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101UP: Implementation of a Gamified Curriculum to Increase Self-Regulated Learning Skills and Motivation for at-Risk Students in a First-Year Experience Course— an Action Research Study

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101UP: IMPLEMENTATION OF A GAMIFIED CURRICULUM TO INCREASE SELF-REGULATED LEARNING SKILLS AND MOTIVATION FOR AT-RISK STUDENTS IN A FIRST-YEAR EXPERIENCE COURSE— AN ACTION RESEARCH STUDY

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DEDICATION

To my best friend and companion, Brian. You have been my biggest source of support during this journey. Your love and your belief in me enabled me to finish my doctoral degree, for which I will be forever grateful. To my sons, Bruce and Brooks, thank you for inspiring me with your intelligence and quest for knowledge and for enduring my qualitative coding post-it-notes all over the walls. To my mom, Lynn, thank you for your patience and encouragement throughout this journey which has been a long one. To my sister, Brittany, thank you for always keeping the perils of academia in perspective with your humor and understanding. And to my dad, Bruce, I know you are smiling down on me which brings me great joy. And finally, to all of the single moms out there, this is for you. You can do it!

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ABSTRACT

The transition to college from high school is significant for at-risk students, especially as they tend to struggle with self-regulated learning skills when trying to adapt to the university environment. In an attempt to mitigate this challenge and assist students with this transition, many universities offer first-year experience courses. Nationally, however, a quarter of freshmen students still drop out before their sophomore year. The purpose of this action-based research study was to evaluate the implementation of a gamified curriculum for at-risk students enrolled in a university first-year experience course. The first research question in this study explored how and in what ways the implementation of a gamified curriculum impacted at-risk students' self-regulated learning skills. The second question explored how and in what ways the implementation of a gamified curriculum impacted at-risk students' motivation. The third question examined at-risk students' perceptions about the gamified curriculum on the quality of their learning experience.

This seven-week action research study incorporated a gamified curriculum designed to increase self-regulatory learning skills (goal setting, strategic planning, task strategies, self-instruction, help-seeking, and metacognitive monitoring) and motivation (choice, control, collaboration, challenge, constructing meaning, and consequences) for 10 academically at-risk students enrolled in a first-year experience course. I analyzed qualitative and quantitative data to include the Learning and Study Strategy Inventory (LASSI) instrument, journal reflection assignments, a Final Self-Reflection Learning

Quest, gamification elements, and learning management system (LMS) metrics. The LASSI pretest and posttest results were analyzed using descriptive statistics as well as inferential statistics including a series of paired sample *t*-tests.

Findings from this study indicated that although only one subscale of the LASSI, Self Testing, was found to be statistically significant, correlations were found between various gamification elements and the subscales of Information Processing, Concentration, and Using Academic Resources. Additionally, as a result of various cycles of coding and the emergence of themes, findings suggested that students perceived the gamified curriculum as helping to improve their academic mindset, study habits, and motivation, all while making their learning easier. Implications for instructors considering the implementation of a gamified curriculum and future areas of research are offered.

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CHAPTER 1

INTRODUCTION

National Context

The transition from high school to college is hard for the majority of students, but it is even more so for at-risk freshmen (Sun, Joo Oh, Seli, & Jung, 2017). The odds are stacked against them; over 40% of college students do not complete their degree in six years ("IES", 2018), with 33% dropping out entirely (Shapiro et al., 2017). The freshman year is especially critical, with 28% of students dropping out before their sophomore year (Shapiro et al., 2017).

At-risk freshmen tend to struggle with self-management skills when trying to adapt to the university environment (Tang & Wong, 2014). Students who drop out tend to have lower self-regulated learning skills (Vallerand & Blssonnette, 1992). In order to help mitigate these odds, many universities have developed first-year experience courses to ease students' transition to college life (Connolly, Flynn, Jemmott, & Oestrecher, 2016). Ideally, the first-year experience course helps new students adjust to the university by developing a better understanding of the learning process to acquire essential academic success. Students learn to adapt and apply appropriate academic strategies to their classes and learning experiences, effectively managing their time and priorities ("National Resource Center", 2018).

First-year experience courses are prevalent, with 78% of universities offering them (Dallin, 2018). Overall, 62% of institutions consider the course to be a general

education requirement, with 29% offering it as an elective. Interestingly, only 12% of private schools list the course as an elective, in comparison to 47% of public institutions (Dallin, 2018). This is unfortunate, as public institutions tend to have more at-risk students than private schools, yet private schools require a higher percentage of their students to take the course (Dallin, 2018).

Early on, positive correlations were found between enrollment in these courses and retention (Titus, 2004) and also between enrollment and the extent of social and academic integration into university life (Astin, 1999). This could be because academic success strategies were the number one objective for first-year experience courses at both public and private institutions (Dallin, 2018), since at-risk freshmen tend to struggle with self-management skills when trying to adapt to the university environment (Tang & Wong, 2014). As a result, 70% of institutions incorporated goal setting and planning as the pedagogical approach set forth in their first-year experience courses (Dallin, 2018). The highest quality seminars develop intellectual and practical competencies (Kuh, Cruce, Shoup, Kinzie, & Gonyea, 2008) in that they not only teach students what it means to be an educated individual, but they also teach the responsibilities that come with gaining a college education (Torres & LePeau, 2013).

Gamification offers promise to address the issues of at-risk student motivation and self-regulated learning. Specifically, the use of game-based thinking, mechanics, aesthetics, and motivational design strategies has been successfully incorporated into curriculum design in order to promote learning (Fazamin et al., 2015; Kapp, 2012; J. Kim & Lee, 2015; Su & Cheng, 2015). One reason for this is that gamification has the potential to externally motivate students (Kumar & Khurana, 2012; Nah, Zeng,

Telaprolu, Ayyappa, & Eschenbrenner, 2014; Su & Cheng, 2015), which is key to its effectiveness (Burke, 2014; Sailer, Hense, Mayr, & Mandl, 2017). The feedback associated with gamification can also empower students as self-regulated learners (Nicol & MacFarlane-Dick, 2006). Feedback strategies in gamification, such as rewards and incentives, can be effective at helping students set goals and reflect on successful learning methods (Dichev, Dicheva, & Irwin, 2018). Therefore, gamification may be a novel way to address both self-regulated learning and motivation for at-risk freshmen as part of a first-year experience course.

Local Context

In the state in which this study took place, 21% of high school graduates are not adequately prepared for any college subject area (Petcu, Frakes, Hoffman, & Young, 2016). In fact, 40% of the working-age population has a college degree in the United States, but this state falls short at only 36.8% (Petcu et al., 2016).

With approximately 2,000 undergraduate students, the Jackson Township University (JTU) (pseudonym) is classified as a senior campus within the state's public university system. JTU was founded in 1795 as Jackson College (pseudonym), but it did not become part of the larger public university system until 1959, at which time in began granting two-year associate degrees. As a four-year institution, JTU is still relatively young; JTU did not achieve baccalaureate degree-granting status until 2002. This accomplishment was widely celebrated in the region, as JTU serves an important role in its surrounding region, educating a significant population of underserved at-risk and first-generation college students. JTU accepts approximately 60% of its applicants, and the average SAT score of newly admitted freshmen is just above 1000. Forty-six percent of

the student body is eligible for Federal Pell Grants (“Jackson Township University”, 2019b).

The six-year graduation rate of the freshmen who start their college journey at JTU is only 27%. Consequently, part of JTU’s strategic plan is to create an intentional experience for first-year students that establishes a solid foundation for lifelong learning while emphasizing retention and persistence to graduation. Recruiting and retaining students from various ethnicities, cultural backgrounds, and socio-economic contexts is also listed as a goal, along with growing total enrollment from its current population of approximately 2,000 to at least 2,500 by 2021 ("Jackson Township University", 2018). Retaining freshmen and preparing them to be academically successful is a university-wide goal that aligns well with the aims of first-year experience courses across the country (Dallin, 2018).

At-risk freshmen at the JTU are lacking the necessary self-regulated learning techniques to adjust to the rigor of college academics. Therefore, these students are typically advised to enroll in a first-year experience course in order to acquire such skills. Unfortunately, the course has not been as effective at improving retention at JTU. In 2014 and 2015, respectively, only 49% and 45% of JTU students who took the first-year experience course returned the following fall for their sophomore year. This is in comparison to the respectively 58% and 55% of students who returned the following fall but did not take the first-year experience course ("Jackson Township University", 2019a). This decrease in enrollment is the opposite of the first-year experience course’s objective to increase retention. In 2016, 58% of students returned for their sophomore year after taking the course, which was close to but still less than 61% of students who

had not taken the first-year experience course ("Jackson Township University", 2019a). It is worth noting that in 2016, at-risk students at JTU were only being advised, not required, to take the first-year experience course ("Jackson Township University", 2019a), which could offer an explanation for the continued low retention rates. In 2017, the university more overtly encouraged non-at-risk students to enroll, which increased the return rate for first-year experience students to 69% ("Jackson Township University", 2019a). For the first time, this was higher than the rate of students (63%) who did not take the course. Additionally, JTU students who took the first-year experience course had a lower average overall GPA of 2.73, while students who did not take the course earned an average overall GPA of 2.99, even though retention proved to be higher for those who took the course ("Jackson Township University", 2019a).

Statement of the Problem

Given the disparity of retention and grade point average in relation to first-year experience course enrollment, JTU administrators have been actively discussing the possibility of changing the first-year experience curriculum to better accommodate academically at-risk students. In addition to the fact that JTU advisors placing at-risk students in the first-year experience course, another reason for this discrepancy may be that JTU students are not academically prepared, given their low entrance GPA and SAT scores ("Jackson Township University", 2019b). Therefore, the intent of JTU's first-year experience curriculum changes is to ultimately increase students' motivation and independent self-regulated learning skills, with the hopes of improving academic success and retention.

Purpose Statement

The purpose of this action research study will be to evaluate the implementation of a gamified curriculum for at-risk students enrolled in a first-year experience course at JTU.

Research Questions

Three primary research questions will guide this study:

1. How and in what ways does the implementation of a gamified curriculum impact at-risk students' self-regulated learning skills?
2. How and in what ways does the implementation of a gamified curriculum impact at-risk students' motivation?
3. What are at-risk students' perceptions about the gamified curriculum on the quality of their learning experience?

Statement of Researcher Subjectivities & Positionality

I believe that structured narratives and effective storytelling appropriately integrated into educational curriculum via technological mediums (i.e. film, television, video games, etc.) provide one of the most engaging forms of learning. Moreover, I posit this phenomenon will only continue to grow as access to both through creating and utilizing technology becomes more accessible worldwide.

It is this conviction that started my educational journey during my undergraduate years while working at Jim Henson Productions, a media company that used its famous Muppet characters to teach children via films, videos, and the popular television series *Sesame Street*. I went on to earn my MFA in screenwriting at Columbia University in the City of New York, and while doing so I interned at another educational preschool

program, *Blue's Clues*, whose writers used Bloom's Taxonomy (1956) as a framework to design the content of each episode. It was during this experience that I realized the importance of instructional and curriculum design as part of crafting an effective educational, yet entertaining, television narrative. The memory of witnessing the pure enjoyment of learning exhibited by the young audience members in post-production evaluation/focus groups has never left me. Learning can, and should be, fun. In this vein, I have also dabbled in videogame narratives as part of a team developing a game based on South Carolina Lowcountry folklore, espousing tangential learning (Fahey, 2016).

Prior to my time at JTU, while serving as part of the U.S. Foreign Service in Buenos Aires, I ran a U.S. Department of State English language scholarship program in Argentina for disadvantaged youth. It was during this period that I truly began to appreciate the worldwide societal benefits of education and how it can change lives.

At the time this study was conducted, I was the senior director of communications at JTU. Although university communications is a far cry from television and video game narratives, it was an excellent fit for my love of storytelling and commitment to education for all who desire it. I started as the public information officer for JTU in 2011 and was promoted to marketing director in 2012 (at which time I also taught one section of the first-year experience course). I held this position until 2015, at which time I left to accept a communication director position at a K-12 school. I returned to JTU in 2018 as the senior director of communications, supporting media relations as well as digital content, which included JTU's web and social media presences, marketing initiatives, and internal and external communications. The main goal of all of these communication platforms is to recruit students with the aim of preparing them to contribute locally, nationally, and

internationally ("Jackson Township University", 2018). At the time of writing up the findings of this study, I accepted a position as Director of Communications for a county school district that is comprised of 30 schools and 22,000 students. As a first-generation college student myself, having graduated from high school in the same county in which JTU is located, I take the region's commitment to education to heart.

I love the structure and discipline of crafting communications, and it is my belief that one must learn the key fundamentals of any given discipline before effectively exploring alternatives. This is perhaps because while at film school, it was ingrained in me that, as a writer, one must first master the three-act structure before being able to effectively deviate from it in an intelligent manner. Later, while at *Blue's Clues,* it became clear to me that any information that was extraneous to the educational goals of each episode should be removed. It was during these years that I learned to refine and remove content in order to achieve clarity and precision. Consequently, as a doctoral student in the University of South Carolina's Curriculum & Instruction Program with a concentration in educational technology, I am particularly aware of and committed to the concept of alignment. I believe that educational technology should be used to solve problems, but never for its own sake—that is, one should never to try the newest technological advancement just because one can; rather, technology should only be used when it is the most effective means of providing an applicable solution (Reeves & Oh, 2017).

I have learned that most good screenplays stem from a simple premise: a protagonist wants something, but they have trouble getting it. This aligns beautifully with my pragmatist research paradigm as an educational technology researcher. As a

pragmatist, I view my research participants as protagonists and my action research implementation as a possible solution that guides them on a journey to achieve what they want and need. Indeed, instead of focusing on methods, pragmatist researchers focus on the problem, using all available approaches to understand it (Rossman & Wilson, 1985). Thus, I was driven to design a gamified curriculum for my first-year experience students at JTU as part of my mixed-methods action-based research. Because this implementation served as a possible solution to the problem of at-risk students not possessing the self-regulated learning skills needed for the academic rigor of college and success at the university, this study embodied my pragmatic worldview.

Like many other doctoral researchers, I view my action research as a means of deepening my reflection on practice toward problem-solving and professional development. Therefore, I served as both researcher and practitioner, an insider who studies one's self-practice (Herr & Anderson, 2015). Furthermore, as is common with insider researchers, I wished to study the outcomes of an implementation (Herr & Anderson, 2015)—in this case, that of gamification. Of course, as the instructor of the class, there within lies the temptation to perhaps lean toward findings that would support said implementation, to which I was heavily committed in terms of time and intellectual development. As a safeguard against such bias, I acknowledged my presence in the study and built-in self-reflection, owning my role which provided a full-access perspective coupled with rigorous data collection and analysis (Herr & Anderson, 2015). One way for me to self-reflect was through bracketing, in which I kept a self-reflective journal, noting my preconceptions, presuppositions, and assumptions surrounding my research questions (Tufford & Newman, 2010). I looked forward to writing up said self-reflection with a

narrative hook to include storytelling elements alongside humor and irony (Herr & Anderson, 2015), something that is especially appealing to me as a screenwriter.

As a pragmatist, I appreciate that insider researchers do not pigeon-hole themselves in terms of methodology or subject matter. The fact I used mixed-methods to research a technology-dependent gamification curriculum at a university that to my knowledge has not ever seriously explored a gamified curriculum is evidence of my pioneering spirit. My appreciation of adhering to standards—and not doing things just because one can—coupled with my appreciation for educational technology mediums such as videogames, uniquely positioned me as an open-minded researcher. My interest in videogames could have been considered a bias in favor of gamification; however, I am equally committed to not doing things halfway, and yet gamification embodies the notion of an incomplete approach, since only certain elements of gameplay are utilized (as opposed to designing and developing an entire game). Thus, I was genuinely interested in seeing how my study participants would respond to a gamified curriculum. Watching this unique dynamic unfold as an insider/participant researcher aided my search for points of useful connection and further cemented the notion that yes, there is a single real world, but people—and perhaps institutions—have their own contextualized interpretations of it.

Definition of Terms

At-Risk Students: Although low SAT or ACT scores, coupled with a low class-ranking and grade point average can classify college freshmen as at-risk (Potts & Schultz, 2008), as well as students whose socioeconomic status, family status, or academic failures hinder their ability to succeed in an educational environment (Gray, 2013), for the purposes of this study at-risk students will be defined purely academically - students who have been at JTU for at least one semester, have a

grade point average lower than 2.99, and/or who have failed at least once class (Barouch-Gilbert, 2015; Campbell, Morrison, & Deasy, 2018; Cruise, 2002; Isaak, Graves, & Mayers, 2006).

First-Year Experience Courses: The majority of these courses are designed for at-risk and first-generation college students with the goal of helping them transition to university life, academically and personally, while increasing engagement and clarifying one's purpose, meaning and direction ("University 101 Programs," 2019).

Gamification: Gamification uses game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems (Kapp, 2012).

Gamification Curriculum: Badges, avatars, leaderboards are making their way into classrooms through an integration of audience response systems, online simulations, and interactive storytelling, currently known as gamification curriculums (Kapp, 2012).

Motivation: Motivation is the mental or emotional state that arouses an individual's behavior or psychological change (Kim, Song, Lockee, & Burton, 2018). It is a person's choice to engage in an activity with effort and persistence (Garris, Ahlers, & Driskell, 2002).

Self-Regulated Learning: Self-regulated learning is when learners are capable of handling choices to decide what, when, where, and how to learn (Steffens, 2006). It is defined as the ability of a learner to monitor and evaluate their own progress

with respect to self-improvement needs in the process of knowledge construction (Zimmerman, 2008).

Six C's of Motivation: Turner & Paris (1995) proposed six components that if incorporated into assigned open-ended academic tasks, will increase student motivation: (a) Choice, (b) Challenge, (c) Control, (d) Collaboration, (e) Constructing meaning, and (f) Consequences.

CHAPTER 2

REVIEW OF LITERATURE

Introduction

The purpose of this action research study is to evaluate the implementation of a gamified curriculum for at-risk students enrolled in a first-year experience course at JTU. The review of literature focuses on three main research questions: (a) How and in what ways does the implementation of a gamified curriculum impact at-risk students' self-regulated learning skills?, (b) How and in what ways does the implementation of a gamified curriculum impact at-risk students' motivation?, and (c) What are at-risk students' perceptions about the gamified curriculum on the quality of their learning experience?

The methodology for the literature review began by searching Education Source, ERIC, PsycINFO, JSTORE, and ProQuest databases for each variable associated with my research questions pertaining to gamification, specifically at-risk students, self-regulated learning, motivation, and first-year learning experience. In addition to the term gamification, the majority of searches included variations of the word, such as gamify and game-based learning. Individual Boolean searches for each variable included gamif* [and] the terms at-risk, self-regulated learning, motivation, and first-year university experience. Individual components of these domains were also searched, such as goal-setting, strategic planning, time management, task strategies, self-instruction, help-seeking, metacognitive monitoring, concentration, information processing, attitude,

anxiety, choice, control, collaboration, consequences, challenge, and constructing meaning). Additional keywords included were higher education, college, students, freshmen, and action research. Google Scholar was then used to look up articles obtained from my database searches in order to see where they were cited, providing even more articles to investigate. Finally, key articles and research-based books on gamification (e.g., Kapp, 2012; Kim, Song, Lockee, & Burton, 2018) not only proved valuable for definitions and theoretical constructs but also for the wealth of studies to mine within the context of associated chapters and sections affiliated with my research variables of self-regulated learning and motivation.

The review of literature is organized into five main sections: (a) at-risk students and college-preparedness, (b) self-regulated learning and college success, (c) motivation and college success, (d) overview of gamification, and (e) potential for a gamified first-year experience seminar. The first section defines and operationalizes at-risk students in terms of this research study and addresses challenges for at-risk students in relation to college preparedness. The second section defines self-regulated learning, its role in students' academic success at the university level, and how self-regulated learning in college has been studied. The third section defines motivation, describes the different types, and examines the overall role of motivation in students' academic experience at college and how motivation as part of the college academic experience has been studied. The fourth section defines gamification, provides theoretical frameworks associated with gamification, and describes the mechanics of gamification, the effectiveness of the mechanics used in this study, the challenges of gamification, as well as the impact of gamification in relation to at-risk students, self-regulated learning, and motivation.

At-Risk Students and College Preparedness

Students whose socioeconomic status, family status, or academic failures hinder their ability to succeed in an educational environment are usually considered to be at-risk (Dembo & Seli, 2016; Gray, 2013). Low SAT or ACT scores, coupled with a low class-ranking and grade point average, can classify college freshmen as at-risk (Potts & Schultz, 2008). For the majority of institutions, students who have less than a 2.0-grade point average after the first semester at college are put on academic probation.

The transition from high school to college is hard for the majority of students, but even more so for at-risk freshmen (Sun et al., 2017). Research has suggested that a quarter of all college students will be designated as probationary at some point during their undergraduate studies at college and approximately half will voluntarily leave prior to suspension (Campbell et al., 2018; Damashek, 2003; Seirup & Rose, 2011). Many at-risk college freshmen are lacking the necessary self-regulated learning skills and motivation required for college preparedness (Brinkworth, McCain, Matthews, & Nordstrom, 2017; Dembo & Seli, 2016). In addition, if a student comes from a high school lacking in financial resources and their family does not have money to cover a gap in educational opportunities (e.g., regular access to computers, tutors, or SAT prep courses), they are at a disadvantage when starting college as they are not adequately prepared to succeed academically (Dembo & Seli, 2016). A discussion of at-risk students' challenges in terms of self-regulated learning and motivation follows as both constructs are essential to a successful academic college experience. It has been posited that not only do self-regulated learning and motivation predict future college success

(Lambert, 2017; Sun et al., 2017; Vallerand & Blssonnette, 1992; van Rooij, Jansen, & van de Grift, 2017), but they also appear to be closely related (LeMay, 2017).

Self-Regulated Learning and College Success

Psychosocial and study skill factors are better predictors of a student's academic success at college than socioeconomic status, standardized achievement tests, and high school GPA (Robbins et al., 2004). Students who are engaged and who are actively generating meaning while adapting their thoughts, feelings, and actions as necessary to affect their learning and motivation are considered to be self-regulated learners (Boekaerts & Corno, 2005). In contrast, students who drop out tend to have lower self-regulated learning skills (Vallerand & Blssonnette, 1992). In this section, self-regulated learning will be defined and its role in college discussed along with the different types of self-regulated learning studies at the university level.

Defining Self-Regulated Learning

Intelligence was once considered the main predictor of academic success, but educators have found students can become more academically successful if they learn to implement self-regulated learning strategies (Dembo & Seli, 2016). Self-regulated learning is achieved when students are capable of handling choices to decide what, when, where, and how to learn (Steffens, 2006). It is defined as the ability of a learner to monitor and evaluate their own progress with respect to self-improvement needs in the process of knowledge construction (Zimmerman, 2008).

In examining self-regulated learning processes in terms of motivation and learning outcomes, Zimmerman (2000) put forth a model based on social cognitive theory which consists of three phases: forethought, performance, and self-reflection. This

model is cyclical, with the intent of understanding the outcomes of repeated learning efforts, predicting quantitative differences in learning, as well as explaining students' qualitative differences in self-regulation (Zimmerman, 2013). The forethought phase, which focuses on processes used to prepare for learning efforts and to enhance learning, is comprised of task analysis which is breaking a task into key components (goal setting & strategic planning) and self-motivation beliefs (self-efficacy, outcome expectancies, task interest/values, and goal orientation). The performance phase, which focuses on processes that are used during learning efforts with the intent of fostering self-control and performance self-monitoring, consists of self-control through the use of specific techniques (self-instruction, imagery, attention focusing, task strategies, environmental structuring, and help-seeking), and self-observation (meta-cognitive monitoring and self-recording). The self-reflection phase, which occurs after efforts to learn have been initiated and optimizes the learners' reaction to their outcomes, contains self-judgment (self-evaluation and casual attribution) and self-reaction (self-satisfaction/affect and adaptive/defensive). All learners will try and self-regulate, but proactive self-regulators will have a superior cyclical pattern of processes in comparison to reactive self-regulators (Zimmerman, 2013). Further, higher-achieving students tend to incorporate more learning strategies than lower-achieving ones (Zimmerman & Martinez-Pons, 1986).

Self-Regulated Learning in College

High school tends to be teacher-led, with instructors helping students manage tasks associated with finishing their assignments (Dembo & Seli, 2016). In contrast, students in college are expected to manage their own learning (Bembenutty, 2011). Some students do not recognize this difference until they are already weeks into the semester

(Dembo & Seli, 2016). In fact, time-management skills in the freshman year can be a better predictor of senior year grade point average than SAT scores (Britton & Tesser, 1991). Although self-regulated learning skills and volition are important for K-12 education, they are perhaps even more significant during the college years. College students have a greater opportunity for metacognition and self-regulated learning as college classroom environments present them with more choice and control, thus requiring more self-regulatory and motivational strategies (Pintrich & Garcia, 1993). Fortunately, students can learn various self-regulatory components, including motivation and learning strategies, to increase academic success in college (Zimmerman & Risemberg, 1997).

How Self-Regulated Learning Has Been Studied in College

There are few pure qualitative studies on self-regulated learning. Most studies use either a quantitative survey instrument only (e.g., Puzziferro, 2008; Yot-Domínguez & Marcelo, 2017) or a combination of a survey instrument and a qualitative measure, such as an interview (e.g., Bråten & Olaussen, 2000; van der Meer, Jansen, & Torenbeek, 2010) or diary entry (e.g., Pekrun, Goetz, Titz, & Perry, 2002). Quantitative components of studies that examine college students and self-regulated learning typically employ survey instruments such as the Learning and Study Strategies Inventory (LASSI) (Weinstein, Palmer, & Schulte, 1987), Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich & DeGroot, 1990; Puzziferro, 2008), or surveys designed by the researchers themselves (e.g., Yot-Domínguez & Marcelo, 2017).

In a quantitative study of 815 community college students enrolled in online liberal arts courses, Puzziferro (2008) found that although self-efficacy was not correlated

with student performance, the MSLQ subscales of time, study environment and effort regulation were significantly related to performance, and rehearsal, elaboration, and metacognitive self-regulated learning. Moreover, time and study environment were significantly positively correlated with satisfaction levels.

In another quantitative study, Yot-Dominguez and Marcelo (2017) examined 711 university students' responses to their Self-Regulated Learning at the University (SRLTU) survey in order to find out if students use technologies to enhance their self-regulated learning. Their findings suggest that apart from limited self-regulation as a byproduct of social support and collaboration tools, students make scarce use of self-regulated learning strategies while utilizing technology. Results indicate that students typically use technology for the more rudimentary purposes of searching, storing, or sharing information. The researchers suggest these types of tasks are limited if they are not coupled with activities that help the student understand, monitor, and self-assess their learning process.

