend utilizing *Scrummage* in the technical writing classroom with some reservations. Even with the problems during the data collection phase due to time constraints and inconsistent methods, it is clear that *Scrummage* can bring educational value to technical communication students' experiences when learning about project management. The data set collected from this initial pilot study suggests that, to a limited degree, *Scrummage* offers players/learners knowledge of how scrum project management functions beyond the scope permitted by traditional textbooks. Although the experimental group participants did not score as highly as the control group on the knowledge of scrum questions on the post-test, they did perform well enough to indicate that there are positive pedagogical outcomes produced by *Scrummage*. The game could compliment a technical communication course module on collaboration, offering students the opportunity to engage with project management rituals in-game before attempting to apply them to their own project later in a course.

Responses to the surveys from the data collection described in this dissertation suggest that, while *Scrummage* may have been useful for giving participants the opportunity to explore the interactions among elements of scrum project management, it did not include an adequate amount of in-game context for the scrum terminology, interactions between players, or visualization of how the various stages of scrum interact with one another. While the players demonstrated sufficient and oftentimes enthusiastic understanding of the gameplay of *Scrummage,* the comprehension of the project management system based on solely on the game was limited. This concern speaks to the larger problem of designing functionally applicative and educational games. Learning how to play a game and coming to understand how the various game mechanics work together to form the gameplay is an achievement in learning in itself. Tracing the impact of specific educational content in the game requires multiple versions of the game with small changes across each one. Running the tests required on each version and processing the results would impractically time-consuming. There are also questions about the contextualization of the game for learning. To what degree does reading the rules to the game improve the learning outcomes? Does receiving an introduction to the game via instructor lecture improve the learner's understanding of the content? What is the most effective way to debrief after playing the game? While post-test surveys are effective for quickly collecting quantitative data, they may not necessarily be the ideal learning solution. These questions, for the time being are outside of the scope of this project.

Future development and testing of *Scrummage* will utilize focus group testing to discover more details about the group dynamic within each particular play session. Beyond responding only to information about scrum project management, I want to learn more about the players' levels of critical immersion (Mariani, 2016). Critical immersion refers to players' ability to

critically contextualize their own in-game actions. Critical immersion analysis moves beyond player response to gameplay mechanics and rules, examining how players sought to embody their specific role in the game. For example, the *Scrummage* player taking on the role of Designer might be asked to consider in what ways the game made them feel as if they really entered the *role* of a designer. I can speculate that, due to the relatively abstract nature of the current build of *Scrummage*, there would be a low level of critical immersion for players. Providing more time for qualitative data collection in future playtesting will help shape the game in ways that are more meaningful for players.

Although this project has not been able to address conceptualizations of play at work, it would be prudent to briefly acknowledge the importance and consequence of play present within *Scrummage.* Brian Sutton-Smith (1997) claims that the "belief in play as progress is something that most Westerners cherish, but its relevance to play has been more often assumed than demonstrated" (p. 9). Prior to developing *Scrummage* and testing it, there was the assumption that, as a tool that requires play from its users, it has the ability to transform the player. I cannot untangle my bias as the designer, developer, educator, and researcher from the goals and intent of the game. Obviously, I would not have built and designed *Scrummage*, found people to play it, collected data, and attempted to make sense of it if I did not believe that it was going to have an effect *somewhat* related to what I expected. As Warmelink (2014) reminds us, "thinking of games as causes of individual or organizational learning effect reveals an instrumentalistic perspective on gaming's objective. Games are considered as designed artifacts that create a learning experience with a clear start and ending" (p. 5). Arguably, all functionally applicative (or educational, or transformative) games demand a degree of instrumentalism in their design. Instrumental play becomes problematic when the designer knows the exact path and outcome of

the game from the start and the players are only engaged so that they can reproduce and complete the rules of the game. *Scrummage* utilizes instrumental play by requiring players to calculate card totals and "solve" sprints by managing their dice rolls in the most effective ways, but the high levels of variance in the game (such as which task cards are drawn, dice rolls that are earned, and event cards drawn between rounds) prevent the game from being a "solvable" puzzle with a single solution.