Mixed-method studies can be effective at capturing students' authentic perceptions. The LASSI has been used as a pre-post achievement measure for college-level learning strategies and study skills courses (e.g., Dill et al., 2014; Weinstein, Palmer, & Acee, 2016) and for academic skills and behaviors such as time management and collaboration (Weinstein & Palmer, 1990). For example, LASSI has also been utilized as an evaluation tool to assess the degree of success with an intervention of courses or programs (e.g., Dill et al., 2014; Weinstein et al., 2016), and is especially effective for first-year experience seminar courses (Weinstein et al., 2016). In order to study self-regulatory skills in terms of motivation, Braten and Olaussen (2000) had 15

senior Norwegian education students complete the LASSI (Weinstein et al., 1987). Qualitatively, participants were also asked interview questions in connection with each LASSI subscale. Findings indicated that only the highest-scoring students ascribed value to activities associated with the scale items in terms of self-discipline and being duty oriented. In addition, students scored lower overall than most American college students, defining motivation more in relation to interest, enjoyment, and excitement than a sense of obligation. Despite the small sample size, the researchers attribute the lower scores to Norwegian students being autonomous and intrinsically motivated; their need to achieve high scores is mitigated by the fact that employment is contingent on graduation, not grades. van der Meer, Jansen, and Torenbeck (2010) used data from three distinct projects at two universities in different countries to examine over 2,000 freshman students' experiences with time management and self-study. Data were collected from their Readiness and Expectations Questionnaire as well as interviews. Findings indicate that although students know they need to manage their study schedules, they have trouble with execution. Consequently, it is suggested that universities should do more to help students self-regulate their study time.

Summary

More than self-efficacy, self-regulatory skills can lead to increased performance. Such skills can be socially fostered in a technology-based environment, even if the student does not access the environment with the intent of improving their self-regulated learning skills. It is also important to note that interest, enjoyment, and excitement also play a role in students' intrinsic desire to learn; a sense of self-disciplined duty for its own sake is less of a factor. And although students know they need to better manage their

studies, they struggle with how to make this happen. Therefore, at-risk college students should engage in educational opportunities designed to increase self-regulated learning skills if they are to achieve academic success at the university level. Of course, when students actively decide which goal-orientated actions to take as part of their self-regulatory forethought phase, motivation has a strong influence (Zimmerman & Campillio, 2003). Therefore, a discussion of motivation and college preparedness follows.

Motivation and College Success

Integral to self-regulated learning skills, motivation is essential to success in college, especially for at-risk students. Teachers play a role in developing an approach to subject mastery for at-risk populations, but student motivation is a significant contributor as well (Iwamoto, Hargis, Taitano, & Vuong, 2017). When learners believe they can achieve a learning goal because they have the skills and autonomy to do so, they are more motivated to learn (Birch & Woodruff, 2017; Zimmerman & Martinez-Pons, 1986). In this section, motivation and the various types thereof will be defined. In addition, strategies to increase motivation in learners will be discussed, as will the role of motivation in college.

Defining Motivation

Motivation is defined as the mental or emotional state that arouses an individual's behavior or psychological change (Kim et al., 2018). It is a person's choice to engage in an activity with effort and persistence (Garris et al., 2002). Motivation can be an important predictor of achievement by influencing the amount of time spent on learning (Cakiroglu, Başibuyuk, Guler, Atabay, & Yilmaz Memis, 2017; Chang & Wei, 2016;

Davis, Sridharan, Koepke, Singh, & Boiko, 2018; Groening & Binnewies, 2019; Sánchez-Martín, Cañada-Cañada, & Dávila-Acedo, 2017; Yildirim, 2017), implying the more engaged students are, the more chance they will succeed (Zainuddin, Chu, Shujahat, & Perera, 2020) Extrinsic motivation occurs when an activity is accomplished in order to obtain a separable outcome (Ryan & Deci, 2000), such as a good grade. It can be influenced by environmental and external factors like rewards or punishment (Kim et al., 2018). Intrinsic motivation tends to be closely associated with academic achievement; it comes from a person's own desire to do something for inherent satisfaction, rather than separable consequence (Ryan & Deci, 2000). Intrinsic motivation tends to have a greater impact on academic achievement than extrinsic motivation (Ryan & Deci, 2000). Moreover, it has been suggested that too many extrinsic motivators can actually decrease a student's intrinsic motivation to learn (Deci & Ryan, 2001; Hanus & Fox, 2015; Reeve, 2012).

Strategies to Increase Motivation in Learners

Pintrich (1999) suggests an adaptive profile of motivational beliefs that can ultimately promote and sustain self-regulated learning. Using this profile as a framework, educators can strive to increase students' sense of self-efficacy. They can provide coursework that students view as interesting, important, and useful while encouraging mastery goal orientation. Tasks that incorporate rehearsal, elaboration, and organization strategies foster self-efficacy have been found to positively correlate with levels of satisfaction (Puzziferro, 2008). Planning activities that involve problem analysis, developing questions before reading a passage, or activating prior knowledge, aid in student comprehension and organization of the material. Said activities can result in

setting cognitive goals for learning, igniting metacognitive knowledge students have about the activity and themselves (Pintrich, 2004). However, Pintrich suggests that self-regulated learning skills are not easily acquired and usually require scaffolding in order to be effective. The researcher also notes that in order to develop more engaged and self-regulated learners, there may be promise in combining both motivational and cognitive interventions.

Keller's ARCS Model (1987, 2010) synthesizes motivational literature into four systematic instructional design categories: attention, relevance, confidence, and satisfaction. In order to capture students' attention educators can design tasks that foster perceptual and inquiry arousal, as well as variability. Relevance can be achieved through an appropriate integration of goal orientation, motive matching, and familiarity in learning activities. Learning requirements, opportunities for success, and personal control can all be designed to foster a positive expectation for student success, competence, and self-efficacy. Student satisfaction can be met by offering students activities with natural and positive consequences that cultivate a sense of equity. Moreover, when the full motivational design process is applied, the ARCS categories can be used to effectively measure students' motivational objectives (Hamzah, Ali, Mohd Saman, Yusoff, & Yacob, 2014; Kapp, 2012; Su & Cheng, 2015).

Turner and Paris (1995) posit that motivation is not necessarily facilitated by the subject matter but rather by the actual tasks offered to students, with open-ended assignments being the most effective. Their Six Cs of Motivation are constructs that can be incorporated into a curriculum:

- *Choice*, a variety of tasks to choose from;

- *Challenge*, the extent to which tasks provide appropriate levels of difficulty, making learning experiences rewarding;
- *Control*, how much say students have in how they spend their time on tasks;
- *Collaboration*, the degree to which students are able to interact with other students during task completion;
- *Constructing meaning*, the extent to which students make sense of what they are learning in open tasks; and
- *Consequences*, the degree to which students experience positive effects from open tasks.

Self-regulated learning techniques do not happen in a vacuum; students must be motivated, either extrinsically or intrinsically, with the latter usually proving to be more effective, especially as too many extrinsic motivators can be counterproductive (Deci & Ryan, 2001; Reeve, 2012). Fortunately, there are numerous strategies that educators can use to increase motivation in college students.

Motivation in College

Motivation is one of the main predictors of college success (Grimes, 1997; Levin & Levin, 1991). In high school, teachers work to motivate students to learn, but in college, professors expect students to already be self-motivated (Brinkworth et al., 2017; Dembo & Seli, 2016). Student motivation in college is comprised of three interdependent components: (a) sociocultural factors (past experiences, socioeconomic status, peer, family, and cultural experiences), (b) environmental factors (college and classroom environment, instructional methods, behavior, and types of assignments), and (c) internal factors (students' perceptions and beliefs) (Pintrich, 2004).

Motivation is essential to college students' academic success and the development of self-regulated learning skills. In a qualitative study of community college students based on semi-structured interviews, the most prevalent theme demonstrated by graduates was their strong motivation to succeed (Martin, Galentino, & Townsend, 2014). If a student wants to control their motivation, they will need to set goals and believe in their ability to complete academic tasks even amidst disturbances, distractions, failures, and conflicts (Dembo & Seli, 2016). In a study of 91 underprepared students in college success classes and 49 college-ready students in orientation courses, LASSI scores revealed that women and non-traditional students tend to have more motivation (Grimes, 1997). In a study by Wolters (1998), 115 college students enrolled in a psychology course took an open-ended questionnaire in order to examine their strategies for regulating motivation. Data were then coded and organized into categories: extrinsic motivation, intrinsic motivation, volition, and information processing. The students also took a survey adapted from the MSLQ to assess goal orientation and strategy use. The results indicate that students monitor, adapt, and regulate their motivation for completing academic tasks and the effectiveness of their cognitive strategies. This is beneficial as it has been suggested that motivation is the main predictor of college success (Grimes, 1997; Levin & Levin, 1991).

Overview of Gamification

It has been suggested that schools, workplaces, and families can use games and gaming technologies to enhance learning and that such uses will likely become pervasive (Gee, 2003), providing a low-stakes environment in which both mastery and effort are rewarded (Lee & Hammer, 2011). This comprehensive overview of gamification includes

(a) defining gamification, (b) theoretical frameworks, (c) gamification mechanics, (d) effectiveness of gamification mechanics, (e) challenges of gamification, and (f) impacts of gamification in terms of at-risk students, self-regulated learning, and motivation.

Defining Gamification

Although gamification is growing with broad appeal and usage (Burke, 2014; Kapp, 2012), the term is still relatively new and contextually dependent; there is not one universally accepted definition (Chou, 2015; Dyer, 2015; Kapp, 2012). At its most basic level, gamification is defined as the use of game elements in a non-game context (Deterding, Dixon, Khaled, & Nacke, 2011; Werbach & Hunter, 2012). More specifically, it includes the use of activities and processes to solve problems by using or applying the characteristics of game elements (Kim et al., 2018). In addition, there is an emerging trend of using gamification to increase associated end-user goals, such as improved motivation and engagement (Kuo & Chuang, 2016; Werbach & Hunter, 2012) as well as improved attitude (Landers & Landers, 2014).

Modern-day educators are grappling with how to motivate young people amidst increasing concerns that today's educational system has not been adapted for students who have been exposed to technology their entire lives (Thurston, 2018). Gamification emerged around 2008, institutionalizing itself as a well-known term by 2010 (Deterding et al., 2011; Dyer, 2015). In trying to adapt the curriculum for these students who have grown up with technology, gamification has been offered as a solution. Specifically, educators have employed game-based thinking, mechanics, aesthetics, and motivational design strategies intended to promote learning (Hamzah et al., 2014; Kapp, 2012; Kim & Lee, 2015; Su & Cheng, 2015). Thus, in an educational context, the frequently assumed

definition of gamification is the incorporation of various elements associated with digital games into a non-game environment as a measure of achievement to support learning (Cormack et al., 2014). My study incorporates an expanded definition, one that is typically embraced by educators attempting to solve engagement and participation problems in the classroom. In this context gamification (in the education discipline) is further defined as a set of activities and processes designed to solve problems related to learning by using game mechanics (Kim et al., 2018) as well as game thinking and aesthetics (Kapp, 2012).

The terms gamification and game-based learning are often confused. The latter is a type of gameplay that has defined learning outcomes (Shaffer, Squire, Halverson, & Gee, 2005), whereas gamification incorporates incentivized game elements to engage people in an unappealing task (Plass, Homer, & Kinzer, 2015). For example, a teacher may gamify math homework by giving students stars and points for completing a boring task, but if a game-based learning approach were to be taken instead, the homework assignments would also be redesigned to include conflict and rules of play (Plass et al., 2015).

Theoretical Frameworks

Three theoretical frameworks inherent to gamification follow: (a) behavioral approaches, (b) self-determination theory, and (c) motivation theory.

Behavioral approaches. Skinner's theory of operant conditioning (1938) suggests that learning is controlled by positive and negative reinforcement. Consistent with operant conditioning where reinforcement schedules are used (Linehan, Kirman, & Roche, 2015), gamification provides rewards, badges, and points at varying intervals in

order to maintain learners' interest (Kapp, 2012), providing positive reinforcement (Woolfolk, 1998). Gamification embraces highly structured patterns of behavioral management, feedback loops, and reward mechanics in order to influence participant behavior (Linehan et al., 2015). For example, feedback elements such as rewards and points must be scheduled appropriately in terms of time and frequency as behavior is not likely to be sustained if an achievement is earned after every action. The researchers suggest that instructional gamification designers take a behavioral psychology approach when designing a gamified curriculum or platform, addressing observed behavior in lieu of presuming learners' inner intentions (Linehan et al., 2015).

Self-determination theory. Self-determination theory (SDT) suggests that learners become more self-determined and motivated when three basic needs are met: autonomy, competence, and relatedness (Deci & Ryan, 2002). When assessed in terms of SDT (Ryan & Deci, 2000), gamification has been found to yield increased motivational results (Harrold, 2015; Ling, 2018; Sailer et al., 2017), even when performance outcomes were not improved (Pilkington, 2018). For example, although learners in a gamified online programming course did not have increased learning outcomes or behavioral changes, the researcher suggests such a platform can have beneficial effects on student perception, appreciation, and the overall class experience, especially in distance courses where students may otherwise feel isolated (Pilkington, 2018). Positive outcomes from gamification studies examining SDT include magnifying students' existing positive learning habits, regardless of whether or not they were initially highly motivated (Harrold, 2015), as well as fostering task meaningfulness and social relatedness (Sailer et al., 2017). Ling (2018) measured the impact of meaningful gaming on college students'

motivation in a course on women in film. Participants took the MSLQ, which the researcher adapted to include both Likert scale and open-ended questions. Results indicate that meaningful gamification has the potential to intrinsically motivate students to scaffold reading material before class, in alignment with Ryan and Deci's (2000) Self-Determination Continuum and the relevant regulatory processes of interest, enjoyment, and satisfaction. Sailer et al. (2017) examined individual game design elements in terms of basic psychological needs in a randomized controlled study from the perspective of SDT. Their results suggest that perhaps gamification as a whole is not necessarily effective, but specific game design elements have distinct psychological effects.

Cristea and Shi (2016) reported research from two university e-learning courses, one on dynamic web-based systems and the other on management, where both courses included motivational gamification strategies that are further distilled into features, designed in alignment with innate learner needs of autonomy, competence, and relatedness rooted in SDT. These strategies included structured and chunked goals, immediate and positive feedback with guidance for the next step, and visualization of social status, comparisons, and learning progress. Based on survey results of the 25 participants, findings indicated strong motivation amongst the learners, with high usability for the SDT motivational gamification strategies put forth.

Motivation theory. The main motivation theory to be used for this study is that of Turner and Paris (1995) - the Six Cs of Motivation: Choice, Control, Collaboration, Challenge, Constructing meaning, and Consequences.

Although the Six Cs of Motivation were primarily developed for K-12 literacy instruction, they are still relevant for higher education as motivation is not necessarily

facilitated by the type of program but rather by the actual tasks assigned to students, with open-ended activities being the most effective (Turner & Paris, 1995). *Choice* correlates with goal setting; *Control* correlates with strategic planning, task strategies, and self-instruction; *Collaboration* correlates with help-seeking; *Constructing meaning* correlates with meta-cognitive monitoring; and *Challenge* and *Consequences* both correlate with goal setting, strategic planning, and task strategies. In terms of gamification, *Choice* correlates both with a learners' ability to access and unlock content via multiple routes to success and with choosing sub-goals within the larger task (Deterding, 2012; Iosup & Epema, 2014; Lee & Hammer, 2011). *Control* is exemplified when students feel empowered by levels of access to and control over course topics as part of a gamified curriculum (Iosup & Epema, 2014). In terms of *Collaboration*, team-based gaming activities build collaborative skills (Educause, 2014), and gamification encourages collaboration amongst learners, enhancing their performance (Anderson, Huttenlocher, Kleinberg, & Leskovec, 2014; Pedreira, García, Brisaboa, & Piattini, 2015). For example, when a gamified online discussion was added to an introductory programming course with 249 students, student collaboration was increased, making course communications 88% more efficient by reducing emails, as measured by course metrics and student surveys (Knutas, Ikonen, Nikula, & Porras, 2014). In terms of *Constructing meaning*, digital games and game elements in the classroom will only enhance learning and motivation if they are designed to enable students to make an active connection between the game and the underlying topic of study (Erhel & Jamet, 2013; Moore-Russo, Wiss, & Grabowski, 2018; Prensky, 2001). Challenges are game activities that take effort to solve, like quests attached to a larger narrative with specific rewards (Werbach & Hunter,

2012). Consequences can be highlighted in quests goals and achievements (Sailer et al., 2017; Werbach & Hunter, 2012).

Even though there is a paucity of research correlating the Six Cs, as a whole, to actual gameplay (Rieber, Davis, Matzko, & Grant, 2001), some of the individual components have been explored. For example, Aldemir, Celik, and Kaplan (2018) incorporated control, collaboration, choice, and consequences as part of their larger qualitative study examining how students perceive gamified elements in a class, using interviews, observation, and documents within a gamified teacher education course. Findings indicated that students prefer challenges that are not repetitive and have increasing difficulty. It was also suggested that instructors give students a choice from a variety of challenges. Students desired visibility of their peers' consequences to create a collective intelligence pool to share their opinions and learn from others, supporting community building.

Gamification Mechanics

Overview of gamification mechanics. Since there is not a universal classification of gamification elements (Aldemir et al., 2018; Dicheva, Dichev, Agre, & Angelova, 2015), the various gamification components are defined with respect to the three categories designated by Werbach and Hunter (2012): (a) dynamics, (b) mechanics, and (c) components, with each category manifesting into the next in a funnel-like fashion.

Dynamics (Werbach & Hunter, 2012). The category of dynamics includes (a) constraints, (b) emotions, (c) narrative, (d) progression, and (e) relationships. *Constraints* create artificial limitations, as is the case with traditional games. It would not be a

"game" without the proper balance between freedom and constraints. With the potential to influence intrinsic motivation, *emotions* should foster curiosity, competitiveness, frustration, happiness, creativity, and self-expression. Players do not just understand the activity, they feel it. *Narratives* should be coherent and have an inner logic that connects to the bigger storyline; a small amount of story can go a long way. Interweaving rewards within a story can help create a cohesive gamified experience (Sheldon, 2011). *Progression* is more than a linear function. A player should not be the same at the end of the game as when they started. People get bored if they repeat the same experience. *Relationships* represent the social aspect of games. They do not have to be only competitive, but they can encompass sharing with friends and helping others. This can be fostered both within and outside of the game.

Mechanics (Werbach & Hunter, 2012). Mechanics are manifestations of the dynamics. The category of mechanics includes: (a) challenges, (b) chance, (c) competition, (d) cooperation, (e) feedback, (f) resource acquisition, (g) rewards, (h) transactions, and (i) turns. As a component of the Six Cs of Motivation (Turner & Paris, 1995), *Challenges* are tasks that take effort to solve; overcoming them demonstrates competence or mastery. *Chance* constitutes elements of randomness in gamification design. If chance is well-designed it can elicit positive emotions. *Competition* is embodied by a structure where one group or player wins, and the other loses. There is usually at least some element of this in games. Another component of the Six Cs of Motivation, Collaboration, aligns with Werbach and Hunter's (2012) mechanic of *Cooperation* which is exhibited when players work together to achieve a shared goal that is usually not obtainable individually. Players can exhibit competition and cooperation at

the same time (e.g., boss fights). *Feedback* happens when the game provides the player with information about how they are doing; this could be accomplished through a display of points or achievement notification. *Resource acquisition* happens when players obtain items that are useful, tradable, or just fun to collect. *Rewards* are benefits given to a player for their achievements, such as badges, points, or even outside value. *Transactions* happen when players trade items. *Turns* happen when players participate one at a time; this is more common in board games.

Components (Werbach & Hunter, 2012). Components are manifestations of the mechanics and include: (a) avatars, (b) badges, (c) collections, (d) combat, (e) content unlocking, (f) gifting, (g) leaderboards, (h) levels, (i) points, (j) quests, (k) social graphs, (l) teams, and (m) virtual goods. *Avatars* are unique representations of a player's character. *Badges* are visual digital representations of achievements. *Collections* are a set of virtual items, gear, or other game resources. *Combat* refers to concrete battles that are short-lived but part of a larger struggle. *Content unlocking* is a reward that makes new aspects of the game accessible when players reach certain objectives. *Gifting* takes place when players share their resources with others in or outside of the game. *Leaderboards* are virtual displays of player progression and achievement in rank order for a group of players. *Levels* are the steps of player progression. They enable a player to see where they stand and serve as a structure to organize rewards and other mechanics. *Points* are a numerical representation of game progression. According to Dyer (2015), points represent a numerical value awarded for achievements; they are a means to measure performance. *Quests* are specific and concrete challenges that are defined ahead of time and are attached to the larger narrative with specific rewards. *Social Graphs* display

social connections that players have amassed during their time playing, showing their friends as potential allies, competitors, or participants in the game. *Teams* are groups of players that work together for a common goal. *Virtual goods* are valuable game assets that can be translated into real-world value, such as points in a game being a form of virtual currency.

Effectiveness of Gamification Mechanics

Overview of effectiveness of gamification mechanics. This study focuses on the following six broadly defined gamification mechanics that have been substantively studied and are well aligned with self-regulated learning and motivational constructs: (a) quests, (b) points, (c) rewards, (d) badges, (e) feedback, and (f) mobile apps.

Quests. Quests can highlight the consequences of a goal, and they can emphasize the importance of a players' action within a situation (Sailer, Hense, Mandl, & Klevers, 2013). In a mixed-methods study comprised of pre-service primary school teachers in an Information and Technology course, it was suggested that directed quests make a positive contribution with clear objectives set forth, something students viewed as useful to their learning (Cakiroglu et al., 2017). The researchers also suggest that providing quests can facilitate the usability of other gamification dynamics.

Points. Points support autonomy, performance feedback, and competency (Chapman & Rich, 2018). Redeemable points can engage learners by supporting personal achievement via motivation (J. Chang & Wei, 2016), especially when learners formulate their own point obtainment goals (Dyer, 2015). Leveling-up is typically the result of earning experience points (XP). Aldemir, Celik, and Kaplin (2018) suggest that people

enjoy using points to purchase tangible rewards, and allocation of points should be perceived as fair by participants.

Rewards. Gamification rewards are not the same as loyalty rewards programs (e.g., airline frequent flyer miles or credit card points earned that can be exchanged for products). Gamification users tend to be more intrinsically motivated (Burke, 2014). Rewards such as badges, leaderboards, and performance graphs can satisfy competence and autonomy needs through task meaningfulness (Sailer et al., 2017). Virtual currency, as a reward strategy, has been found in the existing research to have positive effects in educational settings (Donovan, Gain, & Marais, 2013; Goehle, 2013).

In a Massive Open Online Course (MOOC) gamification study (Chang & Wei, 2016), researchers conducted a focus group with 25 learners to identify 40 game mechanics. In an effort to measure each mechanic's level of engagement, more than 5,000 learners were surveyed online. The ten most engaging mechanics were responsible for more than half of the engagement. Of these, the top mechanic was virtual goods, usually earned for leveling up. The majority of students have a positive reaction to rewards as extrinsic motivators, but if not continuously and systematically distributed, learners can lose their motivation (Aldemir et al., 2018). Especially when used in excess, gamification rewards may undermine intrinsic motivation, decreasing self-regulated learning, and causing students to give up as they become overwhelmed when falling behind on quests (Lambert, 2017). Rewards of points, leaderboards, and badges can all be useful, but they are a small part of the player experience relative to the engagement of the game's core mechanic (Ferrara, 2013). Therefore, narratively interwoven rewards (e.g., receiving *biology bucks* as part of a science lab quest, earning a *golden apple*

achievement during a teacher-education journey, or being designated as *code poet* after successfully completing a computer science challenge) can help create a cohesive gamified experience (Sheldon, 2011).

Badges. Achievement badges are one of the most prominent elements in gamification as they represent virtual awards for accomplishments (Martens & Muller, 2017). Unlike points, they represent specific achievements that can be shown as proof beyond the gamified activities (Martens & Muller, 2017). Badges have been increasingly used as a rewards system for learners, allowing them to publicly display their progress and skill mastery in online profiles (L. Johnson, Adams Becker, Estrada, & Freeman, 2014). In an educational context, digital badges can be used to symbolize and certify knowledge, skills and competencies (Mah, 2016), and with appropriate visual elements, they can be perceived as fun in addition to being a confidence booster and means of self-assessment (Aldemir et al., 2018). Student achievements can satisfy needs for competence and autonomy better than classical classroom goal-setting (Groening & Binnewies, 2019)

However, if not implemented properly, badges can have a negative influence as an extrinsic motivator (Abramovich, Schunn, & Higashi, 2013), especially if they have a non-utilitarian function within the platform (Hakulinen, Auvinen, & Korhonen, 2015). This is evident when low-stakes participatory badges are awarded, whereas student performance skill-based badges could better serve to increase learners' intrinsic motivation. For example, an achievement awarded for participation is more likely to be perceived as an external motivator; whereas, a badge earned for completing a task of significance is more likely to serve as an intrinsic motivator (Abramovich et al., 2013). It

has been suggested that multi-level badges may provide more tailored feedback, becoming a personalized motivator if systematic and continuous (Aldemir et al., 2018; Hamari, 2017).

Feedback. Gamified feedback has the potential to reframe failure as a necessary part of learning for students by means of low-stakes opportunities to assess one's capabilities where effort, not mastery, is rewarded (Lee & Hammer, 2011). Immediate feedback, shortened feedback cycles, and immediate rewards in lieu of vague long-term benefits are most effective in gamification (Kapp, 2012; Lee & Hammer, 2011; Nah et al., 2014). Game mechanics can serve to reinforce the fact that failure is neither a setback nor an outcome; rather, failure is an indication that more work is needed to master the skill or knowledge required (Educause, 2014). Students can learn to view failure as an opportunity instead of becoming overwhelmed and helpless (Lee & Hammer, 2011).

Mobile apps. By incorporating gaming components, aesthetically pleasing mobile apps can create an especially engaging and immersive learning environment. Learners develop and reinforce cognitive skills, making constant connections among the app's visual and auditory elements (Shroff, Keyes, & Wee, 2020). .

Challenges of Gamification

Although evidence suggests that gamification may motivate students to learn better, it is important to also look at the drawbacks so that effective interventions can be designed (Lee & Hammer, 2011). A discussion of the six most prevalent hurdles and challenges associated with gamification follows: (a) negative perception, (b) increased workload, (c) cumbersome, (d) context-specific, (e) inconsistent results, and (f) "cool" and "fun" is not enough.

Negative perception. Not everyone is a fan of gamification. Some posit that merely focusing on badges and points, which are not the most essential parts of games, should not be touted, especially for marketing purposes with no real interest in tapping into the greater value of games (Bogost, 2011; Kapp, 2012). Although gamification is a growing phenomenon, there is insufficient evidence to support the long-term benefits of gamification in educational contexts (Dichev & Dicheva, 2017).

Increased workload. While gamification may enhance engagement, the time and care required to make this happen needs to be considered carefully as to not be a detriment to the pedagogy (Doherty, Palmer, & Strater, 2017). One of the downsides to gamification is that it is administratively time-consuming (de Freitas & de Freitas, 2013; Dias, 2017), especially in terms of design (Evans, 2016; Moore-Russo et al., 2018; Rashid & Suganya, 2017), technical issues (Daubenfeld & Zenker, 2015), and the increased amount of grading required in order to keep up with rewards and achievements (Evans, 2016).

Cumbersome. No matter how well a class is gamified, it will become cumbersome if the work to keep it going takes too much effort (Hung, 2017). Students may also perceive the gamification platform as being too difficult, with too many details associated with each task (Antonaci et al., 2015). For example, if different game-like scenarios are presented throughout the course (e.g., Antonaci et al., 2015), the student will need to devote time and energy to learning the rules and parameters of each novel situation. This could distract the student from comprehending the intended learning objectives. Moreover, similar to the swiftly changing field of gaming, the study and usage of gamification requires a constant review of research findings as it continues to evolve

(Hulsey, 2015) both technologically and pedagogically (Banfield & Wilkerson, 2014; Barneva, Kanev, Kapralos, Jenkin, & Brimkov, 2017; Toyama, 2015).

Context-specific. The effects of gamification are heavily dependent on the context of the implementation and its learners (Hamari et al., 2016). Effects are especially influenced by whether or not students are intrinsically or extrinsically motivated (Berkling & Thomas, 2013; Dichev & Dicheva, 2017; Hanus & Fox, 2015). Differences in prior knowledge also impact the effectiveness of gamification. For example, if a student has prior knowledge of a subject this could impact how quickly they earn badges as well as the value they attribute to the achievement (Abramovich et al., 2013). Furthermore, specific educational contexts in which gamification may be especially useful for certain types of learners have not yet been confirmed (Dichev & Dicheva, 2017). Studies tend to examine the effects of gamification in terms of one discipline at a time, but with a smattering of gamification elements and inconsistent research approaches. Thus, the knowledge of how to gamify an activity in relation to the specifics of an educational context is limited (Dichev & Dicheva, 2017).

Inconsistent results. Inconsistent results are a frustration for educators and gamification designers alike. Although empirical gamification studies in higher education are showing modest gains in some areas, the data can be troublesome to interpret with consistency because there are so many ways in which gamification can be designed and implemented in an educational environment (Hung, 2017). Once the novelty diminishes, results tend to not be as positive (Attali & Arieli-Attali, 2015), whereas, in traditional environments, instruction can be carried out without a decrease in interest derived from

the loss of novelty frequently associated with gamification (Barrio, Munoz-Organero, & Soriano, 2016).

Novelty is not enough. The novelty effect, as defined by Clarke and Sugrue (1988), is the tendency for performance to initially improve when new technology is instituted—not because of any actual improvement in learning or achievement, but rather in response to increased interest in the new technology. Gamification is not an automatic cure-all; it must be grounded in research and designed to maximize positive impact in the classroom (Lee & Hammer, 2011). Points, badges, and leaderboards may cause problems, such as indifference, loss of performance, or declining effects, if not supported by instructional design (Toda, Valle, & Isotani, 2018). Gamification should not be the focal point of the educational activity but should serve to enhance it (Farber, 2017). Even gamers may not be engaged in an educational game if there is not an appropriate alignment between the activity and the curriculum (Educause, 2014).

While gamification mechanics have superficial appeal, their effectiveness is still to be determined because expected effects are not always evident (Attali & Arieli-Attali, 2015; Doherty et al., 2017). Gamifying learning has outpaced researchers' understanding of its mechanisms and methods (Dichev & Dicheva, 2017). Rigorous empirical research on the effectiveness of incorporating game elements in learning environments is still scarce (Dicheva et al., 2015). Future efforts should focus on the relationship between specific game mechanics and learning outcomes (Chang & Wei, 2016) in order to maintain and promote intrinsic motivation (Hanus & Fox, 2015).

Impacts of Gamification

At-risk groups should not be considered a burden needing treatment but rather as individuals with assets, skills, and knowledge who can contribute (Royle & Colfer, 2010). A discussion about gamification and at-risk students follows, with special emphasis on fostering constructs required for academic success at college, self-regulated learning techniques, and motivation.

Gamification and at-risk students. According to Stewart et al. (2013), there is unfortunately scarce research on digital games and gamification for at-risk populations for four main reasons: (a) interventions are typically not planned with evaluative measures in place, (b) there is typically no budget for experimental or quasi-experimental studies in the context of social inclusion, (c) it is difficult to find causality when there are multiple problems present and numerous interventions taking place, and (d) the situation can cause ethical issues in the research design. Nevertheless, researchers have noted gamification's potential for at-risk students (Stewart et al., 2013). Given the high drop-out rates and lack of self-esteem among at-risk youth, game-based approaches could be a way to re-engage at-risk youth with a propensity to associate formal education with negative connotations and experiences. Although not specific to gamification, game-based learning environments or approaches can help at-risk children develop strategic thinking and problem-solving strategies. For at-risk learners in particular, it is important to integrate game-based approaches with empowerment strategies and support initiatives targeted at this population (Karabanow & Nalor, 2010). At-risk students tend to be more engaged when receiving encouragement, thereby boosting confidence (Hughes, 2017); thus, the encouraging feedback that educational apps provide can benefit at-risk students

(Zhang, Trussell, Gallegos, & Asam, 2015). The use of digital technologies to empower at-risk youth should be framed within a well suited pedagogical, trustful, and meaningful approach (Hache & Cullen, 2009; Stewart et al., 2013).

Gamification and self-regulated learning. To be educationally effective, the learning and skill development of the game mechanics should be aligned with the desired learning outcomes (Educause, 2014). Gamification has potential as a form of metacognitive scaffolding to improve self-regulated learning (Tang & Kay, 2014). Gameplay in itself can encourage metacognitive and self-regulated learning behaviors, such as planning, goal-setting, self-monitoring, evaluation, and strategy (Foster, Esper, & Griswold, 2013). Gamification elements in a class have been shown to potentially improve students' time management (Hakulinen et al., 2015). Gamification mechanics lend themselves to self-regulated learning, such as planning, strategy, and collaboration. Reward schedules can encourage self-monitoring, and reflection and badging can lead to self-evaluation (Tang & Kay, 2014).

Gamification can promote goal setting amongst learners (Bai, Hew, & Huang, 2020), especially as games exemplify these characteristics (Devedzic & Jovanovic, 2015; Educause, 2014; Gibson, Ostashewski, Flintoff, Grant, & Knight, 2015; Sailer et al., 2013; Tang & Kay, 2014). Game design elements in non-game contexts can help participants process information, meet their goals, and modify their behavior (Hamari, Koivisto, & Sarsa, 2014; Putz, Hofbauer, & Treiblmaier, 2020; Treiblmaier, Putz, & Lowry, 2018) while also triggering active learning processes to improve knowledge retention (Gatti, Ulrich, & Seele, 2019; Putz et al., 2020; Treiblmaier et al., 2018). Goal setting type actions have be associated with many gamification elements, such as

leaderboards (Bai et al., 2020; Landers, Bauer, & Callan, 2017) and achievements as reward systems (Groening & Binnewies, 2019) as well as competence-based rewards such as points, currency, and progress bars (Tang, Jia, & Zhang, 2020)

Feedback can empower students to be self-regulated learners (Nicol & MacFarlane-Dick, 2006), for which gamification can be especially effective (Dichev et al., 2018). Feedback is essential for students' self-regulated learning as it enables students to monitor their progress toward their goals and adapt their strategies accordingly (Corrin & De Barba, 2014). In their paper about leveraging the potential of combining learning analytics and gamification to increase the motivational effect in a learning context, Dichev, Dicheva, and Irwin (2018) suggest that feedback via learning analytics dashboards in a gamified context can have a stronger effect toward cultivating awareness, reflection, sense-making and self-regulated learning than those in a non-gamified context. Traditional data based on tests, assignments, and forum visits do not provide the depth of feedback and progress gamification data can generate through insight into students' actual learning processes via experience points, leveling up, earning rewards, using virtual currency, and maintaining leaderboard status, etc. (Dichev et al., 2018).

Game mechanics show that learning is an iterative, incremental process towards larger goals that involves trial, error, and repetition (Educause, 2014). Goal-setting can be clarified through gamification mechanics such as quests (Sailer et al., 2013). A two-year study of nearly 3,000 participants compared individuals exposed to a gamified badging platform to those who were not exposed to the badge mechanic (Hamari, 2017). Results indicated that users in the gamified group used the service associated with the gamified platform in a significantly more active way because of the clear goals badges provide

(Hamari, 2017). In addition, the expectations set forth from goals can increase desired behavior, and completing these goals can increase feelings of self-efficacy and satisfaction (Bandura, 1993). The goal orientation aspect of gamification also has the potential to encourage the help-seeking component of self-regulated learning for students exposed to a gamified environment (Teh, Johnson, Schuff, & Geddes, 2013). Additionally, when college students are given autonomy and choices through gamification they tend to have stronger self-regulated learning skills than students in traditional, controlled settings (Lambert, 2017).

However, it should be noted that the structure gamification affords does not necessarily replace standard course rules and requirements. Survey results of 59 students enrolled in a gamified software engineering class suggested that their self-regulated learning skills did not increase, nor did they view gamification in a positive light (Berkling & Thomas, 2013). The authors suggest this could be due to the fact that assignment schedules were suggested by the professor but not enforced, nor was attendance mandatory. In addition, these students were exposed to the gamification platform for five hours a day as part of their quarterly system that alternates between work and study, which is not reflective of typical college classes lasting 40-60 minutes per day. The authors also posit that games are not efficient, but students are (Berkling & Thomas, 2013). Their findings suggest that providing relevance for students is of utmost importance in encouraging them to employ self-regulated learning techniques.

Gamification and motivation. At the forefront of gamification is its potential to motivate (Burke, 2014; Kumar & Khurana, 2012; Nah et al., 2014; Sailer et al., 2017; Su & Cheng, 2015). Motivation-focused gamification studies are typically studied with

surveys (e.g., Hamzah et al., 2014; Pilkington, 2018), journals/diary entries (e.g., Hadijah & Talib, 2017; Rapp, 2015), reflections (e.g., Cakiroglu et al., 2017; Mast, 2017), interviews (e.g., Berns, Isla-Montes, Palomo-Duarte, & Dodero, 2016; Featherstone & Habgood, 2018), and focus groups (e.g., Rapp, 2015). Research largely suggests that gamification can serve to provide motivational benefits to students in educational environments (Barrio et al., 2016; Han, 2015; Kumar & Khurana, 2012; Nah et al., 2014; Stansbury & Earnest, 2017; Su & Cheng, 2015), especially in comparison to traditional settings (Leaning, 2015; Stansbury & Earnest, 2017), providing added value and meeting the needs of today's students who have grown up with technology (Berns et al., 2016; Dyer, 2015).

However, increased motivation via gamification does not necessarily equate to increased performance (Pilkington, 2018) nor does it equate to increased engagement (Doherty et al., 2017). Gamification can be divisive for appearing overly simplistic and for its reliance on extrinsic motivation that does not necessarily increase performance outcomes (Hung, 2017). Too many extrinsic motivators can potentially decrease intrinsic motivation (Abramovich et al., 2013; Keller, 1987; Toda et al., 2018; Toyama, 2015); this is especially true for learners that already exhibit high intrinsic motivation (Richter, Raban, & Rafaeli, 2015).

Gamification has been proven effective for intrinsically motivated learners (Buckley & Doyle, 2016). However, it has also been observed that students with similar levels of intrinsic motivation in a gamified course showed less motivation and lower final exam scores than those in a non-gamified one (Hanus & Fox, 2015). Points, levels, and leaderboards do not necessarily have an impact on learners' intrinsic motivation in non-

game contexts, but they can serve as effective progress indicators (Mekler, Brühlmann, Opwis, & Tuch, 2013). More empirical research is necessary to determine the nature and extent of the influence of gamification on learners' extrinsic and intrinsic motivation (Dicheva et al., 2015), especially if one is aiming to reach students who are already intrinsically motivated by the assignment at hand (Werbach & Hunter, 2012).

A smaller amount of research suggests that students in a gamified educational environment show less motivation than those in a non-gamified experience (Berkling & Thomas, 2013; Hanus & Fox, 2015). Game mechanics can cause demotivation due to promoting excessive competition (Campos, Batista, Signoretti, Gardiman, & Madeira, 2014; Codish & Ravid, 2012; Toda et al., 2018) or distraction from the assessment (Kocadere & Caglar, 2015). As learners lose interest in gamification due to lack of novelty, motivation is gradually diminished (Attali & Arieli-Attali, 2015; Toda et al., 2018). Rapp (2015) conducted a one-month diary study of 36 students using a gamified app that was followed up with focus groups to discuss the diary entries. Findings suggested that students were only engaged superficially by elements in the gamified apps, creating false expectations of a more game-like experience which then fell flat. Rapp (2015) suggests creating meaningful rewards, developing intrinsic motivations, providing a sense of advancement, and fostering collaboration along with competition. Additionally, gamified learning experiences have been perceived as being easier than those that are non-gamified (Brom, Stárková, Bromová, & Děchtěrenko, 2019), in that the presence of game elements can seduce learners to think it will be easy (Brom et al., 2019) due to the aesthetics implying ease of use (Tractinsky, Katz, & Ikar, 2000).

Summary

Rooted in behavioral approaches, self-determination, and motivational theory, gamification has the makings to influence behavior and volition. With a growing list of mechanics, the most implemented and studied elements are achievement and feedback related, such as badges, rewards, and points. There are challenges in gamification, both in its time-intensity for the curriculum developer and its inconsistent results. This has sparked debates as to whether gamification is actually effective or if it only serves to increase affective attributes for students but not performance outcomes. Educators have long held the belief game-inspired tasks in the classroom are well-suited for at-risk students, and gamification has had success in increasing self-regulated learning attributes as well as student motivation, opening the door for a potential marriage between gamification and a university first-year experience course designed to foster academic success.

Potential for a Gamified First-Year Experience Seminar Course

Although some university educators feel self-regulatory skills should not need to be taught, and believe that constructs like time management are the students' responsibility (van der Meer et al., 2010), many universities have developed first-year experience courses to ease students' transition to college life (Connolly et al., 2016; van der Meer et al., 2010). First-year university experience courses bloomed in the 1990s as a result of freshmen needing support in adapting to the rigors of college life (Astin, 1999). The majority of first-year experience courses are designed for at-risk and first-generation college students with the goal of helping them transition to university life, academically and personally, while increasing engagement and clarifying one's purpose, meaning and

direction ("University 101 Programs," 2019). Given the fact that self-regulated learning attributes align well with gameplay, it is not surprising that educators frequently use games to motivate at-risk students (Takeuchi & Vaala, 2014). Applying principles and structures of games to learning can engage students in ways traditional instruction cannot, especially as game mechanics can encourage students to strive for a personal best or achieve their own learning objectives (Educause, 2014). It has also been suggested that classes for at-risk freshmen should use diverse content delivery platforms with a focus on how to set attainable goals and sub-goals through a designed curriculum focusing on accomplishing goals daily (Sun et al., 2017). Of course, the goal is to have self-regulated learners, as they have higher motivation levels and are more likely to succeed without the hand-holding of a teacher; they can set goals, plan, use strategies to achieve these goals, manage resources, and monitor their progress (Lambert, 2017). By participating in gamified activities, students gain new information and refine their abilities while achieving incremental goals that foster a sense of progress instead of just focusing on course completion (Educause, 2014).

Additionally, adopting a Growth Mindset (Dweck, 2007) has shown to increase grit and perseverance (Duckworth, 2007), which can lead to increased student retention (Bowman et al., 2019). Gamification implementation can create a safe, low-stakes environment for learners (Meer & Chapman, 2014; Weitz & Sobke, 2016) with lower stress (Paniagua, Herrero, García-Pérez, & Calvo, 2019). Games exemplify persistence and goal setting (Devedzic & Jovanovic, 2015; Educause, 2014; Gibson et al., 2015; Sailer et al., 2013; Tang & Kay, 2014), and gamified elements allow students to fail and try again (Bilgin & Gul, 2020). Game design elements introduced into non-game contexts

can help participants process information, meet their goals, and modify their behavior (Hamari et al., 2014; Putz et al., 2020; Treiblmaier et al., 2018) while triggering active learning processes to improve knowledge retention (Gatti et al., 2019; Putz et al., 2020; Treiblmaier et al., 2018). Furthermore, gamification can provide active learning experiences that develop critical mindsets like collaboration persistence, problem-solving, and adaptability, all of which can be especially beneficial for college freshmen who are transitioning from high school to college academics (O'Brien & Pitera, 2019).

Lee and Hammer (2011) discuss gamification as a metaphor for the college experience with freshmen (novices) moving through lectures (quests), completing assignments (acquiring skills), and taking tests (challenges) in preparation for final exams (boss-battles) in order to pass the course and become sophomores and juniors ultimately (leveling-up) or fail (lose the game). The end goal being to graduate with a degree (badge of honor, the final big prize at the game's conclusion). They suggest that through the lens of gaming, this model supplies students with very little motivation as-is. Fortunately, gamification has been effective in various first-year experience capacities, such as learning the campus (Nguyen, Muilu, Dirin, & Alamäki, 2018) and familiarizing oneself with the library (Kaneko, Saito, Nohara, Kudo, & Yamada, 2015). Moreover, Mah (2016) posits that gamified badges can positively contribute to students' first-year experience and therefore enhance student retention by increasing student motivation through their desire to be recognized by the institution. The earning of achievements can assist students in their transition to college by providing structure via long and short-term goals. The use of badges can encourage students to keep on track with their studies and therefore

motivate them to expand their skill set or explore new or alternate learning paths (Devedzic & Jovanovic, 2015; Educause, 2014; Gibson et al., 2015).

Gamified apps can offer students access to educational content at any time or place that the learner desires (Shroff et al., 2020); indeed, app usage is key for college learners, as it offers flexibility, automatic practice quizzes, feedback, peer comparison, and accessibility from wherever they are (Pechenkina, Laurence, Oates, Eldridge, & Hunter, 2017). Most students tend to be fluent technology users who expect that teaching styles and content delivery should meet and be adaptable to their needs (Chang, Wang, Lin, & Yang, 2009). To this end, college students appreciate mobile learning applications for their usefulness, perceived ease of use, self-efficacy, and compatibility with how they want to learn, specifically in that they do not have change their current routines to access them (Chung, Chen, & Kuo, 2015).

It should be noted that positive correlations have been found between enrollment in various types of first year-experience courses and retention (Titus, 2004), as well as for social and academic integration into university life as a function of student motivation (Astin, 1999). A study with 711 college students using a gamified app to take first-year science and accounting course quizzes to earn badges and have top student statuses populate a leaderboard, suggested an increased retention rate of 12.33 percent when compared to pre-app cohorts one semester earlier (Pechenkina et al., 2017). Stewart et al. (2013) suggests there is potential value in integrating educational games within organizational support structures to empower at-risk students (Stewart et al., 2013). Examples could include intervention programs, courses, and institution-wide initiatives. As gamified learning experiences have the potential to develop students as more self-

assured, autonomous thinkers who are more prepared to take on significant projects and complete them (Educause, 2014), a gamified curriculum as part of a first-year experience course could be quite effective at increasing self-regulated learning skills and motivation for at-risk freshmen.

Chapter Summary

At-risk college freshmen face challenges in terms of self-regulated learning techniques and motivation which are dependently intertwined (LeMay, 2017; Zimmerman & Campillio, 2003) and necessary for academic achievement (Lambert, 2017; Stewart et al., 2013; Sun & Rueda, 2012; Vallerand & Blssonnette, 1992; van Rooij et al., 2017). Student's self-regulated learning skills can lead to academic success, and such techniques can be fostered in a technology-based environment (Yot-Domínguez & Marcelo, 2017) along with tasks that promote interest, enjoyment, excitement (Bråten & Olaussen, 2000), and ultimately motivation.

Game-inspired tasks are appropriate for at-risk students (Takeuchi & Vaala, 2014). Rooted in behavioral approaches as well as self-determination and motivational theories, gamification has the potential to influence behavior and motivation with its feedback-focused mechanics, such as badges, rewards, and points. It can offer educators who work with at-risk students an alternative curriculum to increase academic achievement in an innovative and appealing way.

A gamified curriculum has the potential to be especially effective in a first-year experience course, as it will be presented at a time when at-risk students need self-regulated learning and motivation the most: during the precarious transition to college. It is at this moment that students know they need to manage their studies better but fail to

do so (van der Meer et al., 2010), with many not returning for their sophomore year (Shapiro et al., 2017). With the promise of increasing self-regulated learning skills and motivation, a gamified first-year experience course could be the launching point for students' successful college careers.

CHAPTER 3

METHOD

The purpose of this action research study was to evaluate the implementation of a gamified curriculum for at-risk students enrolled in a first-year experience course at JTU. Three primary research questions guided this study: (a) How and in what ways does the implementation of a gamified curriculum impact at-risk students' self-regulated learning skills?, (b) How and in what ways does the implementation of a gamified curriculum impact at-risk students' motivation?, and (c) What are at-risk students' perceptions about the gamified curriculum on the quality of their learning experience?

Research Design

Action research focuses on the unique characteristics of the population in which a practice is employed with the intent of action to be taken (Parsons & Brown, 2002). It is ideal for my evaluative study in which I implemented a gamified curriculum for at-risk students enrolled in a first-year experience course at JTU. Employing action research enabled me to develop an action plan uniquely tailored to my course and students, providing me with the opportunity to implement a specific and tangible approach to trying out novel ideas to solve the problem of my at-risk students not acquiring self-regulated learning skills. This implementation process served to generate a subsequent iteration of cyclical research for me as the instructor (Dick, 2002; Mertler, 2011). As a metacognitive instructor, I am drawn to the reflective aspects of action research which have historically been viewed as cyclical in nature (Mertler, 2011). Although it has a

defined beginning, it does not have a clear endpoint (Mertler, 2017). This reflective process is ideal for evaluating existing theories within a practice context using interventions (Herr & Anderson, 2015; Mertler, 2011; Stringer, 2014). Since this was the first time a gamified curriculum was implemented in a first-year experience course at JTU, there was inherent value in employing an action research spiral approach in continually implementing, evaluating, and revising the curriculum (Dick, 2002; Mertler, 2011). This ability to make adjustments as needed to improve the students' learning experience was invaluable in that it enabled me as the instructor to switch LMSs during the course to better serve my students' needs.

Although the mixed-method design utilizing both quantitative and qualitative research is the closest tradition to action research, the main difference is that instead of seeking to explain a research problem, the goal of action research is to find immediate ameliorations to local-level problems that are qualitatively unique to their population and context in lieu of more generalizable explicative quantitative findings (Bloomberg & Volpe, 2016; Creswell, 2005, 2013). In contrast to traditional experimental and correlation studies, action research is not generalizable (Stringer, 2014) because it allows for the researcher to be an active participant in the learning process (Mills, 2011) taking place in their own context-specific educational space (Creswell, 2017; Herr & Anderson, 2015).This type of pragmatic research is not carried out merely as an academic exercise (Rudestam & Newton, 2007). Given my passion for addressing my students' lack of self-regulated learning skills and that I was teaching the course in which I conducted my research, action research was a fitting method of systematic inquiry for this study. It is typically conducted in educational settings by self-reflective instructors interested in how

their teaching methods affect their students' learning in order to improve effectiveness (Creswell, 2013; Mertler, 2017; Mills, 2011). Employing action research enabled me to explore alternate ways of approaching educational problems and practices specific to my course and students, empowering me with the opportunity to improve my educational practices (Mertler, 2017).

I utilized a mixed-methods research design because although quantitative and qualitative research designs individually offer beneficial opportunities for systematic inquiry, action research tends to best align with a mixed methods research design (Mertler, 2011), especially as it is contextually determined (Greenwood & Levin, 2007). I evaluated the implementation of a novel gamified curriculum, and a quantitative and qualitative mixed-method design with concurrent strategies was ideal since this type of design is commonly used over time to further understand a long-term project goal in the fields of evaluation and program intervention (Creswell, 2013).

Creswell (2013) suggests that researchers who appreciate the structure of quantitative research and the flexibility of qualitative inquiry are in alignment with mixed-methods research. I certainly fall into this category with my pragmatist worldview. Employing mixed-methods research provided me with a paradigm of choices due to the complexity of options in integrating both quantitative and qualitative methods (Morgan, 2014). Since action research lends itself particularly well to mixed-methods research, many combinations of research design, analysis, and interpretation were possible. It also provided me with a combination of the rigor and precision of quantitative design, coupled with a deep understanding yielded from qualitative work (Rudestam & Newton, 2007). Neither type of data alone would have been adequate to effectively evaluate the

implementation of a gamified curriculum in my first-year experience course in terms of addressing my students' paucity of self-regulated learning skills.

Because qualitative and quantitative data were collected during the same timeframe, this study employed a convergent parallel mixed-method design. I examined the same research questions using convergent quantitative and qualitative data collection, employing triangulation, the process of relating various sources of data for verification and trustworthiness (Bogden & Biklen, 2007; Glesne, 2006), to determine if the behaviors exhibited and comments made by my students were consistent/similar regardless of the type of data collected (Mertler, 2013), independent of method (Morgan, 2014). Triangulated findings served to best help me to understand my research problem (Creswell & Plano Clark, 2018), as the advantages of one approach can compensate for the weaknesses of the other (Rudestam & Newton, 2007). Moreover, a convergent design enabled me to assess if data from various methods corroborated one another (Fielding, 2012).

Participants and Setting

The participants were a purposeful sample of 10 second-semester at-risk freshmen enrolled in my 16-week Spring semester first-year experience course. Typically, 75% of students enrolled in the first-year experience course at JTU have a grade point average lower than 2.99, the institutional average. Therefore, for the context of this research at-risk participants were selected and defined as students who have been at JTU for at least one semester and have less than a 2.99-grade point average and/or have failed a course. Note, the class had 17 students enrolled. Five students did not meet the research inclusion criteria for being defined as an at-risk student and two students who did meet the research

inclusion criteria stopped participating in the course after the COVID-19 shutdown and never logged into EdApp. Thus, the population size of my study that met the inclusion criteria when data was being collected was 10 students (see Table 3.1). Sixty-percent of the participants were male and forty-percent were female.