As Gosset (2012) states, "modern theories of project management combine quantitative and qualitative means to measure project success or failure" (p. 371). Any (effective) project management teaching tools will offer some combination of these metrics. *Scrummage* offers quantitative measurements in the form of tasks completed and collected, while qualitative assessments emerge through discussion among other players. While the data collected and presented in this pilot study provides insight into how well the player comprehended several of the quantitative metrics, I hope to capture and analyze more player-to-player discussion during the gameplay and code the conversations using schema to better understand how players work together to comprehend the affordances and constraints of scrum project management present within *Scrummage*.

Perhaps even beyond my original research questions and determining whether or not *Scrummage* would be effective at helping technical communication students learn scrum project management, this project has provided a significant degree of insight into the process of designing and playtesting educational or functionally applicative games. For starters, the playtesting and learning outcomes testing sessions for *Scrummage* point towards a similar problem with game design of this nature: what happens when the game becomes *more real* than the topic it is supposed to be teaching? Seeing how the participants of the learning outcomes

testing conflated the game with the subject it was teaching in their post-test evaluations prompted me to rethink including the name in future, one-off playtesting sessions. Simply introducing participants to the game's objective and rules could create a smother testing experience. In leaving out the name of the game, it could create a space in which the facilitator could include a prompt on the post-test survey where the participant recommends a name for the game. Even if players do not come up with particularly snappy names, gathering suggestions this way could illuminate for the facilitator/game designer what the players understand the central aspect or message of the game, helping them in the future with promoting the game. As a finished product, having a game name that reflects the central tenets of the game is ideal, but for playtesting it may be a better option to deemphasize the name of the game.

Additionally the affective potential of functionally applicative games became clear through the testing sessions. Across nearly every response to the question 'what did you learn about scrum project management?' during playtesting, participants mentioned the importance of communication. I included that question during playtesting to get a general sense of what, if anything, the game was communicating about scrum project management during the alpha stages. In addition to letting me know that one of the major concerns about scrum (the communication during the sprint) was occuring, their feedback also signaled an openness to learning more about the subject. One playtester wrote that she wanted to "play more after learning how scrum works," while another added that "scrum seems confusing at first, but playing the game make it easier." While this affinity for the subject could have emerged from the playtesting context (I was an interloper in their class who allowed them to play a game for extra credit), I cannot be so cynical as to believe that the entirety of their interest derived from that. Instead, I would argue that these responses are evidence of the affective impact of games that

have been consciously and thoughtfully designed to create an experience for the player/learner that is connected to learning outcomes while also respecting the limitations of games as a medium.

This project shows the potential for game design in technical communication. The process of game design offers multiple benefits for technical communicators. Game design is about creating and applying systems and offering those systems an opportunity to interact with each other in order to explore the results. The resulting interactions create the simulation that the game reflects. Technical communication practitioners, I would argue, are often called upon to act as simulation mitigators. Their work sometimes requires that they enable their intended users to avoid or bypass certain scenarios so that the users can reach their intended outcomes. For example, a technical writer for an automobile's user manual is responsible for knowing the numerous outcomes of interactions of the complex systems associated with the particular vehicle. However, her work as a simulation mitigator is to ensure that the users are able to find their answer to specific simulation queries within the manual. Game design provides a potential way to explore how the simulation (and its mitigations) lead to failure states when using the owner's manual.

So, while it may not be the most financially prudent for an automobile company to produce a game to test its vehicle owner manuals, the point that the possibility that game design offers to technical communicators as creators and designers of systems still stands. As I have discussed in this dissertation, scrum project management is a system for organizing large-scale projects into smaller goals which are refined through iterations over time. As is the case with any subject, there are countless ways to explain this concept to learners. Because scrum project management is a highly-technical process though, I approached the project as a technical

communicator. That is, I felt it was my goal to find the simplest and more effective method to communicate to my audience (playtesting and learning outcomes participants) information about scrum project management. I reached the conclusion that designing a game about scrum project management would have both the most significant impact on the audience's understanding of scrum's intricate systems and help them understand the complex interactions among those systems. As the results of the testing showed, even while there may have been misinterpretations of the elements of *Scrummage*, the players were able to experiment with the interactions permitted by the game to see the potential relationships, responses, and conflicts among them.