Table 3.1. *Participant Demographics*

Student Pseudonym Name	Gender	Semesters at JTU prior to enrolling in the class	Cumulative GPA after Spring 2020	Failed a course prior to Spring 2020
Ryan	Male	1	2.16	Yes
Daniel	Male	1	2.63	No
Geoffrey	Male	1	1.07	Yes
James	Male	1	1.94	Yes
Andre	Male	1	0.81	Yes
Deja	Female	1	1.80	Yes
Kayla	Female	1	1.81	Yes
Aliyah	Female	1	2.57	No
Arjun	Male	1	1.94	No
Brianna	Female	7	1.73	No

The majority of first-year experience courses are scheduled for the fall, but the institution offers one section in the spring for students who have typically performed poorly during their fall semester. This elective course is comprised of students from various majors; however, the majority of students in this first-year experience courses have not yet declared their majors. Initially, the course met twice a week, in-person, for 75 minutes. The course was held in a classroom located in the science and technology building, enabling each student access to a desktop computer in which to access the course content and all associated activities on the Blackboard Learn learning management system (LMS) during class meeting periods (see Appendix A). After the

government mandated the campus closed as a result of the COVID-19 pandemic and required all courses to be delivered online, I made all of my first-year experience class content accessible on the EdApp platform, a mobile LMS with gamification capabilities, in an effort to increase student engagement .

The first-year experience curriculum is intended to help new freshmen students adjust to the academic rigor of university life and develop a better understanding of the learning processes necessary to acquire academic success, adapting and applying appropriate self-regulatory strategies to their courses and learning experiences. This includes effective time management skills and setting priorities, while also learning how to socially adapt to the college transition. Students learn to identify and apply strategies to effectively manage time and priorities. This course is typically taught by Student Affairs staff members with an emphasis on in-class instruction without the use of an LMS. While teaching the first-year experience course in the past, it was a challenge for me to convince students of its relevance.

Innovation

With the intent of facilitating self-regulatory learning skills and academic motivation for the 10 at-risk students enrolled in my spring first-year experience class, I implemented a gamified curriculum over the course of the 16-week semester. During the first class, I presented an in-class overview of the course structure and components to the students. The gamification elements designed in Blackboard (worlds, quests, badges, currency, progress board, etc.) can be found in Appendix A. During week 4 of the semester, it became apparent students were not engaged in gamification as part of the Blackboard LMS as evidenced by their expressed apathy and dissatisfaction, lack of

checking their achievements, and paucity of enthusiasm during class discussions. After said class discussions and talking with my dissertation chair, I sought a different LMS platform that would better connect with the students. I had some computer science students come to do a focus group with my class of students to see what they desired in a gamification platform. The results indicated the majority of students preferred competitive games and convenient social media apps. The class was split down the middle in terms of whether or not they would find achievements useful, specifically badges. The majority said points would serve as a motivating factor and that they would like a leaderboard highlighting those students in the top running. The majority also said they would find extra-credit opportunities worthwhile to them. Overall, there was a strong desire for a visually attractive app.

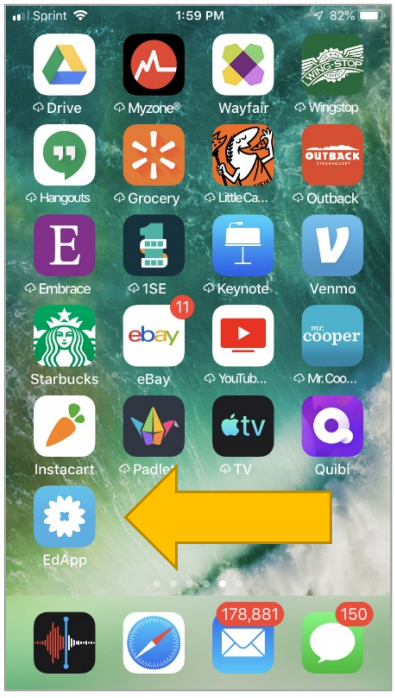

Figure 3.1. Ed App icon on iPhone screen.

The computer science students took this information and came back to me with a recommendation of EdApp, a mobile LMS app with gamification capabilities of holding all course content. Based on students' feedback of wanting something convenient and visually appealing, EdApp was implemented. Students could access the platform on their phones like any other app (See Figure 3.1).

I had individual meetings with students the following week instead of group lectures and explained to each student the change that was coming. They were excited about the shift. This week of time afforded me three things. First, it allowed me individual time to connect with each student. Second, I had a small window of time to learn about EdApp myself, its functionality, and how I could generate research data from this new LMS forum. Third, it afforded me time to build content in the new platform, EdApp. The next week was Spring Break and I continued building content. Then, the COVID-19 campus closures were announced and all classes were postponed for yet another week. I used this time to continue building class content in EdApp, being mindful of how data could be collected for my research as well as following best practices in teaching this course. Once classes resumed asynchronously online, the course and the change of my research innovation was also ready (see Table 3.2).

Table 3.2. *Structure of Course Using EdApp*

Worlds	Quests	Objectives/Goals
JTU COVID-19 Resources and Selecting Main Ideas World	• JTU during COVID-19	• To understand what university resources are available to you during COVID-19

Worlds	Quests	Objectives/Goals
	• Selecting Main Ideas	• To get to the main point
Brain Health & Time Management World	• Brain Health	• To fire up your neurons
	• Time Management	• To make every second count
Growth-Minded Study Tips & Academic Resources World	• Growth-Minded Study Tips	• To expand your knowledge
	• Academic Resources	• To search for knowledge across campus
Goal Setting & Self Testing World	• Goal Setting	• To explore your goals through the Growth Mindset
	• Self Testing	• To check how well you know information and identify gaps in knowledge
Stress-Reducing Tips and Test-Taking Strategies World	• Handling Stress with a Growth Mindset	• To employ stress-reducing strategies and increase learning
	• Test-Taking Strategies	• To learn ways for optimal test-taking
Your Opinion Matters World	• Taking the LASSI	• To see if/how your learning has changed
	• Learning Reflection	• To self-reflect on our class this semester

Self-Regulated Learning and Motivation Gamification Elements

Since the majority of students enrolled in the first-year experience course are considered to be at-risk students lacking self-regulatory learning skills, I chose a gamified

curriculum intervention to engage them via game elements specifically selected in accordance with the motivational constructs of Choice, Control, Collaboration, Challenge, Constructing meaning, and Consequences (Turner & Paris, 1995), as well as the self-regulated learning aspects of goal setting, strategic planning, task strategies, self-instruction, help-seeking, and metacognitive monitoring (Panadero, 2017; Zimmerman & Moylan, 2009). See Table 3.3 for a list of the self-regulated learning elements and motivation aligned to the specific gamification strategies that were employed in EdApp. A discussion of the implementation of the specific gamification elements follows.

Table 3.3. *Self-Regulated Learning and Motivation Elements Aligned to Gamification Strategies*

Self-Regulated Learning Elements	Motivation Elements	Gamification Elements and Strategies
• Goal Setting	Choice	• Objectives • Quests • Leveling-Up • XP • Currency (stars) • Achievements/Badges • Leaderboard
• Strategic Planning • Task Strategies • Self-Instruction	Control	• Gameplay • Quests • Leveling-Up • XP • Currency (stars) • Leaderboard

Self-Regulated Learning Elements	Motivation Elements	Gamification Elements and Strategies
• Help-Seeking	Collaboration	• EdApp Customer Support function • Group quests were not possible after everyone left campus due to COVID-19.
• Meta-Cognitive Monitoring	Constructing meaning	• Quests • Leveling-Up • Achievements/Badges • XP • Currency (stars) • Leaderboard
• Goal Setting • Strategic Planning • Task-Strategies	Consequences	• Achievements/Badges • Leaderboard • XP • Leveling-Up • Currency (stars)
• Goal Setting • Strategic Planning • Task Strategies	Challenge	• Objectives • Quests • Leveling-Up • Achievements/Badges • Leaderboard • XP • Currency (stars)

Course Structure using EdApp

Six mini-courses were presented as *worlds* as part of the gamified curriculum: (1) JTU COVID-19 Resources and Selecting Main Ideas World, (2) Brain Health & Time Management World, (3) Growth-Minded Study Tips & Academic Resources World, (4)

Goal Setting & Self Testing World, (5) Stress Reducing Tips and Test-Taking Strategies World, and (6) Your Opinion Matters World. Students were assigned one world per week. When students opened the app they could see their available worlds and had the ability to scroll down through them on their device (see Figure 3.2).

Each world was comprised of two to four lessons adapted from, and focused on, the concept of the growth-mindset, as well as topics aligned with self-regulated learning and motivation associated with the LASSI (Dweck, 2007; Weinstein et al., 2016). These lessons were presented as *quests* as part of the gamified curriculum. Each quest was also accompanied by an extra-credit mini-quest of the same name (See Figure 3.3). When students clicked on a quest, they experienced a journey with an opening objective (see Figure 3.4) followed by a mix of multiple-choice, free-response, Likert-Scale and true/false questions, words of encouragement as well as various games.

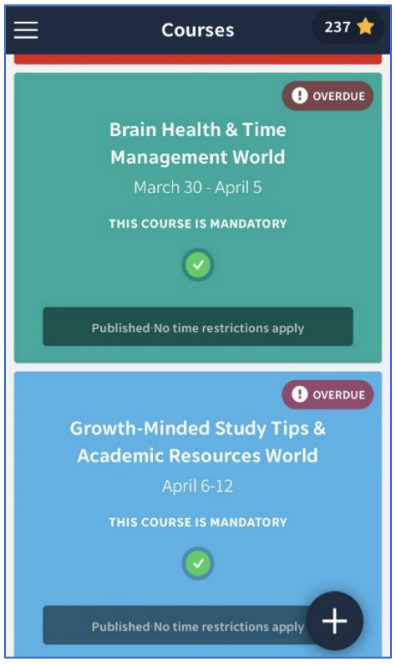

Figure 3.2. Presentation of worlds in EdApp.

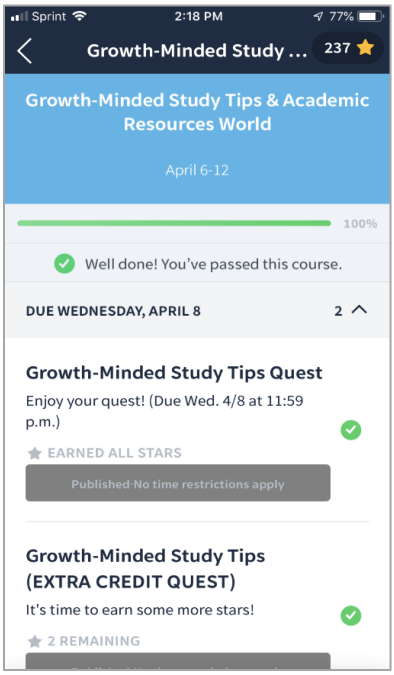

Figure 3.3. Presentation of regular and extra-credit quests.

Figure 3.4. Opening quest slide.

Slides were not static, there was always an element of interaction, whether it be pressing a button, swiping, dragging and dropping in a word, scrolling to select a number, circling the correct answer, drawing a line to associated items, expanding a bulleted list, or flipping a card for more detail, etc. (See Figures 3.5-3.9).

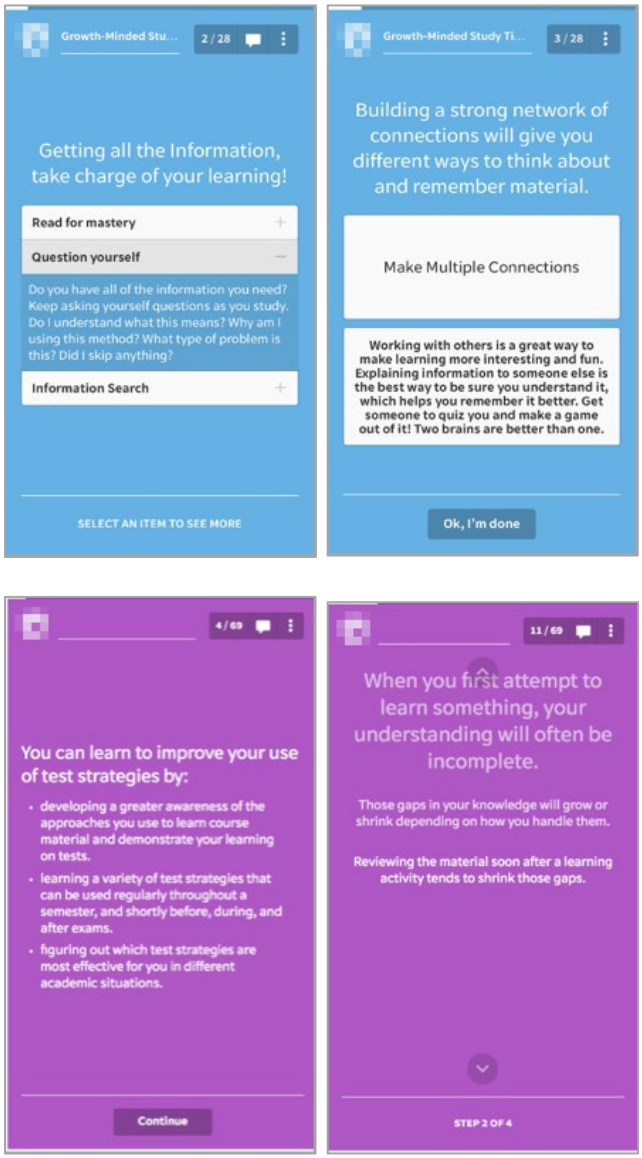

Figure 3.5. Content slides.

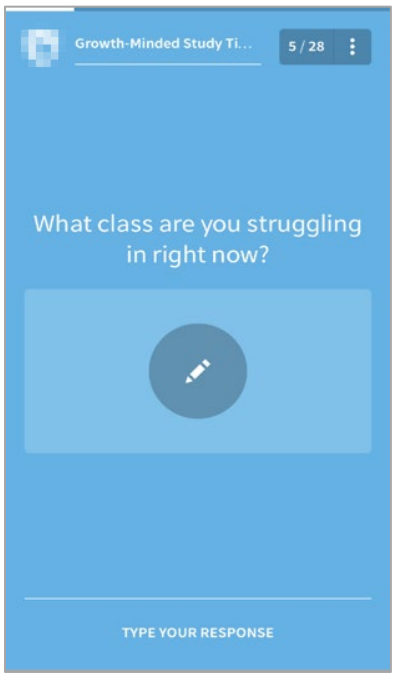

Figure 3.6. Free text for user responses.

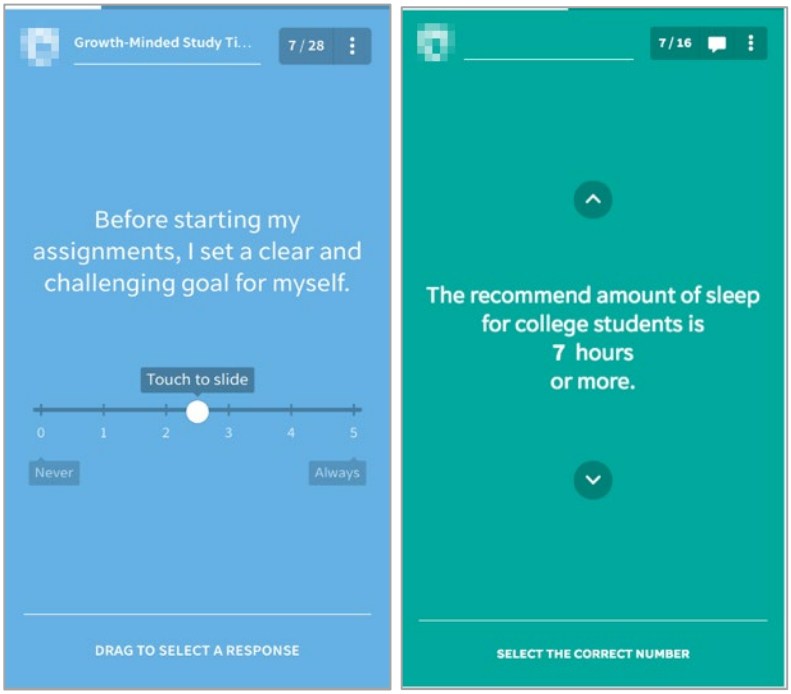

Figure 3.7. Numerical response slides.

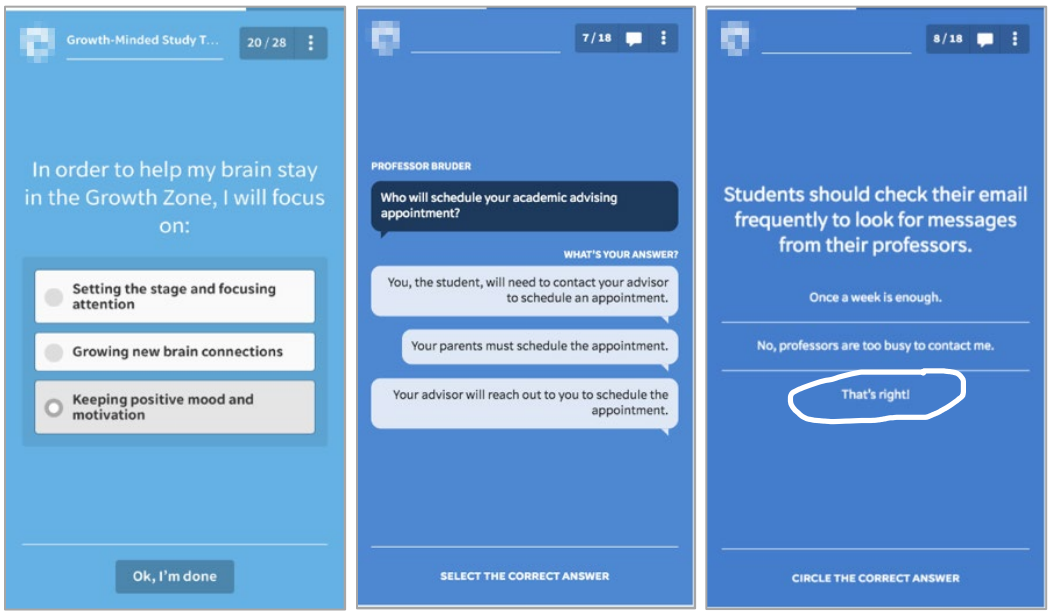

Figure 3.8. Multiple-choice slides.

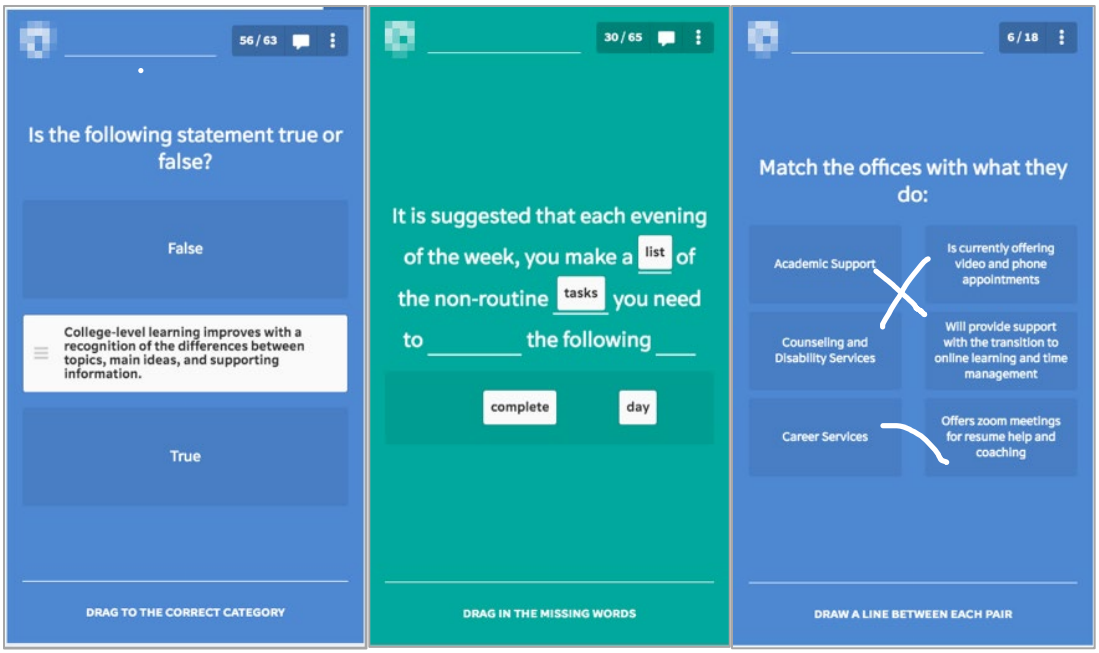

Figure 3.9. True or false slide, dragging in missing word slide, and drawing connection slide.

Supplementary visuals were also included so information could be expanded upon, or examined in more detail by students (see Figure 3.10).

Figure 3.10. Visual content slides.

I also included supplemented videos within the EdApp experience. The app also allowed for students to upload their own videos in response to prompts (see Figure 3.11).

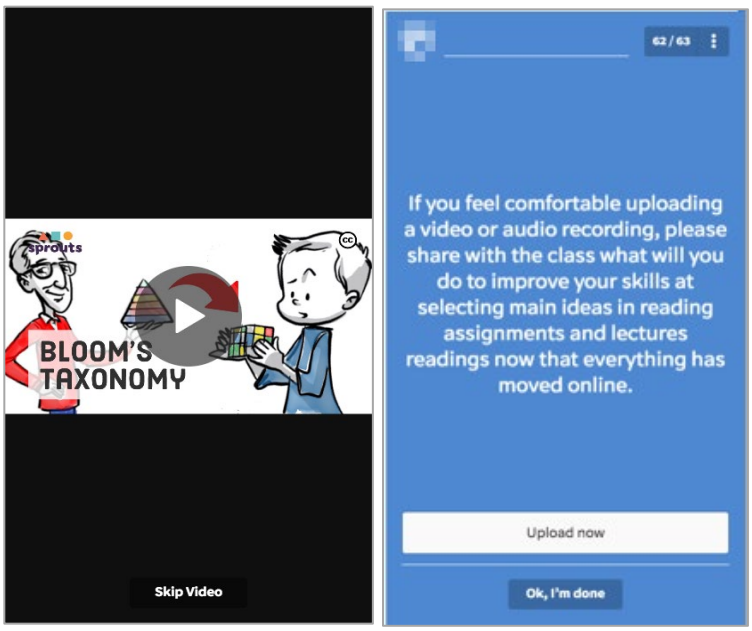

Figure 3.11. YouTube slide and student participation video slide.

Each main lesson quest concluded with a Jeopardy-style game in which students could win significant XP and stars (see Figure 3.12).

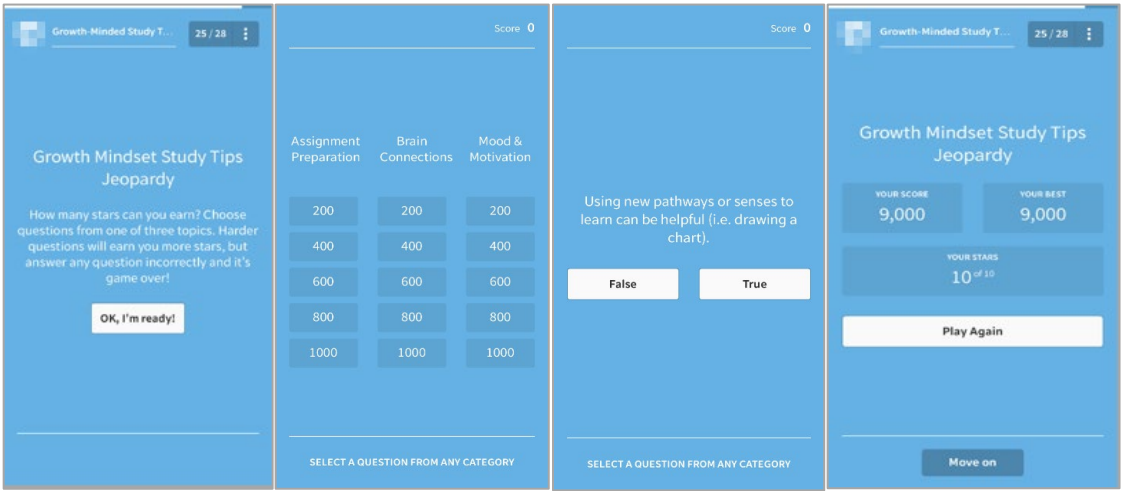

Figure 3.12. Jeopardy game slide.

Ending slides either offered encouragement or reminded students of the star bar opportunity (see Figure 3.13). The extra credit quests were comprised of game opportunities (see Figure 3.14). At the end of each extra-credit quest, students were encouraged to go to the star bar to spend their stars for a chance to win an Amazon gift certificate (see Figure 3.15). In addition to the quests and worlds in EdApp, students were able to access the class leaderboard, the star bar, their performance metrics (stars earned, lesson completion status, and badges earned), and the Brain Boost quiz function via the side menu in the app (see Figure 3.16). What follows are the descriptions of the rewarding gamification elements built into EdApp: Experience points (XP), Achievement badges, and Currency.

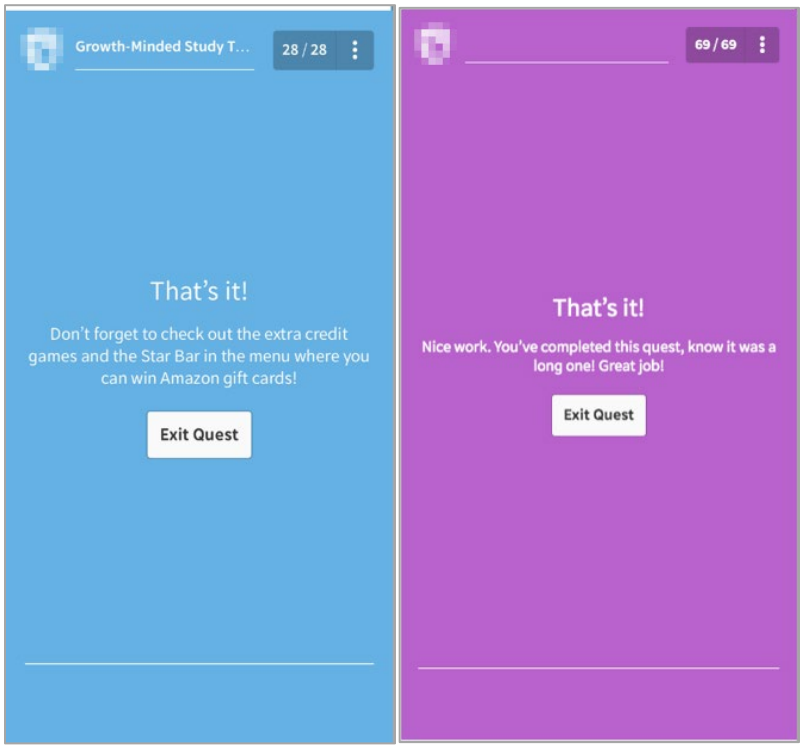

Figure 3.13. End of quest slides

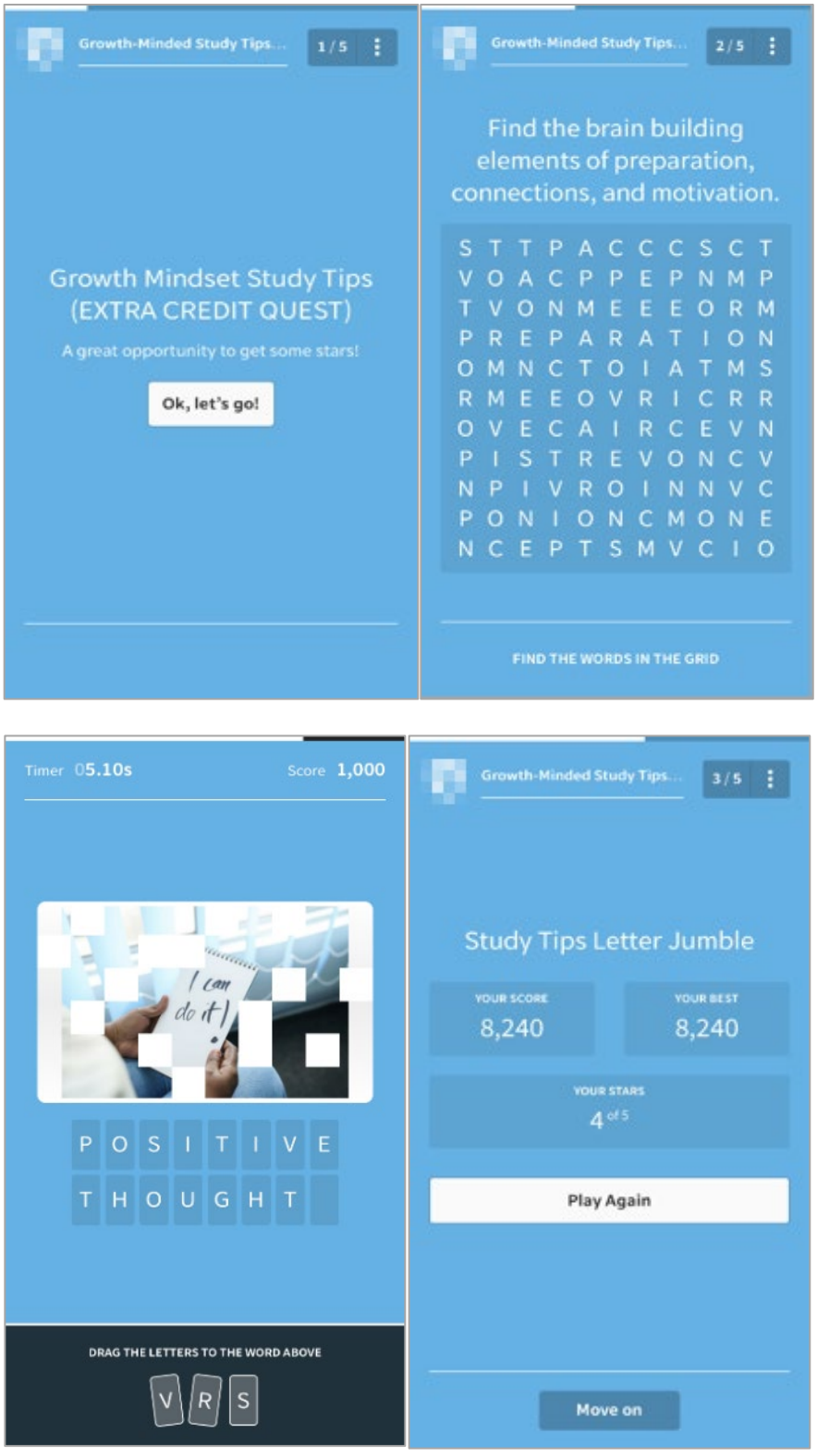

Figure 3.14. Extra credit game slides.

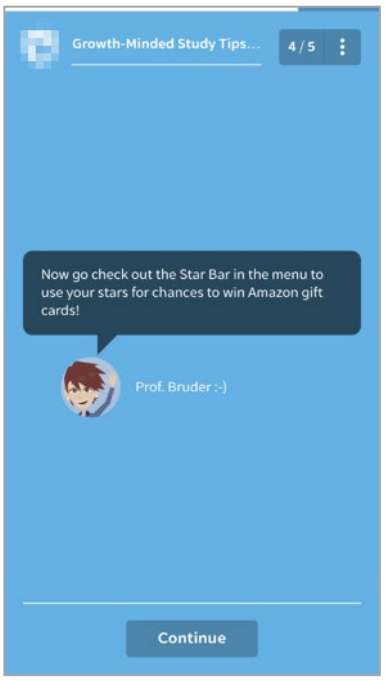

Figure 3.15. Prompt to go to the star bar.

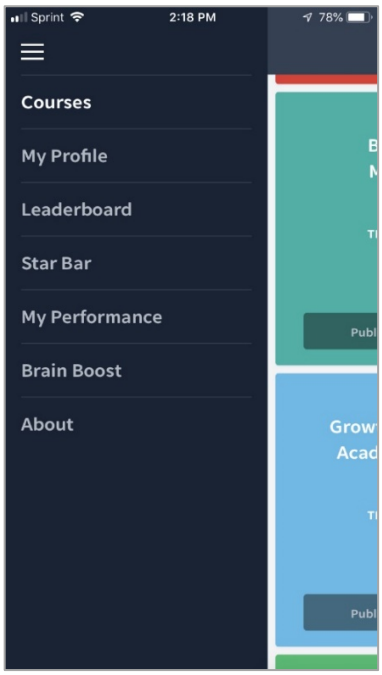

Figure 3.16. EdApp side navigation menu.

Experience points (XP). Frequently found in educational gamification, quest-based learning can replace grades in some instances, offering experience points (XP) instead, resulting in individualized learning experiences as students advance to higher levels in the course (Lambert, 2017). Instead of receiving a letter grade, students earned XP points for completing each game objective. Representing a numerical value awarded for achievements, points are a means to measure performance (Dyer, 2015). They support autonomy, performance feedback, and competency (Chapman & Rich, 2018). As long as students answered at least 70% of the questions correctly in any given EdApp quest, they received full-credit for completing the assignment. If they scored less than 70% the app would not mark the quest as complete, and they had the opportunity to complete it as many times as necessary to reach the 70% rate to obtain completion. Each quest in EdApp had a score of 100 and the scoring was spread out amongst all question slides. For example, if the lesson had 10 questions each question was worth 10 points. Additionally, if using the App default setting, scoring in the game slides affords each learner 500 points for a correct answer. The points earned for each quest activity populated the leaderboard. Since the extra-credit quests in this class were solely comprised of game slides, students who completed them had a better chance of rising to the top of the board. If a learner retook a quest, the best score out of all attempts was reflected in the leaderboard, an element that research suggests can serve as a motivating factor (Landers & Landers, 2014) (see Figure 3.17).

Figure 3.17. Leaderboard.

Achievement badges. Badges can foster competence and autonomy need satisfaction in terms of task meaningfulness (Sailer et al., 2017). Unlike points, they represent specific achievements that can be shown as proof beyond the gamified activities (Martens & Muller, 2017). EdApp automatically awarded badges when students leveled up based on completing lessons and courses. As the instructor, I had no control in this regard. EdApp also awarded students badges based on stars earned and spent in the Star Bar. Figure 3.18 illustrates the badges EdApp awarded to participants. Students were able to check their badge status on the app through achievements in the My Performance option in the app menu (see Figure 3.19).

Image	Title	Rule	Message
	Three for three	Lessons - 3	Awesome job! You have completed your first three lessons!
	Centurian	Lessons - 100	Not everyone can make it this far. You have completed 100 lessons!
	Smarty Pants	Courses - 8	Awesome job! You have completed eight courses!
	2-4-6-8	Lessons - 8	Who do you appreciate? You have completed your first eight lessons!
	Wise Guy	Courses - 20	Take a walk! You have completed 20 courses!
	Newbie	Courses - 1	You have completed your first course! It's good to see you settling in.
	Learner	Courses - 3	Awesome job! You are getting the hang of it. That's three courses so far!
	Midas Touch	Stars - 100	Awesome job! You have earned 100 stars!
	Nifty Fifty	Lessons - 50	That's a huge 50 lessons under your belt!
	Flight of Fancy	Spins - 1	You have tried your luck at the Star Bar for the first time!
	Flutter	Spins - 20	Awesome job! You have spun 20 times.
	Big Spender	Spins - 10	Awesome job! You have spun 10 times.
	Star Power	Stars - 50	Awesome job! You have earned 50 stars!
	Freshman	Lessons - 1	Consider yourself initiated. You have completed the lesson!
	Starry Eyed	Stars - 70	Don't lose your head. You have earned 70 stars!
	20/20 Vision	Lessons - 20	You can see clearly now you have done 20 lessons!
	Brainiac	Courses - 5	Just don't let it go to your head! You have completed 5 courses!
	Professor	Courses - 11	Maybe you should be teaching us! You have completed 10 courses!
	Galaxy Quest	Stars - 20	The journey continues! You have earned 20 stars!

Figure 3.18. Badges created in EdApp.

Figure 3.19. Student badge status.

Currency. Redeemable currency can engage learners by supporting their personal achievement motivation (Chang & Wei, 2016) when they formulate their own goals on them (Dyer & Sharifi, 2019). Apart from achievement badges associated with the completion of each world, students also had the opportunity to earn star currency when answering reinforcement questions or engaging with the game slides in EdApp. Students could monitor their number of stars earned. As the instructor, I did have control over the number of stars students could earn within EdApp for each question (see Figure 3.20).

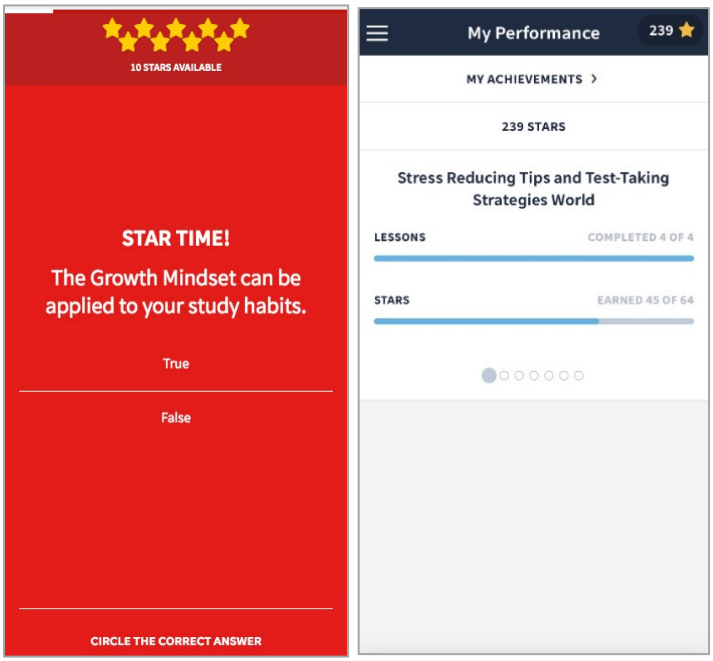

Figure 3.20. Star presentation in EdApp.

Earned Stars afforded students the opportunity to play the Star Bar for a chance to win Amazon gift cards (see Figure 3.21) that increased in value from $5.00 to $25.00 over the course of the semester. EdApp controlled who won based on an algorithm. However, as the instructor, I did set the parameters as to how many gift-certificates were to be awarded each week, as well as their monetary value.

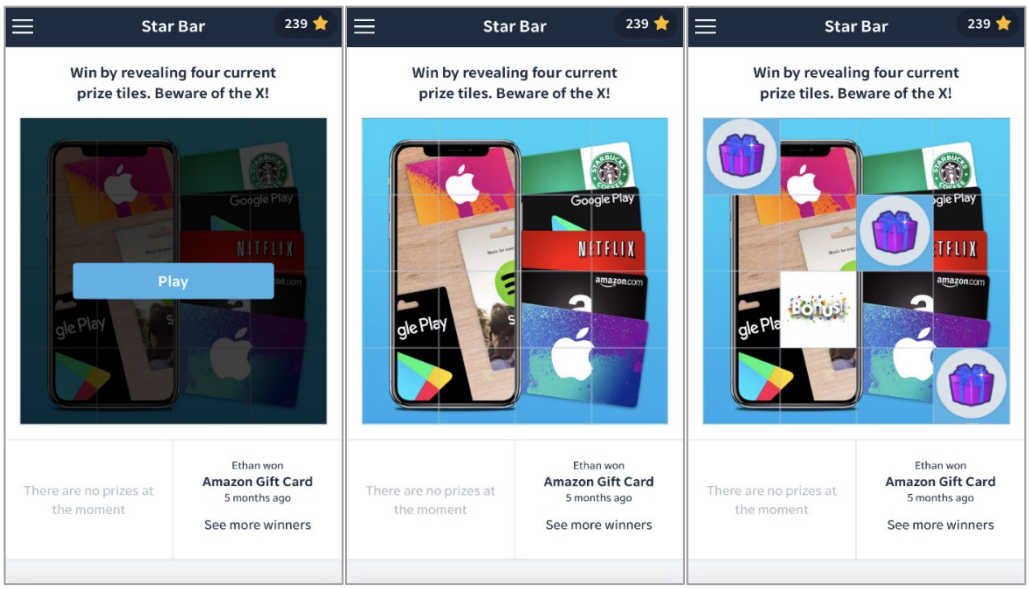

Figure 3.21. Star bar slides.

Data Collection

Four data sources were used to evaluate the implementation of the gamified curriculum. Both quantitative and qualitative data were collected, carrying equal emphasis in order to establish their trustworthiness and verification of the consistency of the facts while trying to account for their inherent biases (Bloomberg & Volpe, 2016; Bogden & Biklen, 2007; Mertler, 2017). Because the EdApp platform was significantly more robust than Blackboard, metrics from EdApp were solely analyzed. The four data collection sources included: (a) LASSI, (b) EdApp metrics for self-regulated learning and motivation (c) reflection journal assignment responses, and (d) the Final Self-Reflection Learning Quest responses. These data sources are in line with Buss and Zambo (2016) who note that an action research study typically includes quantitative data gathered using a questionnaire or a survey and product or performance data, while a mixed method one also includes two to four types of qualitative data. The data sources per each research question can be found in Table 3.4.

Table 3.4. *Research Questions and Data Sources*

Research Questions	Data Sources
RQ1: How and in what ways does the implementation of a gamified curriculum impact at-risk students' self-regulated learning skills?	• LASSI • EdApp Metrics • Reflection Journal Assignment Responses • Final Self-Reflection Learning Quest Responses
RQ2: How and in what ways does the implementation of a gamified curriculum impact at-risk students' motivation?	• LASSI • EdApp Metrics • Reflection Journal Assignment Responses • Final Self-Reflection Learning Quest Responses
RQ3: What are at-risk students' perceptions about the gamified curriculum on the quality of their learning experience?	• Reflection Journal Assignment Responses • Final Self-Reflection Learning Quest Responses

LASSI

The LASSI (Weinstein et al., 1987) is a 10-subscale, 64-item assessment of college students' awareness and use of learning and study strategies related to skill, will, and self-regulation (see Appendix A). Four of these questions are considered to be introspective as part of the survey design and thus not quantitatively scored. Each subscale is comprised of six questions. The LASSI yields individual scores per scale, but not a total score as this is not a diagnostic instrument. Although some have doubted the constructs measured by the LASSI (Cano, 2006; Melancon, 2002; Ning & Downing,

2010), researchers have found it helpful as a predictor of academic performance (Cano, 2006; Dill et al., 2014; Marrs, Sigler, & Hayes, 2009) and assessing motivation (Marrs et al., 2009). According to the LASSI 3rd Edition Manual (Weinstein et al., 2016), the coefficient alphas for the 10 LASSI scales range from .76 to .87 with six scales above .80. Generally, a Cronbach's alpha reliability coefficient of .70 is considered acceptable, although some sources accept a minimum threshold of .60 (Berger, R., & Hänze, 2015; Tavakol & Dennick, 2011). See Table 3.5 for LASSI scales, reliability coefficient, and sample items for each of the 10 scales.

Table 3.5. *LASSI Scales, Reliability Coefficient, Measurement, and Sample Item*

Scale	Alpha	Measurement	Sample Item
Attitude	.87	Attitude and interest in achieving academic success at college.	When I am studying, worrying about doing poorly in a course interferes with my concentration.
Anxiety	.76	The degree to which students worry about their academic performance and school.	I only study the subjects I like.
Time Management	.80	Use of management principles and practices for academic tasks.	I set aside more time to study the subjects that are difficult for me.
Test Strategies	.77	Utilization of test taking and test preparation strategies.	I have difficulty adapting my studying to different types of courses.
Self Testing	.80	Use of comprehension monitoring techniques (like paraphrasing or reviewing) to ascertain the level understanding of the information or skill to be learned.	I stop periodically while reading and mentally go over or review what was said.

Scale	Alpha	Measurement	Sample Item
Using Academic Resources	.76	Willingness to use academic resources such as writing, tutoring, and academic support centers when encountering academic challenges.	I am not comfortable asking for help from instructors in my courses.
Concentration	.85	Ability to maintain and direct attention to academic tasks.	If I get distracted during class, I am able to refocus my attention.
Information Processing	.81	Use of imagery, elaboration, organization strategies, and reasoning skills as learning strategies to learn new information.	I try to find relationships between what I am learning and what I already know.
Motivation	.77	Self-discipline, diligence, and willingness to make the necessary effort to successfully complete academic requirements.	When work is difficult, I either give up or only study the easy parts.
Selecting Main Ideas	.86	Ability to discern important information for study from less significant information and supporting details.	I have difficulty identifying the important points in my reading.

The LASSI was administered to students at the beginning and end of the course (Flowers, Bridges, & Moore, 2012) to measure self-regulated learning strategies and motivation. The LASSI consists of a series of Likert-type statements where the students responded (1) Not at all typical of me, (2) Not very typical of me, (3) Somewhat typical of me, (4) Fairly typical of me, and (5) Very much typical of me. Students typically completed the LASSI in less than 15 minutes. The LASSI aligns particularly well with this study for three primary reasons. First, it has been used as a pre-post achievement measure for college-level learning strategies and study skills courses (Dill et al., 2014;

Weinstein et al., 2016). Secondly, it can be used as an evaluation tool to assess the degree of success of an intervention on courses or programs (Dill et al., 2014; Weinstein et al., 2016). Thirdly, it is an effective tool for first-year experience seminar courses (Weinstein et al., 2016). The 10 scales on the LASSI align with my research questions (see Table 3.6.).

Table 3.6. *Research Questions, Variables, and LASSI Inventory Scale Alignment*

Research Questions	Lesson	LASSI Subscale
RQ1: How and in what ways does the implementation of a gamified curriculum impact at-risk students' self-regulated learning skills?	• Goal Setting, Strategic Planning, and Time Management	• Time Management
	• Task Strategies and Self-Instruction	• Test Strategies • Self Testing • Selecting Main Ideas
	• Help-Seeking	• Using Academic Resources
	• Metacognitive Monitoring	• Concentration • Information Processing
RQ2: How and in what ways does the implementation of a gamified curriculum impact at-risk students' motivation?	• Choice, Control, Collaboration, and Constructing meaning	• Motivation • Attitude • Anxiety

LMS Metrics for Self-Regulated Learning and Motivation

Data from EdApp metrics was also used as indicators of students' behaviors. The numbers of extra-credit quests completed, logins, badges, XP, and stars earned and spent were analyzed. Aligning the EdApp metrics to my research questions one and two can be seen in Table 3.7.

Table 3.7. *Research Questions and EdApp Metrics*

Research Questions	EdApp Metrics
RQ1: How and in what ways does the implementation of a gamified curriculum impact at-risk students' self-regulated learning skills?	• Numbers of extra-credit quests completed • Numbers of logins • Numbers of badges earned • Numbers of XP earned • Numbers of Stars earned
RQ2: How and in what ways does the implementation of a gamified curriculum impact at-risk students' motivation?	• Numbers of badges earned • Numbers of XP earned • Numbers of Stars earned • Numbers of Stars spent

Reflection Journal Assignment Responses

Student journals can help instructors get a sense of a student's thoughts, perceptions, and experiences in the classroom (Mertler, 2017), providing reflections, moods, and feelings, both positive and negative (Rapp, 2015). Moreover, reflective journal writing in first-year experience seminar courses can be used to support institutional action to improve the quality of the undergraduate experience and student

success (Everett, 2013). By including excerpts from reflection journal assignment questions, my data came alive by creating an actual sense of being there (Mertler, 2017). Students in my first-year experience course responded to reflection journal assignment questions upon the completion of each world, resulting in a total of five reflection journal assignment responses throughout the semester (see Appendix C). See Table 3.8 for reflection journal assignment entry prompts as they relate to each research question.

Table 3.8. *Research Questions, Variables, and Reflection Journal Assignment Prompts*

Research Questions	Variables	Reflection Journal Assignment Question Prompts
RQ1: How and in what ways does the implementation of a gamified curriculum impact at-risk students' self-regulated learning skills?	• Goal Setting, Strategic Planning, and Time Management	• Which topics or strategies in this world helped you set goals and manage your time at college?
	• Task Strategies and Self-Instruction	• Which topics or strategies in this world helped you complete your assignments and study for your exams?
	• Help-Seeking	• Which topics or strategies in this world did you find helpful in terms of what you should do when you need academic support at college?
	• Metacognitive Monitoring	• Which topics or strategies helped you the most in this world in terms of how you reflect on your own learning?

Research Questions	Variables	Reflection Journal Assignment Question Prompts
RQ2: How and in what ways does the implementation of a gamified curriculum impact at-risk students' motivation?	• Choice, Control, Collaboration, Constructing meaning, Attitude, Anxiety, and Motivation	• Has your motivation to complete assignments and study for tests changed as a result of taking this class? Please explain. • Please cite an example where you employed something you learned in this class to another course you are taking.
RQ3: What are at-risk students' perceptions about the gamified curriculum on the quality of their learning experience?		• Overall, what part of this class did you find the most helpful for your academic experience at college? • What did you like the best, and what did you like the least in this world, and why?

Final Self-Reflection Learning Quest

A self-reflective learning opportunity was implemented in the final element of the course as reflective writing in first-year experience seminar courses has been found to support institutional action to improve the quality of the undergraduate experience and student success (Everett, 2013). Additionally, the self-reflected questions and prompts not only prove useful in terms of providing data for this study, but afford students the opportunity to reflect on their own learning (Everett, 2013; Mertler, 2017; Rapp, 2015). I developed a thorough Final Self-Reflection Learning Quest comprised of open-ended questions (29), Likert-scale questions (11), and multiple-choice questions (11), in which all ten students participated (see Appendix D). Table 3.9 shows the alignment between

the 21 open-ended questions related to Research Question Three included in the Final Self-Reflection Learning Quest and Research Question Three.

Table 3.9. *Alignment Between Research Question Three and Final Self-Reflection Learning Quest Questions*

Research Question	Final Self-Reflection Learning Quest Questions
RQ3: What are at-risk students' perceptions about the gamified curriculum on the quality of their learning experience?	• Was this course what you expected? Did anything surprise you about it? • How did this course differ from other courses you have taken? Was it better, worse, or just different? • Describe how you felt when you found out this class was going to have game-like elements in it. • Describe your process of deciding which worlds to enter first, and how you chose your quest objectives. • Explain how it felt to level up. • What is your favorite thing about EdApp? • What's something you **don't** like about EdApp? • How did you feel when you earned an achievement badge? • Some of you finished your quests early, before the due date. If this was you, what motivated you to work ahead? • Did you like the balance of free response questions and games, or would you prefer more of one than the other? • Explain how it felt to level up. • Describe how you felt when you earned stars. • Did you spend your stars at the Star Bar for a chance to win Amazon gift cards? Why or why not? • If you won a gift card, describe how you felt when you won. • Did you like seeing your name on the leaderboard? Why or why not? • Would your XP points have mattered to you if there was not a leaderboard? Why or why not? • What aspects of the course motivated you the most, and why?

Research Question	Final Self-Reflection Learning Quest Questions
	• Were there any parts of the course that you felt were distracting from your learning experience? • If you were in charge and could make any changes to the course you wanted, what would they be? • If you were telling a friend about the course what would you say? • What is the most important thing we have discussed here today?

Data Analysis

Data from my action research study was analyzed in a comprehensive, convergent manner in order to indicate and verify similar sets of results (Mertler, 2017). Data was examined and used to build a coherent justification of themes, adding to the validity of the study (Creswell, 2014, 2017). Both quantitative and qualitative analyses were performed, specifically descriptive and inferential statistics, and inductive analysis. Table 3.10 demonstrates the analysis methods associated with each research question and the accompanying data source.

Table 3.10. *Research Questions, Data Sources, Data Analysis Method*

Research Questions	Data Sources	Data Analysis Method
RQ1: How and in what ways does the implementation of a gamified curriculum impact at-risk students' self-regulated learning skills?	• Pre- and Posttest LASSI Inventory Scales • Numbers of extra-credit quests completed, logins, badges, XP, and stars earned. • Reflection Journal Assignment Responses	• Descriptive Statistics • Inferential Statistics • Inductive Analysis

Research Questions	Data Sources	Data Analysis Method
RQ2: How and in what ways does the implementation of a gamified curriculum impact at-risk students' motivation?	• Pre and Posttest LASSI Inventory Scale • Reflection Journal Assignment Responses • Numbers of extra-credit quests completed, logins, badges, XP, and stars earned and spent at the star bar.	• Descriptive Statistics • Inferential Statistics • Inductive Analysis
RQ3: What are at-risk students' perceptions about the gamified curriculum on the quality of their learning experience?	• Final Self Reflection Learning Quest Responses	• Descriptive Statistics • Inductive Analysis

Descriptive Statistics

Measures of central tendency and dispersion were utilized to analyze data from the LASSI subscales (Weinstein et al., 2016) associated with student self-regulated learning: Time Management, Test Strategies, Self Testing, Using Academic Resources, Concentration, Information Processing, Selecting Main Ideas, as well as Attitude, Anxiety, and Motivation for Research Question 1 and Research Question 2. Specifically, the mean and standard deviation were calculated. Descriptive statistics were calculated for the 11 Likert-rating scale questions in the Final Self-Reflection Learning Quest. Descriptive statistics were calculated for student data retrieved from the EdApp platform regarding the following gamification elements: XP, Stars Earned, Stars Spent, Gift Certificates Won in the Star Bar, Logins, Badges Earned and Extra Credit Quests

Completed for More Stars. Frequency Statistics were calculated for the multiple-choice Final Self-Reflection Learning Quest responses.