This experimentation of interaction, I believe, is one of the critical affordances that game design has to offer the field of technical communication. Game design offers a way to move beyond the historical privileging of expediency by technical communication in favor of developing simulative knowledge for a subject. Of course, this is not to say that simulations cannot argue for dubious ethical outcomes through their systemized object interactions. Game design offers technical communication an avenue to respond to Katz's concerns about the ethics of expediency in technical writing (Katz, 1992). Katz reminds us of the deliberative nature of technical communication, arguing that "technical writing, perhaps even more than other kinds of rhetorical discourse, always leads to action, and thus always impacts on human life; in technical writing, epistemology necessarily leads to ethics" (Katz, 1992, p. 259). However, this deliberative nature of technical communication becomes muddied when presented through game design. Game design--both the act of creating a game and playing a game--is a sort of ethical testing ground. The designer decides how to permit the game's agents, elements, rules, and dynamics to interact with each other and the player then explores those permitted interactions through playing the game. Unlike traditional forms of technical communication, good games and

game design are, ideally, less concerned with the quickest route from point A to point Z and more concerned with offering a playful, exploratory space for systems learning for users. Having technical communicators design games, in one way, responds to Katz's call for more ethical forms of technical communication. Game design encourages technical communicators to consider the multitude of possibilities for their intended audiences and how those audience may become stymied or derailed in working towards the goal of the piece of technical communication.

Game design as discursive practice permits technical communicators to lead users not "to act" in a singular sense as Katz suggests, but to multiple actions. As technical communication becomes more and more concerned with simplifying and communicating complexity, game design permits that complexity to be laid before the user. *Scrummage*, for example, demonstrates the complexity of scrum project management, but also how that complexity can be an advantage over a less complex and less flexible project management system. Game design permits space for users to respond to the extraneous forces that may impact the messaging of the technical artifact. For example, in the case of *Scrummage*, players could consider how material forces (represented by the event cards) could impact the completion of the project scenario.

Additionally, game design reminds us of the value of user failure in technical communication. Traditional forms for technical communication typically seek to avoid user failure; an easy metric for an ineffective set of instructions is if they cannot lead the user to complete the tasks they set out to finish. Failure is a significant, meaningful, and even required aspect of games though. Failure leads the player to a better understanding of how to play the game, offering a chance to repeat the failed task over and over until it is achieved. Game design, as this project has suggested, requires a lot of failure on the part of the designer to reach a

functioning prototype. The process of iterating upon a game's design to learn what does and does not work about it provides the game designer with valuable information not only about the gameplay, but about how the game fails to meet its goals. In designing a functionally applicative game, failure means that the designer learns exactly how the game does not meet its expected functionally applicative outcomes. This data can, ultimately, be more useful than instances in which the game works as intended since it provides more actionable data than successful outcomes. Gameplay that meets expected outcomes can be bypassed; gameplay that fails needs to be adjusted. In this way, failure is deliberatively rhetorical in that it impels the designer to act in some way to address the failure.

Lastly, I see the potential for game design in technical communication to address some of the concerns about project management that Whiteside raised in her survey of recent technical communication graduates that was discussed in the introduction of this project. While asking technical communication undergraduates to design games is not a project management panacea, it is scalable to nearly any level course within a technical communication or English department. Whereas Whiteside's research found that "nearly 60% of the managers responded that "their newly-graduated technical communicators lacked project management experience," asking technical communication students to design and build a game is method through which students can obtain experience overseeing a project (Whiteside, 2003, p. 312). Game design in the technical communication classroom could work as an individual or a group project, depending on the learning objectives of the course. As an individual project, game design provides students with the opportunity to execute responsibility for all sectors of a project: drafting, documentation, iterating, testing, etc. Designing a game requires that the student understand how these multiple forms of technical communication integrate with one another to create through a

process that is both creative and technical. As the project that I have discussed in this dissertation shows, in addition to teaching specific content, game design is an exercise in assessing how to communicate complex material in a simple way through the game's systems, a skill that will forever remain central to the technical communicator's identity.

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APPENDIX A

RUBIN REPRODUCTION PERMISSION LETTER

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APPENDIX B

VOLUNTARY CONSENT FORM: PLAYTESTING

VOLUNTARY PARTICIPATION: Your participation in this study is completely voluntary.

RIGHT TO WITHDRAW FROM THE STUDY: You have the right to withdraw from the study at any time for any reason.

HOW TO WITHDRAW FROM THE STUDY: Please inform the person hosting this research study that you no longer wish to participate and leave the room. There is no penalty for withdrawing. If you would like to withdraw after the playtest has ended and your materials have been submitted, please contact Matthew Beale (mbeal009@odu.edu).

PAYMENT: There is no payment for participating in this study.

FURTHER QUESTIONS: Any further questions about the research and your rights as a participant will be answered if you contact the project director: Matthew Beale, English department, mbeal009@odu.edu, 213-447-8361.

You will receive a copy of this form for your records

AFFIRMATION OF PARTICIPANT: I have read and understand the information above. Any questions I have asked have been answered to my satisfaction. I agree to participate in this activity, realizing that I may withdraw without penalty at any time. I have received a copy of this consent form.

Signature:_____ Date:_____

APPENDIX C

PLAYTESTING QUESTIONNAIRE

Scrummage game experience (circle your answer):
Rules:

The rules to the game are easy to understand:
Strongly agree Agree Disagree Strongly disagree

The rules covered all of the eventualities of the game:
Strongly agree Agree Disagree Strongly disagree

Gameplay:
The gameplay was streamlined and smooth:
Strongly agree Agree Disagree Strongly disagree

I understood what was happening in the game and why it was happening at all times:
Strongly agree Agree Disagree Strongly disagree

The game pieces were easy to use:
Strongly agree Agree Disagree Strongly disagree

The game is fair for all of the players:
Strongly agree Agree Disagree Strongly disagree

This game is fun:
Strongly agree Agree Disagree Strongly disagree

The game requires too much on luck:
Strongly agree Agree Disagree Strongly disagree

I liked the mechanics of the game (mechanics are things like drawing cards, rolling dice, etc.):
Strongly agree Agree Disagree Strongly disagree

The game was too difficult:
Strongly agree Agree Disagree Strongly disagree

I cared about the outcome of the game:
Strongly agree Agree Disagree Strongly disagree

I would play this game again:
Strongly agree Agree Disagree Strongly disagree

Aesthetics:
I enjoyed the artwork of the game:
Strongly agree Agree Disagree Strongly disagree

The art design is easy to understand:
Strongly agree Agree Disagree Strongly disagree

The theme of the game was interesting:
Strongly agree Agree Disagree Strongly disagree

Community/Cooperation:
Communication was important to success in the game:
Strongly agree Agree Disagree Strongly disagree

I felt like part of a team while I played:
Strongly agree Agree Disagree Strongly disagree

My decisions in the game mattered:
Strongly agree Agree Disagree Strongly disagree

I made a connection with the other players in the game:
Strongly agree Agree Disagree Strongly disagree

I learned about agile project management:
Strongly agree Agree Disagree Strongly disagree

I could explain how agile project management works to a friend after playing the game:
Strongly agree Agree Disagree Strongly disagree

Open-ended general reactions:
What is something you wish you could have done but weren't able to?

What were your favorite aspects of the game?

What changes do you want to make to the game?

How would you describe this game to a friend?

What was most important to your success in the game?
What did you learn about agile project management?

What was the most confusing part of the game?

Were you ever bored during the game? If so, when?

Is there anything else you would like me to know about your gameplay experience that has not been addressed?

What is your age?_____

What is your gender identity? (please circle): Female Male Non-binary

Would you like your name mentioned in the 'thank you' section of the final version of the game's instructions? If you check yes, please complete the biographical information below:
Yes____ No____

Your name:_____
Email:_____

APPENDIX D

VOLUNTARY CONSENT FORM: OUTCOMES TESTING

VOLUNTARY PARTICIPATION: Your participation in this study is completely voluntary.

RIGHT TO WITHDRAW FROM THE STUDY: You have the right to withdraw from the study at any time for any reason.

HOW TO WITHDRAW FROM THE STUDY: Please inform the person hosting this research study that you no longer wish to participate and leave the room. There is no penalty for withdrawing. If you would like to withdraw after the playtest has ended and your materials have been submitted, please contact Matthew Beale (mbeal009@odu.edu).

PAYMENT: You may elect to enter a drawing for a $75 Amazon gift card if you choose.

FURTHER QUESTIONS: Any further questions about the research and your rights as a participant will be answered if you contact the project director: Matthew Beale, English department, mbeal009@odu.edu, 213-447-8361.