Inferential Statistics

Inferential statistics were used to analyze LASSI pre- and post-test data. A dependent *t*-test was conducted to determine if the participants' self-regulated learning skills and motivation significantly changed from the start of the course to after the implementation of the gamified curriculum. The dependent *t*-test provided a *p*-value that indicated if my test results were significant or not. I compared this outcome against the alpha level of .05, typical in educational research, indicating that one can be relatively certain that differences would not be a result of chance (Mertler, 2017). Because multiple tests were run under the same research question, the Bonferroni type adjustment was applied to reduce type I error rate and the likelihood of discovering a false positive (Streiner & Norman, 2011). The alpha level threshold for determining if the results of a test were statistically significant needed to be lowered to account for the number of comparisons being made (Streiner & Norman, 2011). Additionally, a series of analyses were performed in order to identify statistically significant correlations (using Pearson's *r*) between LASSI subscale scores and the gamification element counts.

Inductive Analysis

Inductive analysis was used to analyze the five reflection journal assignment responses gathered throughout the semester for Research Question 1 and Research Question 2, as well as analyze the Final Self-Reflection Learning Quest responses for Research Question 3. A key component of inductive analysis is reducing the volume of information collected by aggregating data into a small number of themes (Saldaña, 2016).

Holistic inductive data analysis for reflection journal assignment entries were performed where patterns and themes were built from the bottom up, learning the participants' meaning, and discovering emergent findings (Creswell, 2014). In order to manage and organize the data, I prepared a file naming system and organized a database of files for texts, images, and recordings associated with my participants' reflection journal assignment responses and the Final Self-Reflection Learning Quest responses (Creswell, 2017). I used the software application Delve to aid this process as I named and categorized my codes while watching themes emerge (Creswell, 2017).

First, I made separate Microsoft Word documents for each participant. Then, I copied and pasted all of the students' reflection journal assignment entries into their respective transcript documents. I carefully read through them looking for overall patterns via a constant comparative method (Strauss & Corbin, 1998). I took memo-type notes that later served to aid code development, in conjunction with my own researcher reflections over time and summarizations (Creswell, 2017). I then reread this data four times by employing methodological coding (Bogdan & Biklen, 2003; Corbin & Strauss, 2008). Since qualitative analysis is not a linear or fixed approach (Creswell, 2017; Mertler, 2017), I used a data analysis spiral in which I incorporated analytic strategies for the goal of generating specific outcomes (Creswell, 2017). I then classified the codes into categories, looking for words and phrases that reflect events or observations that repeated themselves (Mills, 2011; Parsons & Brown, 2002) as they related to my research questions (Mertler, 2017; Parsons & Brown, 2002). This was key in looking for aspects of data that answered my research questions and could serve to guide future practice, noting any patterns in the data (Mertler, 2017). In the vein of authenticity, I also looked

for information that conflicted with the patterns or trends that emerged in order to ensure accurate and meaningful findings (Buss & Zambo, 2016; Mertler, 2017). Finally, from these categories, I looked for connections between them, which ultimately were my reported themes. I met with my dissertation chair weekly during this inductive analysis process to clarify and focus my thinking regarding the findings that were emerging. Once this process was completed, I stepped back from my research for a period of introspection. This was an important part of my action research and the reflective practices, ensuring objectivity and an open-minded interpretation of data (Mertler, 2017). Only after such reflection did I create my summative point of view.

Representation of Findings

The majority of quantitative findings for this study are displayed in table form and referred to within the larger results and narrative discussion. However, when particular results were of interest and lend themselves to a more graphical representation, figures were incorporated appropriately.

The majority of qualitative findings for this study are shared narratively through an exploration of themes, setting, and descriptive quotes from participants. With a Masters of Fine Arts degree in screenwriting, I am extremely well versed in the narrative structure and by nature, my writing style lends itself to storytelling. Selected data and findings are visually displayed in table form organized by themes, theme-related components, and assertions (Buss & Zambo, 2016), incorporating figures or direct quotes when appropriate.

Procedures and Timeline

The procedural timeline associated with this study is categorized into four phases as summarized in Table 3.11.

Table 3.11. *Procedural Timeline*

	Phase I	Phase II	Phase III	Phase IV
Timeframe	• 1 week (Jan. 13-19, 2020)	• 5 weeks (March 23-April 26, 2020) • NOTE: Midway In the semester (March 16-22) there was a two-week gap of instruction due to spring break and the government-mandated COVID-19 mandated campus closure, after which is when we started using EdApp.	• 1 week (April 27-May 3, 2020)	• 26 weeks (May 4-Oct. 20, 2020)
Participant's Role	• Complete consent form • Complete LASSI pretest	• Complete five worlds • Complete reflection journal assignment entries for each world	• Complete LASSI posttest • Complete Final Self-Reflection Learning Quest	

	Phase I	Phase II	Phase III	Phase IV
Researcher's Role	• Distribute consent form • Administer LASSI pretest	• Creation of course within EdApp • Review and download reflection journal assignment responses	• Administer LASSI posttest • Release the final Your Opinion Matters World with Self-Reflection Learning Quest. • Retrieve EdApp metrics	• Complete inductive analysis for reflection journal assignment entries and Final Self-Reflection Learning Quest • Calculate descriptive statistics for LASSI pre and posttest subscale • Run dependent t-tests for LASSI pre and posttest subscales • Calculate descriptive and frequency statistics for Final Self-Reflection Learning Quest Responses • Calculate descriptive and inferential statistics for EdApp data • Integrate qualitative and quantitative findings • Member checking • Meet weekly with dissertation chair • Compose the dissertation • Present the findings to my dissertation committee

Phase I- Jan. 13-19, 2020 (1 week)

In Phase I, consent forms (see Appendix E) were distributed during the first class to students enrolled in my Spring 2020 first-year experience course. Consenting participants then completed the LASSI as a pretest measure.

Phase II- March 23-April 26, 2020 (5 weeks)

During Phase II, which comprises the bulk of the semester with a timeframe of five weeks, participants worked through the five worlds in the LMS. Upon the completion of each world, participants completed journal reflections based on the prompts provided (see Appendix C). I downloaded and reviewed the participants' reflection journal assignment entries upon receipt. It should be noted that prior to this timeframe (March 16-27), there was a gap of instruction for a period of two weeks as necessitated by Spring Break and the government-mandated closure of campus due to the COVID-19 pandemic. It was during this gap that the class transitioned from Blackboard to EdApp.

Phase III- April 27-May 3, 2020 (1 week)

Phase III took place during the last week of the course. Participants completed the LASSI as a posttest measure and completed the Final Self-Reflection Learning Quest (see Appendix D). Finally, I retrieved EdApp data, specifically numbers of Extra-Credit Quests Completed, Logins, Badges, XP, and Stars Earned and Spent at the star bar for a chance to win a gift certificate.

Phase IV- May 4-Oct. 20, 2020 (26 weeks)

Phase IV commenced after the course was finished. I meet with my dissertation chair most weeks during this phase as I analyzed and then wrote about the findings. I

completed the inductive analysis process for the five reflection journal assignments and the Final Self-Reflection Learning Quest. In addition, I calculated descriptive statistics (measures of central tendency and dispersion) and inferential statistics (dependent *t*-tests) for the LASSI pre and post-test subscales. I calculated descriptive statistics for the Ed App data. Additionally, I calculated descriptive and frequency statistics for multiple-choice and Likert-scale responses on the Final Self-Reflection Learning Quest. Before finalizing my themes, I shared my findings with the participants via email so they would have the opportunity to provide feedback on the accuracy of the interpretations and I could make adjustments as needed. Finally, I composed the dissertation manuscript of my research and presented the content to my dissertation committee.

Rigor & Trustworthiness

Validity and reliability are strategies of rigor and trustworthiness for quantitative designs and these have been described previously in the sections about the individual data collection instruments. Qualitative designs embrace other approaches to support the accuracy of findings and convince the reader of such accuracy (Creswell, 2014). As a result, the qualitative findings from my mixed-method study used thick, rich description, methodological triangulation, peer debriefing, member checking, and an audit trail to ensure rigor and trustworthiness (Creswell, 2014; Guba, 1981; Mertler, 2017; Shenton, 2004). Each of these is described below in detail.

Thick, Rich Description

I employed thick, rich descriptions that transport readers into the setting by providing an element of shared experiences in the discussion that will offer additional perspectives about the themes interpreted through qualitative analysis of varied reflection

journal assignment and Final Self-Reflection Learning Quest transcriptions (Creswell, 2014; Mertler, 2017). This was done through the sharing of specific examples and detailed, descriptive accounts from these data sources, including negative cases to add credibility (Buss & Zambo, 2016).

Methodological Triangulation

Themes derived from my research were corroborated by examining evidence from the convergence of varied sources (Creswell, 2014; Shenton, 2004), such as the five reflection journal assignments and the Final Self-Reflection Learning Quest responses, EdApp metrics, and pre-post LASSI scores measuring self-regulated learning and motivation. The methodological triangulation process of using multiple methods and data collection strategies (Mertler, 2017) provided a different way of seeing and interpreting the data (Greene, 2007; Maxwell, 2010). Therefore, combining the quantitative findings from the pre-post LASSI scores measuring self-regulated learning and motivation with the qualitative findings of the reflection journal assignments and Final Self-Reflection Learning Quest responses, and EdApp metrics served to ensure consistency and accuracy.

Peer Debriefing

My dissertation advisor frequently reviewed and critiqued my process of data collection, analysis and interpretation as a means of peer debriefing, verifying my processes as a professional and auditor of my research (Creswell, 2014; Mertler, 2017). Having this auditor not only added credibility, but served as a source of recommendations for additional ways the data can be analyzed, enhancing the quality of the study overall, ensuring my research is as rigorous as possible in order to reach its full potential.

Member Checking

In line with member checking (e.g., Bradbury & Mather, 2009), I reviewed my findings with the participants via email with an opportunity to provide feedback on the accuracy of the interpretations so I could make any adjustments as needed. Only a couple of the students responded, which I believe is likely due to the fact the students were not consistently checking their university email account during the summer months. However, the students who replied did not have any changes but responded positively, saying they enjoyed the class and/or would recommend it to others.

Audit Trail

In order to create a path of evidence noting how research was conducted and interpreted, researchers using qualitative data need to document procedures extremely well in an audit trail to ensure there is not a shift in the definition of codes associated with qualitative methods such as reflection journals (Creswell, 2017). I accomplished this by constantly comparing the data with the codes and my accompanying memos about how these codes were derived (Creswell, 2017; Shenton, 2004). I also documented my reflections on this process in analytical memos to demonstrate the origins of my codes and categories. I noted how I transformed data into codes, categories, and ultimately patterns, taking special notice of how I connected concepts (Saldaña, 2013). This is important in the event my study is replicated as an area for future research.

Plan for Sharing and Communicating Findings

Research findings in the form of a PowerPoint presentation will be presented to the office of academic affairs, to include the provost, university chancellor, chair of the Humanities, and first-year experience faculty committee members. This presentation will

touch on background information, review of literature highlights, the purpose of the study, and methodology; however, the main focus will be the results, conclusions, and action plan (Mertler, 2017). The chancellor's and provost's recommendations for the action plan, as well as the committee's suggestions regarding the presentation content in terms of additional audiences (i.e. students, staff, and faculty), will be documented. If needed, the PowerPoint will be adjusted to include these suggestions for subsequent presentations.

Given the universally applicable topic of gamification, findings will be presented during an open campus brown bag lunch seminar series, with an allotted time of approximately 30 minutes. This will give students, staff, faculty, and especially other first-year experience instructors, the opportunity to learn about the study and subsequent recommendations. A similar format to the office of academic affairs presentation will be utilized, however, content will not be as thorough due to time constraints. Thus, key findings and recommendations will be highlighted, followed by a question and answer portion designed to encourage discussion about the action plan.

Additionally, I will apply to present the findings at the South Carolina EdTech Conference, Eastern Educational Research Association Conference, Association for Educational Communications & Technology Conference, American Educational Research Association Conference, and the Annual Conference on the First-Year Experience. I will also submit findings in an article format to appropriate action research, educational technology, and first-year experience journals, such as the *International Journal of Educational Technology in Higher Education* and the *Journal of the First-Year Experience and Students in Transition*.

With all findings, the confidentiality of the participants has been protected by limiting the descriptions of individuals or settings so they are not easily identifiable; and as an added measure, pseudonym names were used for the flow of the presentation, of which the audience will be informed (Halai, 2006; Mertler, 2017).

CHAPTER 4

ANALYSIS AND FINDINGS

Analysis and Findings

The purpose of this action research study was to evaluate the implementation of a gamified curriculum for at-risk college students enrolled in a first-year experience class at JTU. Data was collected to address these research questions:

1. How and in what ways does the implementation of a gamified curriculum impact at-risk students' self-regulated learning skills?
2. How and in what ways does the implementation of a gamified curriculum impact at-risk students' motivation?
3. What are at-risk students' perceptions about the gamified curriculum on the quality of their learning experience?

This chapter presents an overview and analysis of the data collected through a mixed-methods action research study. Ten students took part in this study and were administered a pre- and post-intervention survey (LASSI). They also completed five reflection journal assignments and a Final Self-Reflection Learning Quest comprised of both Likert rating scale and multiple-choice questions as well as free-response prompts. This chapter includes both quantitative and qualitative findings. In the qualitative section, participant experiences with the study and my interpretations of the data are presented through the findings of three themes.

Quantitative Findings

Quantitative data collected in the study included participants' (a) scores on the LASSI, (b) responses to the Final Self-Reflection Learning Quest (c), and measurement of gamification elements in EdApp incorporated into the class. Data were analyzed using the open-source statistical analysis software program JASP (Version 0.12.2 for MacOS; 2020), with Microsoft Excel being used for selected computations and for the composition of selected figures.

Learning and Study Strategies Inventory

The LASSI (Weinstein et al., 1987) is a 10-scale, 64-item assessment of college students' awareness and use of learning and study strategies related to skill (Information Processing, Selecting Main Ideas, and Test Strategies), will (Anxiety, Attitude, and Motivation), and self-regulation (Concentration, Self Testing, Time Management and Using Academic Resources) (see Appendix B). There are 10 subscales of the LASSI: Anxiety, Attitude, Concentration, Information Processing, Motivation, Selecting Main Ideas, Self Testing, Test Strategies, Time Management, and Using Academic Resources. (See Appendix B for the complete list of LASSI instrument items and the subscales to which they belong.) Each subscale consisted of six questions, answered by the students using a Likert-type scale. The LASSI yields scores per subscale, but not a total survey score as this is a diagnostic instrument. Although some have doubted the constructs measured by the LASSI (Cano, 2006; Melancon, 2002; Ning & Downing, 2010), researchers have found it helpful as a predictor of academic performance (Cano, 2006; Dill et al., 2014; Marrs et al., 2009) and assessing motivation (Marrs et al., 2009).

Reliability Analysis. Normally, Cronbach's alpha reliability coefficient (Cronbach, 1951) is used to measure the reliability or internal consistency of a questionnaire. However, the small sample size of only 10 participants was inadequate to produce an unbiased estimate for the Cronbach's alpha coefficient (Yurdugül, 2008); consequently, a reliability analysis was not able to be conducted. However, the LASSI instrument itself has been demonstrated to have good internal consistency. According to the LASSI 3rd Edition Manual (Weinstein et al., 2016), the Cronbach's alpha reliability coefficient for the 10 LASSI subscales ranges from .76 to .87, with six scales producing internal consistency above .80. Generally, a Cronbach's alpha reliability coefficient of .70 is considered acceptable, although some sources accept a minimum threshold of .60 (Berger & Hänze, 2015; Tavakol & Dennick, 2011).

Descriptive statistics. Table 4.1 displays the descriptive statistics for the LASSI pretest-posttest as computed for each of the LASSI subscales: Anxiety, Attitude, Concentration, Information Processing, Motivation, Selecting Main Ideas, Self Testing, Test Strategies, Time Management, and Using Academic Resources. Each of the subscales contained six items where students offered a response on a Likert-type rating scale: (1) *Not at all typical of me*, (2) *Not very typical of me*, (3) *Somewhat typical of me*, (4) *Fairly typical of me*, and (5) *Very much typical of me*. Although not all subscales saw significant improvement, it is worth noting that the change in class modality as a result of the COVID-19 pandemic may have influenced these results.

Anxiety subscale descriptive statistics. The mean score of student responses for the Anxiety subscale of the LASSI at the start of the first-year experience class was 13.80

(*SD* = 4.34). The mean score of student responses for the Anxiety subscale of the LASSI after completing the first-year experience class was 13.40 (*SD* = 5.60).

Attitude subscale descriptive statistics. The mean score of student responses for the Attitude subscale of the LASSI at the start of the first-year experience class was 22.50 (*SD* = 4.14). The mean score of student responses for the Attitude subscale of the LASSI after completing the first-year experience class was 21.50 (*SD* = 3.72).

Concentration subscale descriptive statistics. The mean score of student responses for the Concentration subscale of the LASSI at the start of the first-year experience class was 17.00 (*SD* = 3.62). The mean score of student responses for the Concentration subscale of the LASSI after completing the first-year experience class was also 17.00 (*SD* = 5.10).

Information Processing subscale descriptive statistics. The mean score of student responses for the Information Processing subscale of the LASSI at the start of the first-year experience class was 18.90 (*SD* = 4.15). The mean score of student responses for the Information Processing subscale of the LASSI after completing the first-year experience class was 23.20 (*SD* = 3.52). An increase in the mean score on the Information Processing subscale posttest suggests that participants learning and study strategy skills improved after experiencing the gamified curriculum innovation.

Motivation subscale descriptive statistics. The mean score of student responses for the Motivation subscale of the LASSI at the start of the first-year experience class was 19.60 (*SD* = 3.03). The mean score of student responses for the Motivation subscale of the LASSI after completing the first-year experience class was 21.80 (*SD* = 5.10). An increase in the mean score on the Motivation subscale posttest suggests that participants

learning and study strategy skills improved after experiencing the gamified curriculum innovation.

Selecting Main Ideas subscale descriptive statistics. The mean score of student responses for the Selecting Main Ideas subscale of the LASSI at the start of the first-year experience class was 15.70 (*SD* = 4.03). The mean score of student responses for the Selecting Main Ideas subscale of the LASSI after completing the first-year experience class was 17.00 (*SD* = 5.31). An increase in the mean score on the Selecting Main Ideas subscale posttest suggests that participants learning and study strategy skills improved after experiencing the gamified curriculum innovation.

Self Testing subscale descriptive statistics. The mean score of student responses for the Self Testing subscale of the LASSI at the start of the first-year experience class was 15.20 (*SD* = 3.80). The mean score of student responses for the Self Testing subscale of the LASSI after completing the first-year experience class was 21.30 (*SD* = 5.33). An increase in the mean score on the Self Testing subscale posttest suggests that participants' self-regulation regarding learning and study strategy skills improved after experiencing the gamified curriculum innovation.

Test Strategies subscale descriptive statistics. The mean score of student responses for the Test Strategies subscale of the LASSI at the start of the first-year experience class was 16.60 (*SD* = 2.46). The mean score of student responses for the Test Strategies subscale of the LASSI after completing the first-year experience class was 17.90 (*SD* = 5.34). An increase in the mean score on the Test Strategies subscale posttest suggests that participants learning and study strategy skills improved after experiencing the gamified curriculum innovation.

Time Management subscale descriptive statistics. The mean score of student responses for the Time Management subscale of the LASSI at the start of the first-year experience class was 14.60 (*SD* = 3.50). The mean score of student responses for the Time Management subscale of the LASSI after completing the first-year experience class was 16.90 (*SD* = 3.87). An increase in the mean score on the Time Management subscale posttest suggests that participants' self-regulation regarding learning and study strategy skills improved after experiencing the gamified curriculum innovation.

Using Academic Resources subscale descriptive statistics. The mean score of student responses for the Using Academic Resources subscale of the LASSI at the start of the first-year experience class was 15.90 (*SD* = 4.68). The mean score of student responses for the Using Academic Resources subscale of the LASSI after completing the first-year experience class was 19.20 (*SD* = 4.52). An increase in the mean score on the Using Academic Resources subscale posttest suggests that participants' self-regulation regarding learning improved after experiencing the gamified curriculum innovation.

Inferential statistics. Inferential statistics were used to test for significant differences as a result of the gamified curriculum intervention and to draw conclusions (Lee, Dinis, Lowe, & Anders, 2016). To check for normality within a set of data (Ralazi & Wah, 2011), the Shapiro-Wilk normality test (Shapiro & Wilk, 1965) was conducted. The Shapiro-Wilk outcomes indicated no significant deviation from normality for each subscale of the LASSI. A paired samples *t*-test was therefore used to compare the means of the participants' pretest and posttest scores for each LASSI subscale (Creswell, 2017). For each paired samples *t*-test, the alternative hypothesis was that the mean posttest score would be greater than the mean pretest score, with the corresponding null

hypothesis being that the mean pretest score would be greater than or equal to the mean posttest score (see Table 4.1). Based on the alpha threshold of .05 being used to determine significance (Mertler, 2017), the null hypothesis would be rejected for three of the subscales: Information Processing ($p = .021$), Self Testing ($p < .001$), and Using Academic Resources ($p = .029$); suggesting that the posttest scores for these three subscales are significantly greater than the corresponding pretest scores, which in turn would suggest that the gamified curriculum intervention had an impact on these variables. However, because multiple tests were run under the same research question, a Bonferroni adjustment was applied to reduce a type I error rate. Using the Bonferroni type adjustment helps to avoid reporting false positives (Streiner & Norman, 2011). To reduce the likelihood of discovering a false positive result, the alpha level threshold for determining if the results of a test were statistically significant needed to be lowered to account for the number of comparisons being made (Streiner & Norman, 2011). See Table 4.2 for the adjusted alpha level thresholds and rationale for each LASSI subscale. Of the ten total LASSI subscales, the only scale that had a statistical significance after the Bonferroni type adjustment was applied was the Self-Testing subscale ($p < .001$).

Table 4.1. *Descriptive Statistics and Results of Paired Samples t-Tests for Each Learning and Study Strategies Inventory Subscale*

Subscale	Pretest		Posttest		Paired Samples *t*-test Results		
	M	*SD*	*M*	*SD*	*t*	*df*	*p*
Anxiety	13.80	4.34	13.40	5.60	0.27	9	.60
Attitude	22.50	4.14	21.50	3.72	0.61	9	.72
Concentration	17.00	3.62	17.00	5.10	0	9	.50
Information Processing	18.90	4.15	23.20	3.52	-2.38	9	.02
Motivation	19.60	3.03	21.80	5.10	-1.52	9	.08

Subscale	Pretest		Posttest		Paired Samples *t*-test Results		
	M	*SD*	*M*	*SD*	*t*	*df*	*p*
Selecting Main Ideas	15.70	4.03	17.00	5.31	-0.9	9	.20
Self Testing	15.20	3.80	21.30	5.33	-4.48	9	< .001
Test Strategies	16.60	2.46	17.90	5.34	-0.71	9	.25
Time Management	14.60	3.50	16.90	3.87	-1.77	9	.06
Using Academic Resources	15.90	4.68	19.20	4.52	-2.17	9	.03

Note 1. N = 10.
Note 2. For all paired samples *t*-tests, the alternative hypothesis specifies that measurement one (the pretest score) is less than measurement two (the posttest score).

Table 4.2. *Rationale for Bonferroni Type Adjustment to Learning and Study Strategies Inventory Subscales*

Research Question	LASSI Subscale	Bonferroni Adjustment Rationale
RQ1: How and in what ways does the implementation of a gamified curriculum impact at-risk students' self-regulated learning skills?	• Information Processing • Selecting Main Ideas • Test Taking Strategies • Self Testing • Time Management • Using Academic Resources • Concentration	The Bonferroni adjustment was applied because seven LASSI subscales answer RQ1. Therefore, the alpha level of < .007 was used.
RQ2: How and in what ways does the implementation of a gamified curriculum impact at-risk students' motivation?	• Attitude • Motivation • Anxiety	The Bonferroni adjustment was applied because three LASSI subscales answer RQ2. Therefore, the alpha level of < .017 was used.

Final Self-Reflection Learning Quest

Originally, an in-person focus group was planned for the end of the semester to obtain data on students' perceptions of the gamification curriculum implemented in the

class. Due to the institution closing as a result of COVID-19, and all learning moving to online, this option was no longer feasible. Since not enough students were available to participate in a synchronous video session, an instructor designed self-reflection end of the semester survey assignment (Final Self-Reflection Learning Quest) was implemented. All 10 participants completed the survey which consisted of 51 questions (29 free-response, 11 Likert-type scale, and 11 multiple choice.).

Descriptive statistics. Descriptive statistics were calculated for the 11 Likert-rating scale questions in the Final Self-Reflection Learning Quest completed at the end of the semester. Students responded using a 6-point Likert-rating scale with the following options: (0) *Strongly Disagree* to (5) *Strongly Agree* (see Table 4.3). Overall, the elements of gamification were well received by the students. Of note is that stars, as a form of currency, motivated students the most to answer questions within each quest correctly ($M = 4.60$, $SD = 0.70$). Students then used these stars to play a game in which they had the potential to win an Amazon gift card. The chance of winning gift cards served as an additional source of motivation to perform better in class ($M = 4.50$, $SD = 0.90$). Moreover, the increased value of the gift cards over the class of the semester increased their desire to win one ($M = 4.40$, $SD = 1.00$).

Table 4.3. *Final Self-Reflection Learning Quest Likert-Rating Scale Questions*

	M	*SD*
EdApp has a lot of the elements I was hoping for in a gamification platform for our class.	4.10	1.20
EdApp reminders motivated me to finish my quests.	3.70	1.60
I liked our lessons being referred to as quests.	4.10	0.90
Leveling-Up and Badges motivated me to perform better on my lessons.	3.90	1.60

	M	*SD*
I liked the appearance and types of badges in EdApp.	4.30	0.90
Earning stars motivated me to answer questions correctly.	4.60	0.70
The chance of winning gift cards motivated me to perform better in the class.	4.50	0.90
The leaderboard motivated me to perform better on my quests.	3.60	1.70
The increase of gift card values from $5 to $20 during the course also increased my desire to win one.	4.40	1.00
All of the transitions associated with COVID-19 decreased my motivation this semester.	3.70	1.20
All of the transitions associated with COVID-19 decreased my ability to turn my assignments in on time.	3.80	0.60

Frequency counts were calculated for the multiple-choice survey responses (see Table 4.4). Perhaps the most notable finding is that 80% of the students accessed the class on their phone. Additionally, the majority (70%) of the students felt the class was better than other ones they have taken. No one thought it was worse. There was no clear preference as to the presentation modality of educational content in EdApp. Twenty-percent of students opened EdApp to check their status on the Leaderboard, whereas 40% did so because they needed to complete an assignment. It is worth pointing out that an email notification that was generated from the instructor about an assignment being due resulted in 30% of the students having opened EdApp, in contrast to only one student who opened EdApp from an app designed and generated notification. Seventy percent of students said playing games was their favorite part of EdApp, while there was an even distribution of responses for the type of activity/game in EdApp they identified as their favorite. Sixty percent of students accessed EdApp two to six times a week for reasons not associated with their checking the Leaderboard.

Table 4.4. *Frequency Counts of the Final Self-Reflection Learning Quest Multiple-Choice Questions*

Question	Responses (for each question, 10 total responses)	Counts
Would you describe this course as better, worse, or just different than other ones you have taken?	Better	7
	Worse	0
	Just different	3
During the first half of the semester did you ever look at the achievements area on Blackboard for our class to see if you had any badges?	I NEVER looked at the achievements section in Blackboard.	5
	I looked FREQUENTLY at the achievements section in Blackboard.	1
	I only looked ONCE OR TWICE at the achievements section in Blackboard.	4
During the first half of the semester, did you choose to watch any of the animated videos associated with the badges in the achievement section in Blackboard?	I did not even know they existed.	5
	No	2
	Yes	3
How do you usually access EdApp?	Computer	2
	Phone	8
	Tablet	0
What is your favorite way to answer questions in EdApp?	CIRCLE the answer	4
	CLICK the answer	5
	DRAG the answer	0
	Select the correct CHAT	0
	BUBBLE answer	0
	TYPE out the answer	1
	Strongly Agree/Disagree SLIDER	0
What is your favorite way to read content in EdApp?	BULLETED Lists	4
	Clicking on EXPANDABLE lists	3
	SCROLLING thru text sequences with arrows	3

Question	Responses (for each question, 10 total responses)	Counts
What was the #1 thing that usually made you open EdApp?	I knew it was time to complete my work	4
	I received a notification from EdApp	1
	I received an email that an assignment was due	3
	I wanted to check the leaderboard	2
	I wanted to play the Star Bar	0
Which experience did you like the most on EdApp?	Reading Content	0
	Answering Questions	0
	Checking the Leaderboard	2
	Playing Games in the lesson	7
	Playing the Star Bar to win a gift certificate	1
What is your favorite activity/game in EdApp?	Jeopardy	0
	Building entire sentences with a word bank	1
	Filling in missing letters while timed	3
	Filling in the missing words of a sentences with a word bank	2
	Word Searches	3
	Drawing a line to connect pairs of information	1
How often do you open EdApp?	Everyday	2
	Once a week	1
	2-6 times a week	6
	Every 2 weeks	1
	Every 3-4 weeks	0
How often did you check the leaderboard?	Frequently, I was curious to see the stats.	3
	Never	2
	Only when I was working on my quests	0
	Rarely	4
	Whenever I received a notification	1

Measurement of Gamification Elements in EdApp

The EdApp gamification platform effectively captured student data in terms of Experience Points (XP), Stars Earned, Stars Spent, Gift Certificates Won in the Star bar, Logins, Badges Earned and Extra Credit Quests Completed for More Stars. Detailed descriptions of these gamification elements were provided in Chapter 3.

Descriptive statistics. Descriptive statistics were used to describe the basic features of the gamification data collected in the study. They provide simple summaries about the sample and the measures (Creswell, 2017). Descriptive statistics were calculated for student data retrieved from the EdApp platform regarding the following gamification elements: XP, Stars Earned, Stars Spent, Gift Certificates Won in the Star Bar, Logins, Badges Earned and Extra Credit Quests Completed for More Stars (see Table 4.5). These measures are not necessarily mutually exclusive. For example, students spent stars to play a game that gave them the chance of winning an Amazon gift certificate.

Table 4.5. *Descriptive Statistics for Gamification Element Counts While Using EdApp*

Gamification Element	*M*	*SD*
Experience Points (XP)	1340.20	465.23
Stars Earned	246.90	62.47
Stars Spent	48.00	85.16
Gift Certificate won in the Star Bar	0.80	0.79
Logins	60.00	57.42
Badges Earned	9.70	1.16
Extra Credit Quests Completed (for more stars)	5.20	3.39

Inferential statistics. Without any context, it is difficult to ascertain whether the gamification elements have intrinsic value. Consequently, a series of analyses were performed in order to identify statistically significant correlations (using Pearson's *r*) between LASSI subscale scores and the gamification element counts reported in Table 4.5. The Pearson correlation coefficient, also referred to as Pearson's *r*, is the covariance of the two variables divided by the product of their standard deviations; it shows a measure of strength of the association between the two variables (Pearson, 1985).

Table 4.6 provides a summary of the bivariate relationships that yielded the strongest and most significant correlations when using Pearson's *r* as the computed correlation coefficient. To select these bivariate relationships from the complete set of correlations performed I used a threshold value of *r* with an absolute value greater than or equal to 0.8 (Ratner, 2009). Note that one bivariate relationship yielded a strong negative correlation, while the remaining eight bivariate relationships yielded strong positive correlations. However, because Pearson's *r* assumes normality, it was necessary to perform a Shapiro-Wilk test for normality on each of these bivariate relationships to determine whether the corresponding Pearson's correlation is valid. Of the nine bivariate relationships listed, six are considered normal based on their respective Shapiro-Wilk test *p*-values being greater than .05. To help visualize the linearity of the relationships that is required for Pearson's *r*, scatterplots of these six strongly correlated bivariate relationships are shown in Figures 4.1 through 4.6.

Table 4.6. *Pearson's* r *for Identified Bivariate Relationships with Strong Correlations*

Measure	1	2	3	4	5	6	7	8	9	10	11	12
1. Information Processing Posttest	—											
2. Information Processing Pretest	-.105	—										
3. Information Processing Percent Change	.594	-.847**	—									
4. Concen-tration Posttest	.427	**-.331**	.500	—								
5. Using Academic Resources Posttest	.822**	.227	**.283**	.521	—							
6. XP	**.903****	**-.228**	.634*	**.632***	**.778****	—						
7. Stars Earned	**.891****	**-.103**	**.531**	**.707***	**.802****	.872****	—					
8. Stars Spent	.210	-.891****	.871**	.281	-.025	.328	.110	—				
9. Extra Credit Quests Completed	.833**	-.085	.509	**.366**	**.744**	**.886****	.744*	.302	—			
10. Badges Earned	.615	**-.377**	.567	**.808****	**.458**	**.787****	.794**	.242	**.497**	—		
11. Chance to win gift card motivated student to do better in class	**.854****	.079	.397	**.359**	**.724***	**.776****	**.840****	.098	.848**	.507	—	
12. Increase in gift card value from $5 to $10 increased student desire to win one	**.823****	.039	.410	**.316**	**.693***	**.774****	**.783****	.151	**.922*****	**.417**	.947****	—

Note 1. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

Note 2. Values of *r* shown in **bold** pass the Shapiro-Wilk test for normality (i.e., the Shapiro-Wilk test *p*-value was not less than 0.05, and thus we fail to reject the null hypothesis of normality)

The Information Processing subscale posttest score from the LASSI strongly correlated with XP gamification element ($r = 0.903$, $p < .001$) (see Figure 4.1).

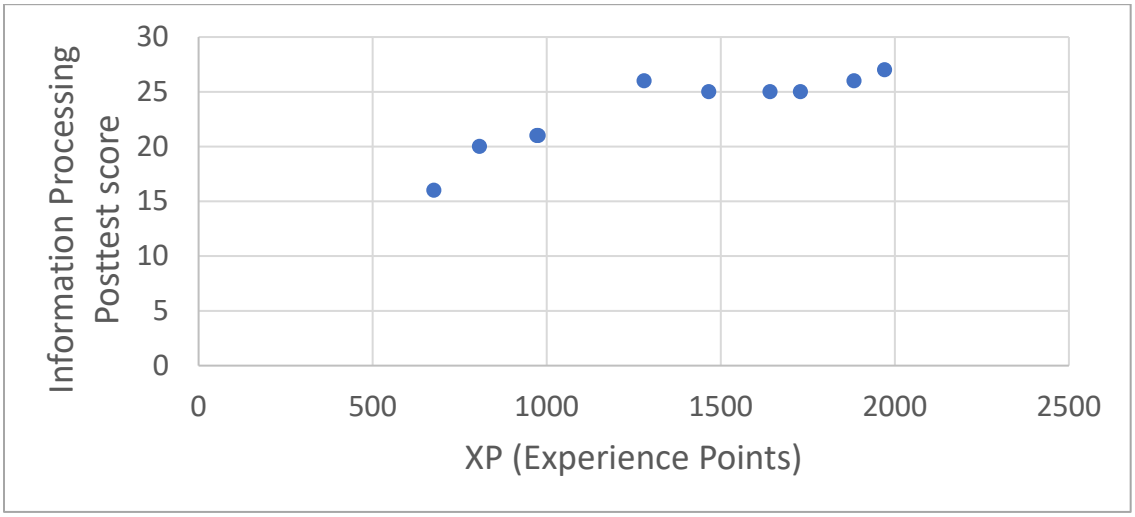

Figure 4.1. Scatterplot of the Information Processing subscale posttest score versus the XP (Experience Points) gamification element.

The Information Processing subscale posttest score from the LASSI strongly correlated with stars earned ($r = 0.891$, $p < .001$) (see Figure 4.2).

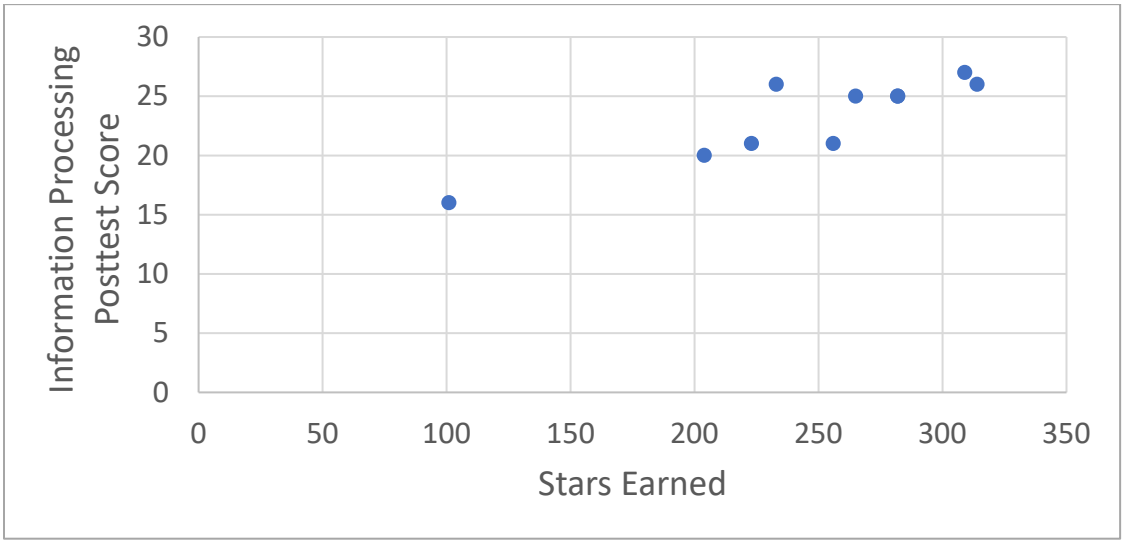

Figure 4.2. Scatterplot of the Information Processing subscale posttest score versus stars earned.

The Concentration subscale posttest score from the LASSI strongly correlated with badges earned ($r = 0.808$, $p = .001$) (see Figure 4.3).

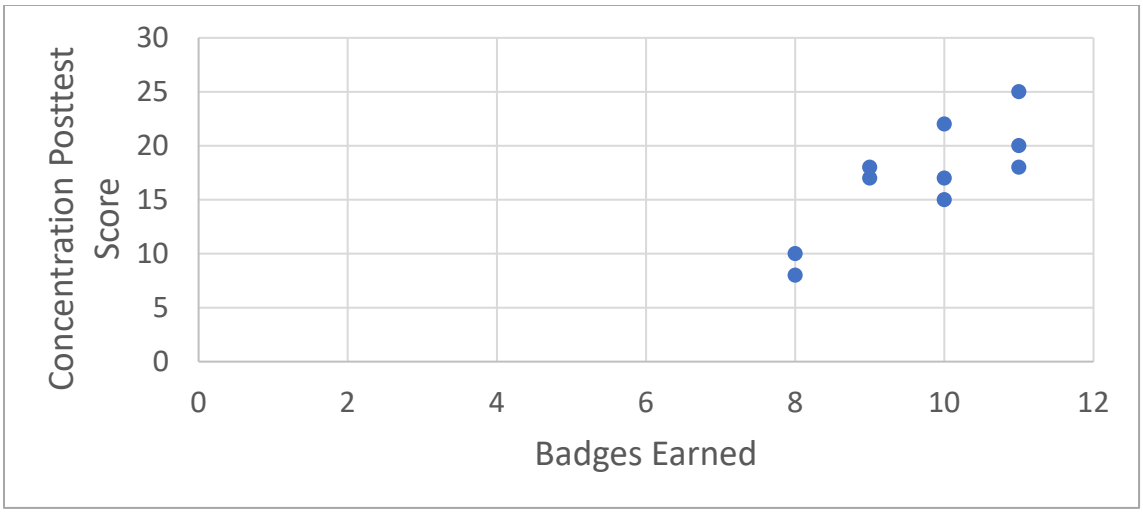

Figure 4.3. Scatterplot of the Concentration subscale posttest score versus badges earned.

The Information Processing subscale posttest score from the LASSI strongly correlated with the extent to which the chance of winning a gift card motivated the student to do better in class ($r = 0.854$, $p < .001$) (see Figure 4.4).

The Using Academic Resources subscale posttest score from the LASSI strongly correlated with the Stars Earned gamification element ($r = .802$, $p = .003$) (see Figure 4.5).

The Information Processing subscale posttest score from the LASSI strongly correlated with the Likert-scale score reflecting the extent to which an increase in gift card value from $5 to $20 during the class increased the student's desire to win one ($r = 0.823$, $p = .002$) (see Figure 4.6).

See Appendix F (Figures F.1 and F.2) for the full Pearson correlation coefficient analysis outcomes, showing the strength of the association between each subscale of the LASSI pretest and posttest and the seven gamification elements.

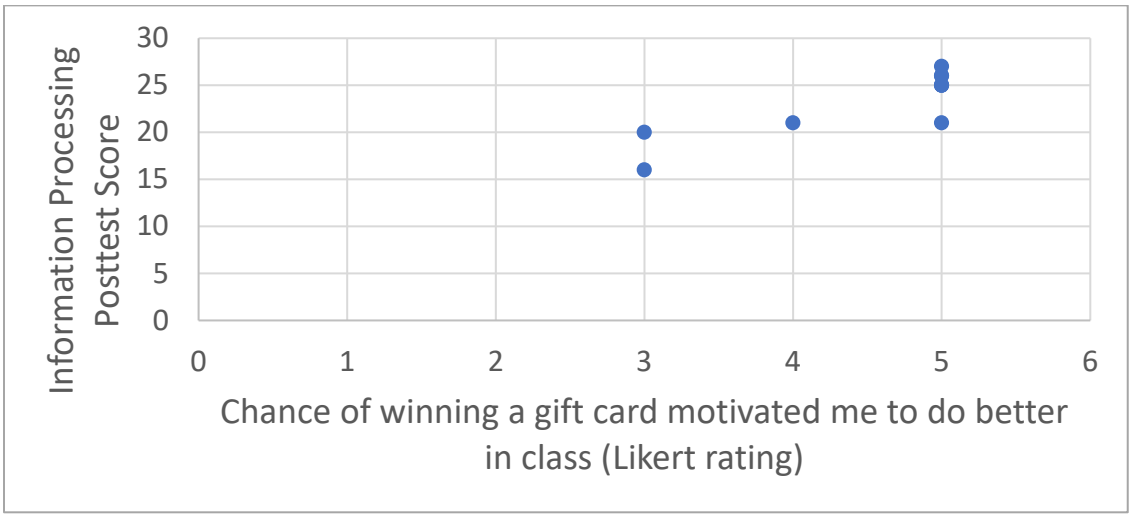

Figure 4.4. Scatterplot of the Information Processing subscale posttest score versus the extent to which the chance of winning a gift card motivated the student to do better in class.

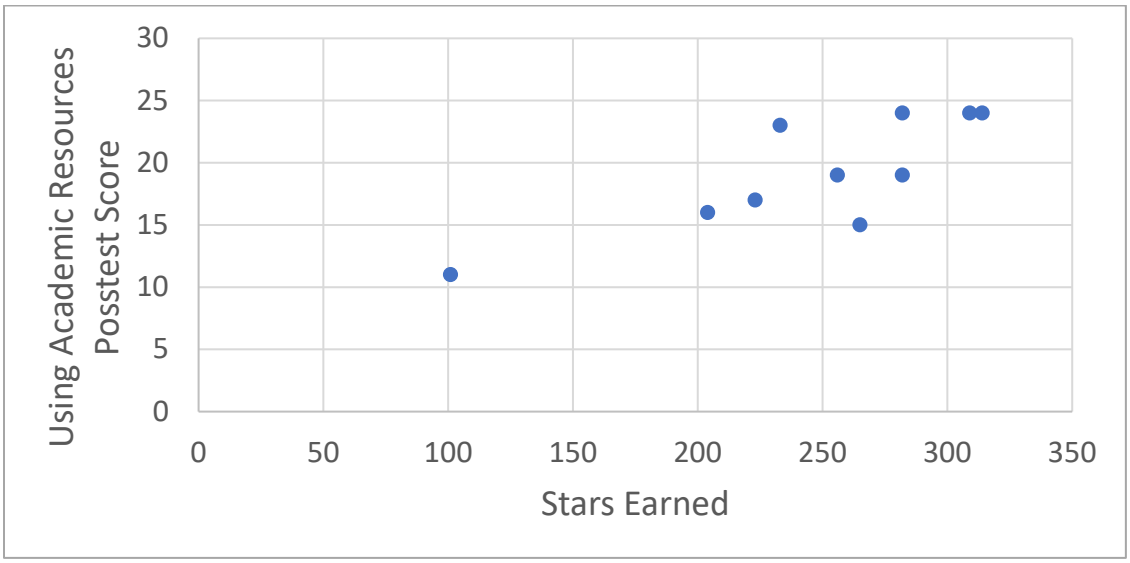

Figure 4.5. Scatterplot of the Using Academic Resources subscale posttest score versus the Stars Earned gamification element.

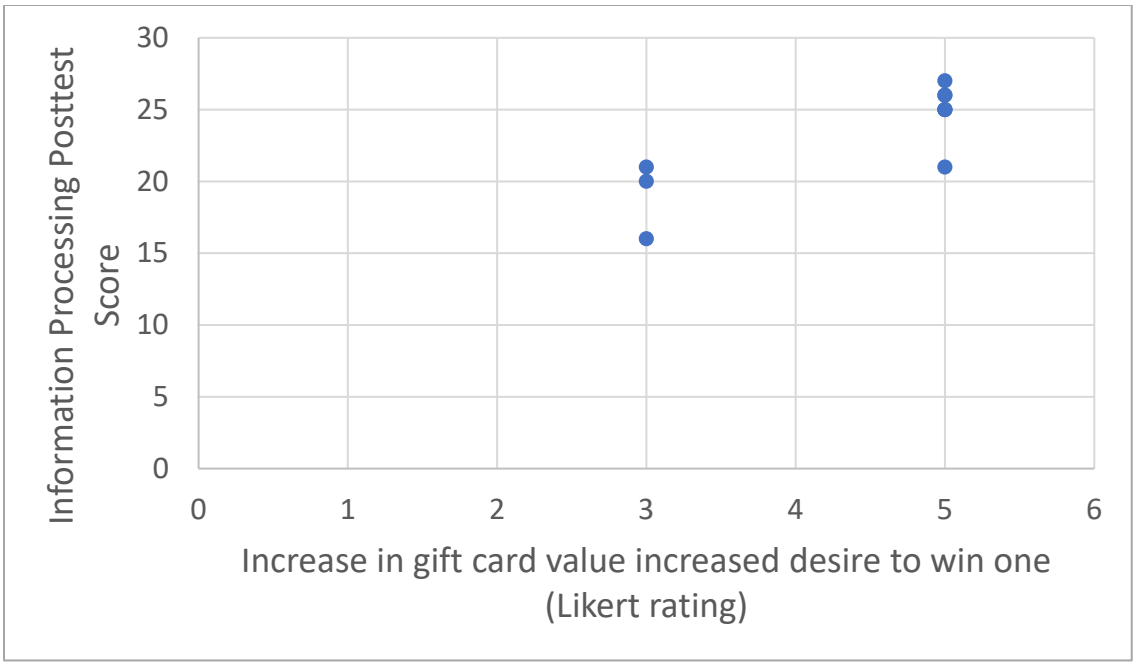

Figure 4.6. Scatterplot of the Information Processing Posttest Score versus the Likert-scale score reflecting the extent to which an increase in gift card value from $5 to $20 during the class increased the student's desire to win one.

Timeliness of submitting assignments. Data was to be collected regarding the timeliness of students submitting their assignments. Whether those submissions were submitted early or on time by students were to be analyzed. However, the change in class modality mid-semester due to the COVID-19 pandemic, coupled with the university's mandate to relax assignment deadlines due to the unprecedented circumstances, resulted in an estimate of at least 40% of the total class assignments being turned in during the last two weeks of class. These unforeseen factors potentially compromised the ability to determine the gamification platform's impact on students turning in assignments early or on time. This is consistent with the student responses to the last multiple-choice question on the Final Self-Reflection Learning Quest completed at the end of the semester (see Table 4.3) in which students answered the extent to which COVID-19 decreased their ability to turn in assignments on time ($M = 3.8$, $SD = 0.6$).

Qualitative Findings and Interpretations

I collected qualitative data from two sources: (a) five reflection journal assignments and (b) 32 open-ended free-response questions or prompts the students answered on the Final Self-Reflection Learning Quest (See Appendix D). Four of the reflection journal assignments contained two questions/prompts, with the remaining reflection journal assignment having three questions/prompts. Table 4.7 shows the total number of unique codes generated from these qualitative data sources. This section describes the qualitative analysis of this data and the resulting themes and findings.

Table 4.7. *Summary of Qualitative Data Source*

Type of Qualitative Data Source	Number	Total Number of Codes Applied
Reflection Journal Assignments	11 open-ended free-response questions/prompts	81
Final Self-Reflection Learning Quest (End of the Semester Survey Assignment)	29 open-ended, free-response questions/prompts	142
Total	40 questions/prompts	223

Analysis of Qualitative Data

My intent in analyzing the qualitative data was to accurately capture the participants' experience with the gamified curriculum using EdApp. First, I made separate Microsoft Word documents for each participant. Then, I copied and pasted all of the students' reflection journal entries and learning survey responses into their respective transcript documents. Next, I uploaded each of these documents separately into Delve, an online, computer-aided qualitative data analysis program. This way, I was able to

transcribe each individual student's journey throughout the class in its entirety. All coding described below was conducted using a sentence-by-sentence unit of analysis.

First cycle coding. As part of the first cycle of coding, I began with *Structural Coding*, where I assigned codes to segments of data per each of my research questions (Saldana, 2016), utilizing RQ1, RQ2, and RQ3 codes respectively. As well, *Structural Coding* was conducted first to familiarize myself with the transcribed data which offered me reassurance that the data I had collected did indeed align with my research questions. Also, upon doing *Structural Coding* I realized that there was a good deal of data associated with the gamification learning management system I utilized post COVID-19, EdApp. Upon consultation with my dissertation chair, I coded data that included the wording "EdApp" as RQ4 just in case the addition of a fourth research question may be justified with the unforeseen turn of events that the COVID-19 pandemic caused. See Figure 4.7 for an example of *Structural Coding* in Delve.

Q

Question

What is your favorite thing about EdApp?

K

[redacted]

That it has games included in the end of the lessons

RQ3- Perceptions of Gamification on Learning Experience

Figure 4.7. Structural coding in Delve.

Next, I went through all the data again, this time having applied *InVivo Coding. InVivo Coding* allowed me to seize my students' own words (Saldana, 2016) from their responses to the five reflection journal assignments and the Final Self-Reflection Learning Quest open-ended free-response questions/prompts. For me, this was my

favorite way of coding as I knew it to be an authentic and genuine representation of the students' experiences. Examples include, *losing is disheartening, learned about myself, and like a girl scout*. I could feel the excitement of my participants, as seen when Brianna said her open-ended learning reflection survey question response that the leaderboard activity made her feel, "Like a BOSS!!!" I generated a total of 93 unique codes during *InVivo Coding*.

Then, I reviewed all the data through a *Process Coding* lens, capturing words that ended in "ing" (Saldana, 2016). Codes such as the following were generated under the *Process Coding* method of coding: *using it* [EdApp] *on the go, attention grabbing, applying to other classes, bettering myself, completing school work, improving as a student, staying focused, thinking about my actions, managing my time, studying is different now, felt like buying something, spending stars*, etc. I generated a total of 34 unique codes during *Process Coding*.

As a fourth step of first cycle coding, I applied Descriptive codes to all elements of the data. It was helpful doing this step later rather than early in the first cycle coding process as I already had a solid understanding of my data. Consistent with the purpose of *Descriptive Coding*, I looked for points of unique interest, assigned codes related to gamification elements and I coded data to allow the reader to see what I saw and to hear what I heard (Saldana, 2016). Examples of codes generated regarding gamification elements were *leaderboard*, *badges*, *stars*, *quests*, and *XP*. I generated a total of 96 unique codes during *Descriptive Coding*. Figure 4.8 provides an example of an open-ended free-response question/prompt and how that one piece of qualitative data was coded for each method of first cycle coding.