You will receive a copy of this form for your records

AFFIRMATION OF PARTICIPANT: I have read and understand the information above. Any questions I have asked have been answered to my satisfaction. I agree to participate in this activity, realizing that I may withdraw without penalty at any time. I have received a copy of this consent form.
Signature:_____ Date:_____

If you would like to enter the drawing for $75 Amazon gift card, please enter your email address below:
Email:_____

APPENDIX E

LEARNING OUTCOMES PRE-TEST SURVEY

1. I enjoy working on group projects for my classes
____ Strongly agree
____ Agree
____ Disagree
____ Strongly disagree

2. I am familiar with Scrum-style project management
____ Strongly agree
____ Agree
____ Disagree
____ Strongly disagree

If you answered '**agree'** or '**strongly agree**' to question 2, please answer questions 2a-2d. If you answered 'disagree' or 'strongly disagree,' please proceed to question 3.

2a. What is a sprint in Scrum project management?

2b. What is a story in Scrum project management?

2c. What is the backlog in Scrum project management?

2d. What is the scrum part of Scrum project management?

3. Project management is an important skill for technical communication and technical writing
____ Strongly agree
____ Agree
____ Disagree
____ Strongly disagree

4. When I work on group projects in class, I have a system to divide tasks among members that I encourage my group to use
____ Strongly agree
____ Agree
____ Disagree
____ Strongly disagree

5. I have been taught how to manage a group project
____ Strongly agree
____ Agree
____ Disagree
____ Strongly disagree

6. I think project management will be important in my future career
____ Strongly agree
____ Agree
____ Disagree
____ Strongly disagree

7. My college classes have taught me how to be a good project manager
____ Strongly agree
____ Agree
____ Disagree
____ Strongly disagree

8. I am good at breaking larger tasks into smaller tasks in order to complete them
____ Strongly agree
____ Agree
____ Disagree
____ Strongly disagree

APPENDIX F

LEARNING OUTCOMES POST-TEST SURVEY

1. Describe Scrum project management to a friend in 3-6 sentences.

2. What is a sprint in Scrum project management?

3. What is the purpose of the product backlog in Scrum project management?

4. What is a story in Scrum project management?

5. What is the purpose of a scrum in Scrum-style project management?

6. After this activity, I feel I could apply Scrum project management to my own group projects
____ Strongly agree
____ Agree
____ Disagree
____ Strongly disagree

7. I understand Scrum project management more after this activity
____ Strongly agree
____ Agree
____ Disagree
____ Strongly disagree

8. What is Scrum?
____ a software development methodology
____ a process framework with a standard set of process prescription
____ a philosophy or way of thinking based on some principles
____ delivering products frequently, conducting daily meetings, and having demos

9. Select the most correct statement
____ scrum reduces the cycle of time for projects
____ scrum improves the productivity of project members
____ scrum requires less effort to deliver a project
____ scrum is inexpensive

10. Which of the following is **not** a characteristic of Scrum project management?
____ culture of empowerment
____ leadership is at the top
____ continuous learning (keeping skills up to date)
____ responding to new concerns with speed

11. All of the following are part of Scrum project management except :
____ flexibility

____ design up front
____ embrace change
____ self-organized project teams

12. Scenario: Norfolk snow day and Scrum project management

The parking lot of the local Target store has been covered in snow and needs to be shoveled. Using what you have learned from your activity, write a proposal for using Scrum project management to remove the snow. Assume that you have two colleagues to help you, that you each have your own shovel, and that the project will take one week. How would you sort the tasks required and remove the snow using Scrum project management?

VITA

Matthew Carson Beale

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Biography:

Matthew Beale is a Ph.D. candidate in the English department at Old Dominion University. His research attends to games studies, game design, technical communication, and project management.

Education:

- M.A. in English, Virginia Tech, 2006
- B.A. in English, Virginia Tech, 2003
- B.A. in Communication Studies with English minor, Virginia Tech, 2002

Publications:

- "'Good' Grief: Subversion, Praxis, and the Unmasked Ethics of Griefing Guides." Co-authored with Daniel Richards and Megan McKittrick. Technical Communication Quarterly, 2016. doi: 10.1080/10572252.2016.1185160
- Book review. *Playful Design: Creating Game Experiences in Everyday Interfaces* by John Ferrara. Communication Design Quarterly 3.2, 2015. 100-103.
- "NorthPoint Courtesy Services." Co-designed with Daniel Cox. G|A|M|E: The Italian Journal of Game Studies, n. 5, 2016. http://www.gamejournal.it/beale-cox-northpoint/
- Conference proceedings: "Designing an Agile Game for Technical Communication Classrooms." SIGDOC 2016 Proceedings, 2016.