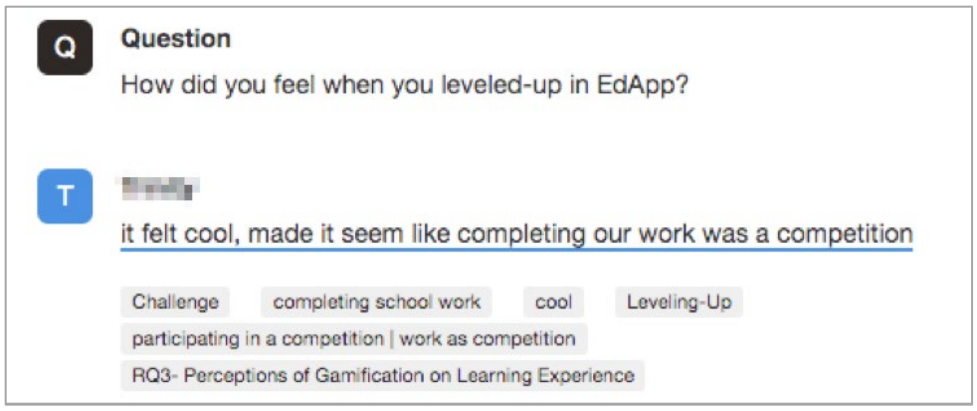

Figure 4.8. Reflection response coded with Structural, In Vivo, Process, and Descriptive coding.

Analytical memos served to provide points of reminders and possible areas to emphasize (Saldana, 2016). I created analytic memos in a notebook, and in two places in Delve throughout the qualitative data analysis process. To further organize the analytical memos, I generated an *Analytical Memos* code in Delve. Figure 4.9 shows how the data was captured under the *Analytical Memo* code.

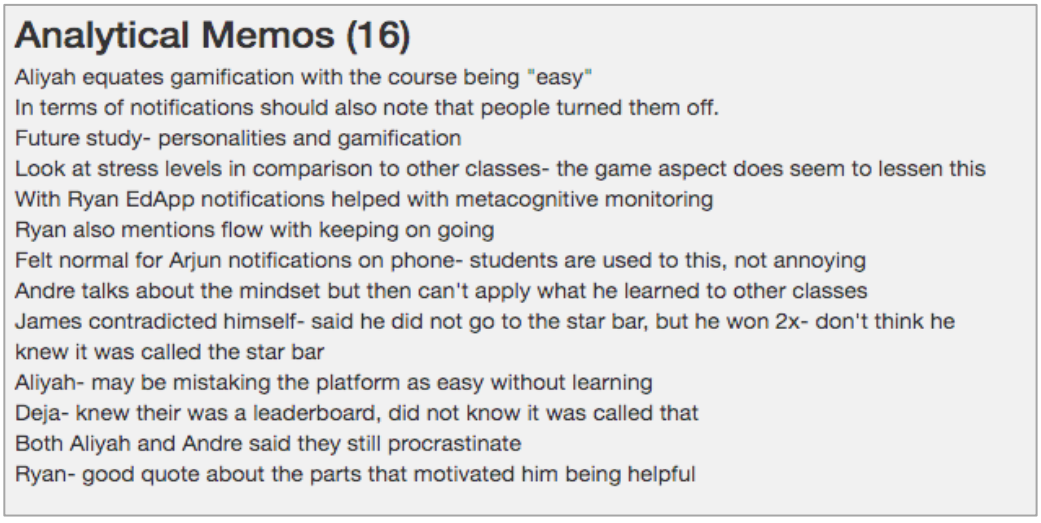

Figure 4.9. Analytical memos organized in Delve as its own code.

Additionally, I added analytical memos to the code descriptions in Delve when needed (see Figure 4.10).

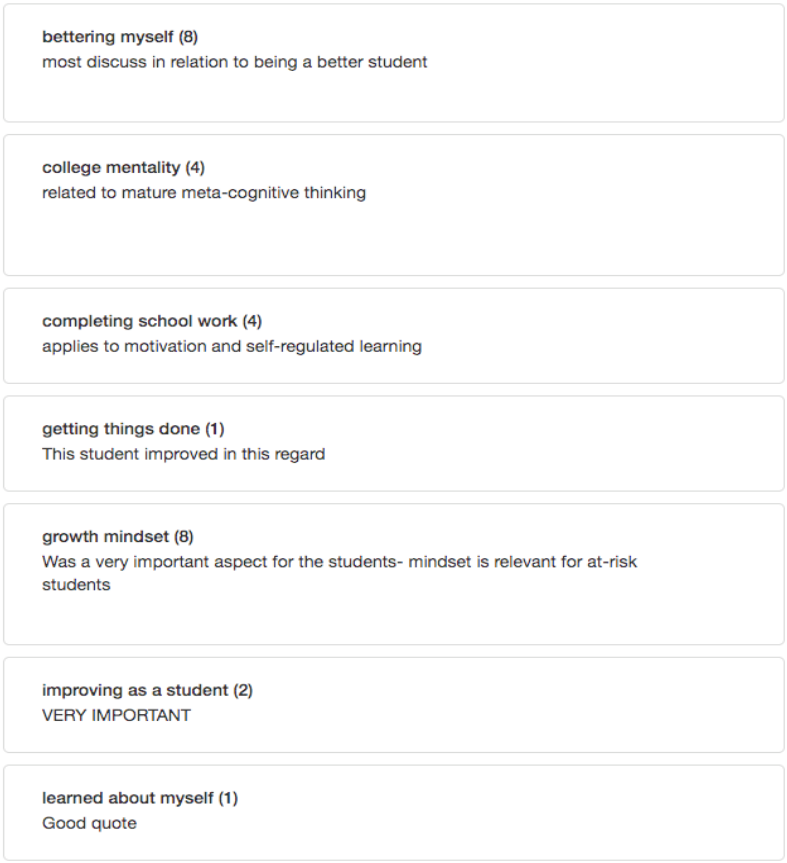

Figure 4.10. Analytical memos as code descriptions in Delve.

Transition method. After concluding first cycle coding, I was really curious how these 223 codes may align with the 6C's of motivation (Turner & Paris, 1995) as well as the LASSI subscales (Weinstein et al., 1987, 2016). Therefore, I began reorganizing my codes in Delve, nesting them under the 6C's and LASSI subscales and generating a spreadsheet (see Figure 4.11, with a more detailed version shown in Appendix G; see Figures G.1 and G.2).

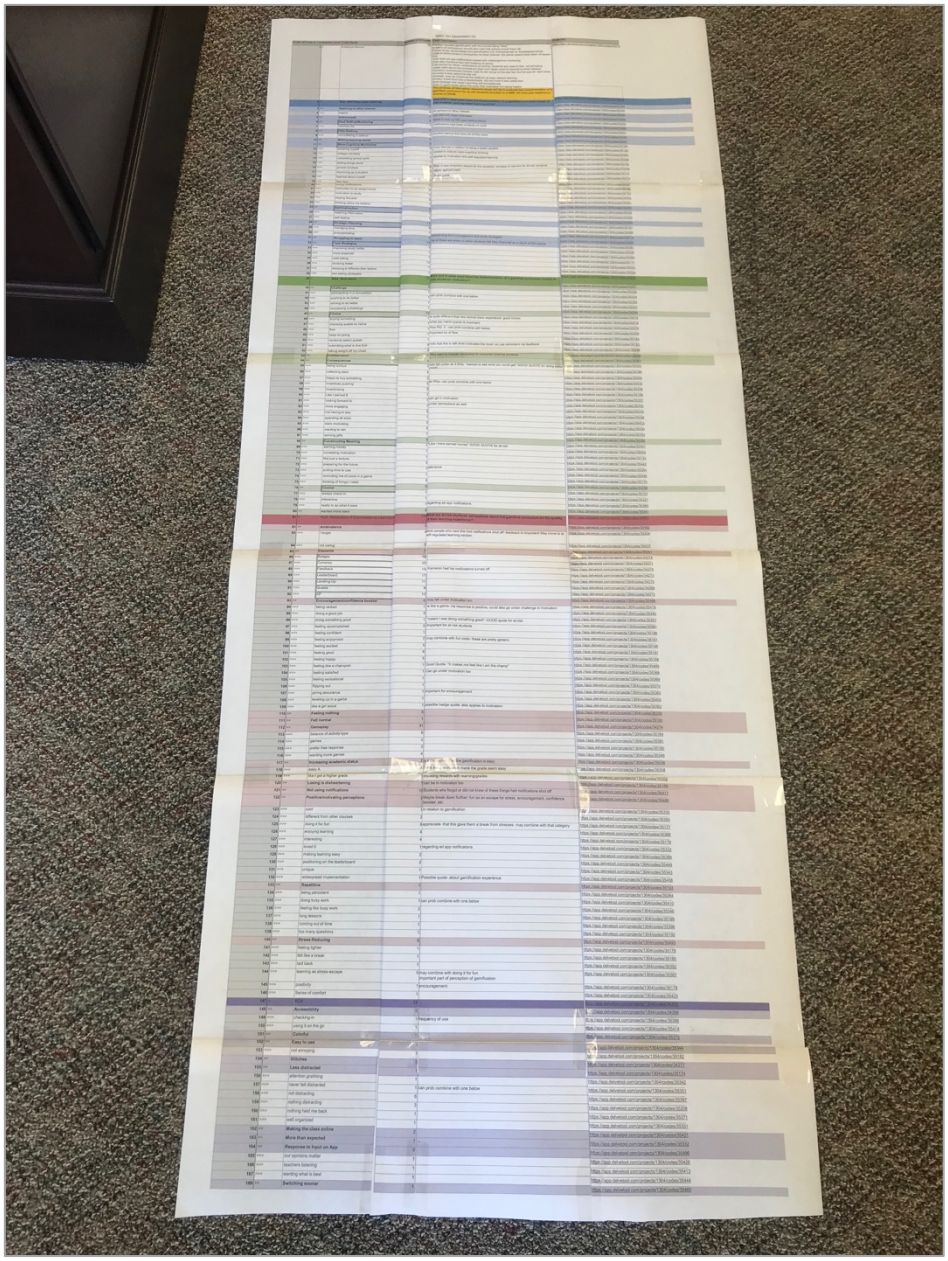

Figure 4.11. Transition method in a spreadsheet generated by Delve.

To a certain degree, this helped me form some primitive categories as part of my initial refinement. My intent of this process was more of *Code Mapping*, but the process seemed to morph more into an *Axial Coding* experience (Saldana, 2016). As a result of this

process, I was able to combine some codes that were similar, and thus reduced the number of unique codes to 168.

While the goal of a transition method is to assist in reorganizing and reconfiguring the corpus of data (Saldana, 2016), what I did seemed rather robotic and perfunctory and did not seem to capture the essence of the participants' experience. As such, after consulting with my dissertation chair, I then wrote the 168 codes on to individual post-it notes and loosely grouped them on my wall without thought to my research questions or categories specifically. Doing this allowed me to reopen my thinking and interpretation of the data as well as offered me a new way of interpreting the data without boundaries (see Figure 4.12).

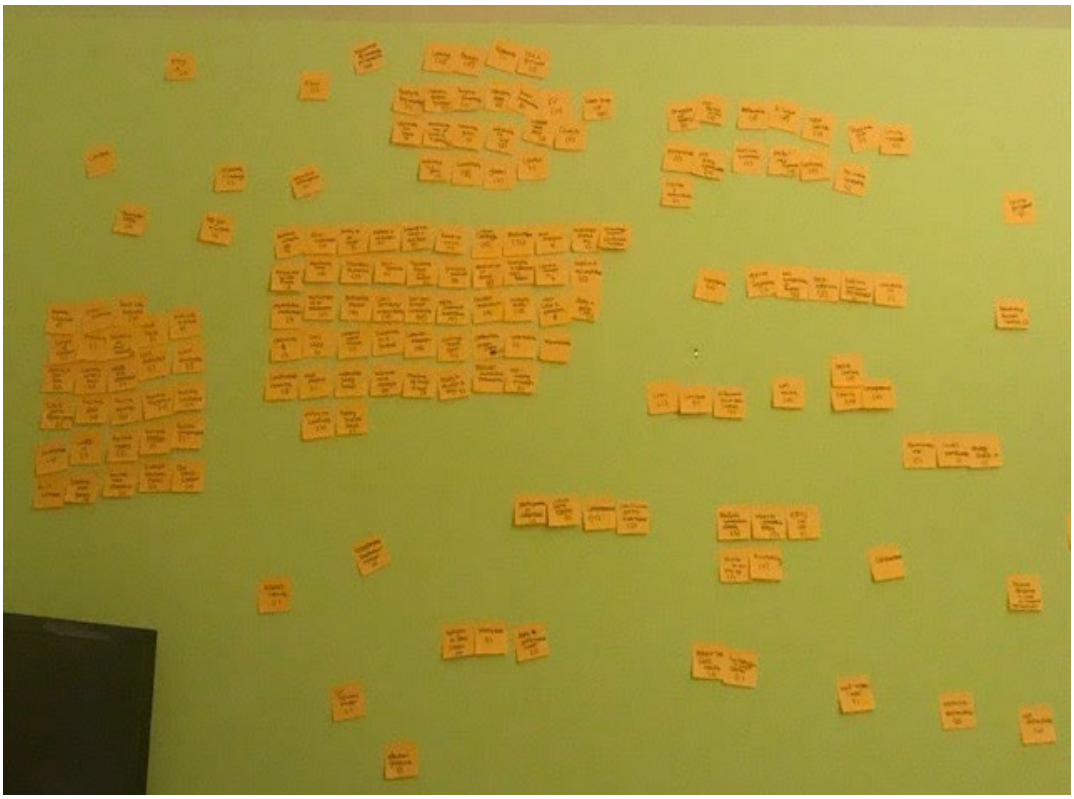

Figure 4.12. Codes on my wall.

Second cycle coding. Prior to starting second cycle coding, I stepped away from the qualitative data analysis process for a couple of days so I could come back with fresh eyes and a clear mind. Upon returning to the data scattered on my wall, I returned to *Axial Coding* to construct linkages between the data (Saldana, 2016). This time I saw how some codes could be separated further, and others combined. Next, I employed *Pattern Coding* to create smaller constructs and attribute additional meaning to what was emerging out of the data into categories. I repositioned the post-it notes as such, aligning similar codes horizontally along a vertically assembled category (see Figure 4.13). This ultimately resulted in 10 categories, comprising of a total of 158 unique codes (see Table 4.8).

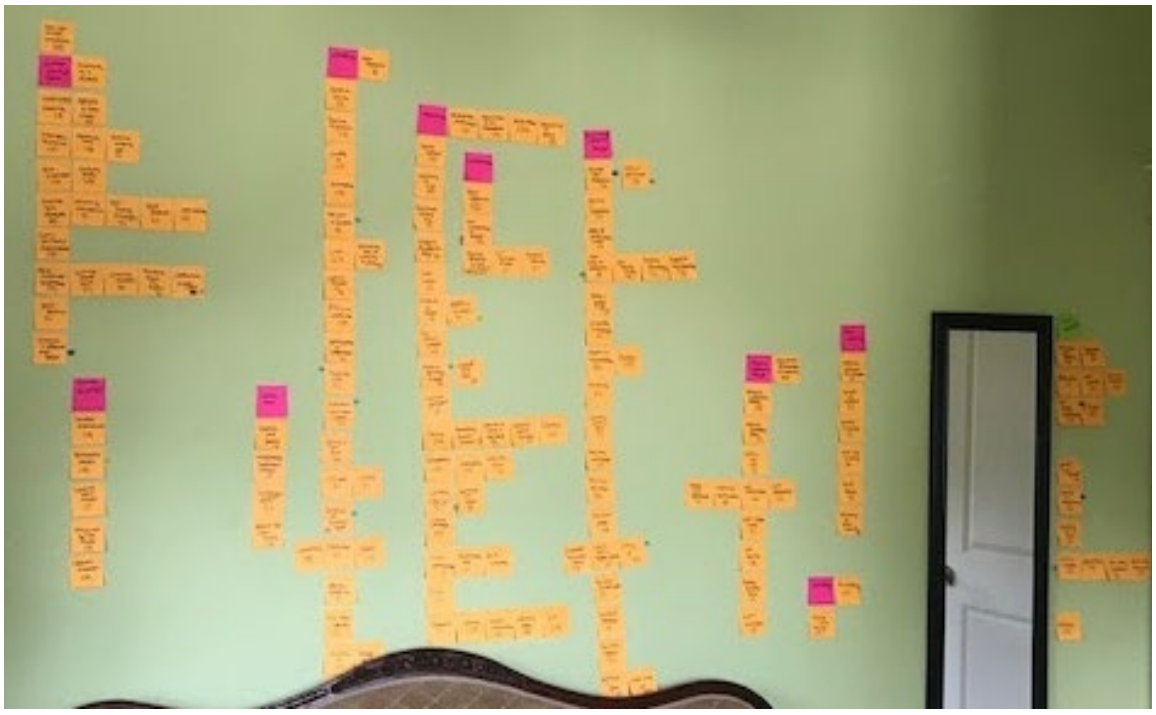

Figure 4.13. Category formation.

Table 4.8. *Category Names and Number of Unique Codes in Each Category*

Category Name	Number of Unique Codes
Improved Study Habits	23
Expanded Mindset	5
Student Engagement	27
Wanting More	4
Student Motivation	35
Collaboration	5
Encouragement/Confidence Builder	25
Making Learning Easier	11
Accessibility	2
Stress Reducer	6
Not a fan	15
Total	158

Last, I went back and looked at my analytic memos generated in Delve, and tagged with a transparent strip the coded post-it notes that had an analytic memo associated with them (see Figure 4.14). These analytical memos included researcher insights, student details, and potential student quotes to highlight in my writing.

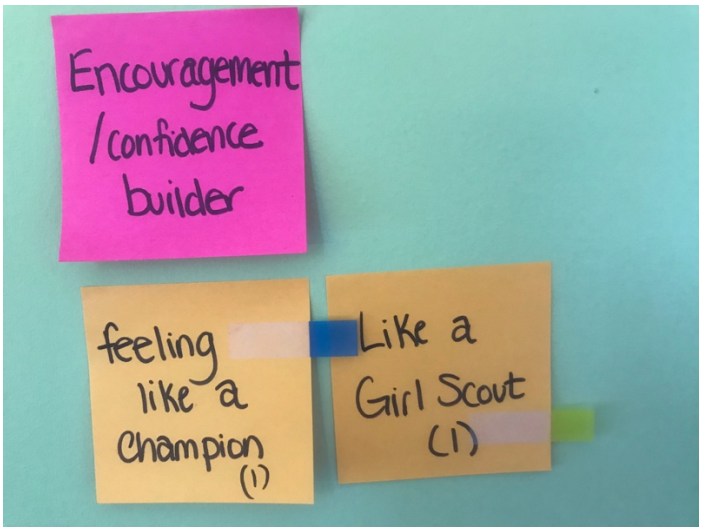

Figure 4.14. Tagged analytic memos.

Peer debriefing. Having one's process of data collection reviewed as a means of peer debriefing serves to verify one's process as a professional and auditor of the research (Creswell, 2017; Mertler, 2017). Peer debriefing with my dissertation chair was extremely helpful in terms of looking for things beyond the post-it notes adhered to the wall. She asked me a lot of "Why do you think this is?" questions that served to help me look at the data through a deeper lens. This process not only served as confirmation of my proposed categories and themes, but by verbalizing my rationale, I was able to see what data I really found to be significant and thus, really resonated with me as the researcher. Moreover, she helped me determine that my grouping of what I thought were outlier codes, could really be another category entirely, that of Not a fan. I eventually included the content of this category (see Figure 4.15) when reporting across all three themes.

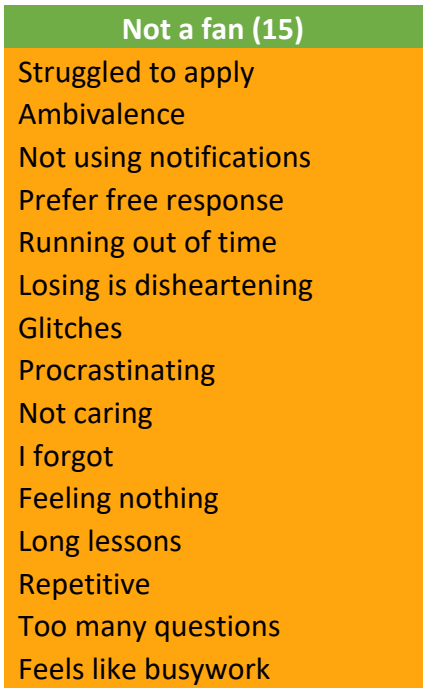

Figure 4.15. Not a fan category.

Themes and Findings

In order to generate themes as a result of my coding process, I strove to deeply reflect on the participant meanings and outcomes (Saldaña, 2016). When building my categories on the wall, I positioned the seemingly related ones next to each other which proved quite useful in identifying the three themes that resulted from my data (1) Students Perceived Their Academic Mindset and Study Habits to Have Improved (2) The Gamified Curriculum Served to Motivate Students, and (3) Students Perceived the Gamified Curriculum Made Their Learning Easier. The themes were written on blue post-it-notes and added to my wall of codes, categories, and now themes (see Figure 4.16).

Figure 4.16. Theme development.

I then created an Excel spreadsheet with these themes and categories, appropriately color-coded to match the post-it notes on my wall to have an accessible summary to aide in peer debriefing discussions and the writing of my findings (see Figure 4.17).

Students Perceived Their Academic Mindset and Study Habits to Have Improved	The Gamified Curriculum Served to Motivate Students			Students Perceived the Gamified Curriculum Made Their Learning Easier
Improved study habits	**Wanting more**	**Student motivation**	**Collaboration**	**Making learning easier**
Self-regulated learning	Wanting more games	Increasing motivation	Help seeking	Perceptions of gamification on learning
Improving as a student	Widespread implementation	Being curious	Not suffering in silence	Making learning easier
Constructing meaning	Switching to EdApp sooner	Wanting to win	Liked comp sci students asking for input	Easy to use
Strategic planning	Make the whole class online with EdApp	Incentives pushed me	Our opinions matter	Not annoying
Self-instruction		Ready to do what it says	Teachers listening	Never felt distracted
Improved task strategies	**Student engagement**	Less lazy		Well organized
Goal setting/monitoring	More engaging	Striving to do better	**Encouragement/confidence builder**	Not distracting
Metacognitive monitoring	Keep on going	Doing extra credit	Feeling like a champion	Making learning easy
Self testing	Feeling enjoyment	Thinking of things I need	Giving assurance	Helpful
Studying is different than before	Loved it	Being persistent	Doing something good	Noting held me back
Applying to other classes	Enjoying learning	Choice	Felt like I earned money	Less distracted
Managing time	Always check in	Consequences	Doing a good job	
Studying better	Positioning on leaderboard	Control	Surpassing a challenge	**Stress reducer**
Retaining information	Liked being ranked	Liking challenge	Feeling accomplished	Taking weight off my chest
Putting time to use	Interactive	Loved notifications	Positivity	Sense of comfort
More prepared	Colorful	Flow	Wanting what is best	Feeling lighter
Notetaking	Games	Elements	Feeling confident	Felt like a break
Thinking about my actions	Reminding me of coins in a game	Motivation to do assignments	Feeling excited	laid back
Completing school work	Interesting	Submit what is due first	Feeling good	Learning as stress escape
Getting things done	Not just a lecture	Winning gifts	Increased academic status	
Test-taking strategies	Cool	Felt normal	Feeling sensational	**Accessibility**
More prepared	Looking forward to it	Stars motivating	Feeling satisfied	Accessibility
Staying focused	Participating in competition	Collecting stars	Feeling happy	Using it on the go
	Flipping out	Pushing to do better	Leveling up in a game	
Expanded mindset	Different from other courses	Choosing quests by name	Leveling up	
College mentality	Doing it for fun	Wanted more stars	Feeling like a girl scout	
Bettering myself	Unique	Quests	Buying something	
Learned about myself	Balance of activity type	Randomly accept quests	Happy to buy something	
Preparing for the future	Gameplay	Feedback	Not having to pay	
Growth mindset	Attention grabbing	Spending all stars	Easy A	
	More than expected	Motivation	Badges	
	Checking in	Motivation to study	Like I got a higher grade	
	Leaderboard	XP		
		Reminded me		
		Currency		

Figure 4.17. Excel spreadsheet of final themes. See subsequent tables that follow to view each subsection, as well as Appendix H, for a more detailed view.

A rich description of my themes and the subsumed 10 categories follows, along with the justification of categories associated with each theme and additional points of interest.

Theme one: Students Perceived Their Academic Mindset and Study Habits to Have Improved. Students who are engaged and who are actively generating meaning while adapting their thoughts, feelings, and actions as necessary to affect their learning and motivation - are considered to be self-regulated learners (Boekaerts & Corno, 2005). All learners will try and self-regulate, but proactive self-regulators will have a superior cyclical pattern of processes in comparison to reactive self-regulators (Zimmerman,

2013). Further, higher achieving students tend to incorporate more learning strategies than lower achieving ones (Zimmerman & Martinez-Pons, 1986). Fortunately, students can learn various self-regulatory learning strategies, to increase academic success in college (Zimmerman & Risemberg, 1997). Additionally, adopting a Growth Mindset (Dweck, 2007) has shown to increase grit and perseverance (Duckworth, 2007) which can lead to increased student retention (Bowman, et. al, 2019).

This theme is comprised of a balance of students' skills and study techniques as well as growth in their academic mindset (see Figure 4.18).

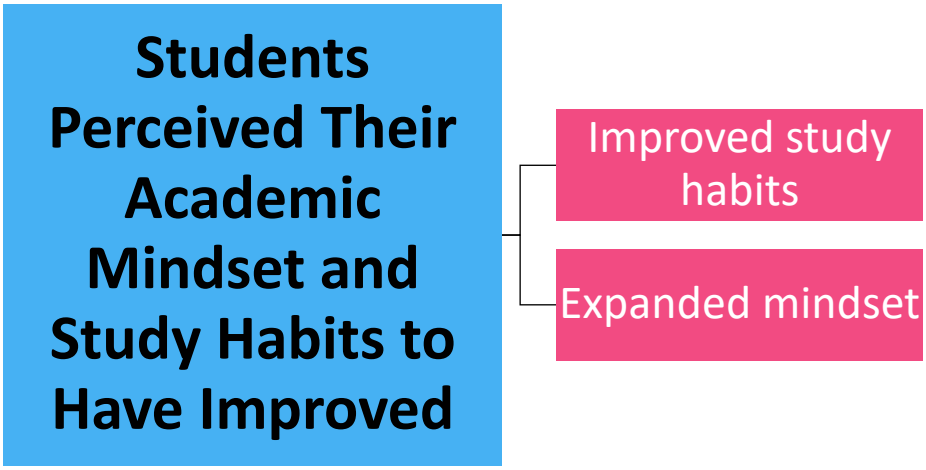

Figure 4.18. Categories subsumed into Theme one: Students Perceived Their Academic Mindset and Study Habits to Have Improved.

This coupling was evident in the students' Final Self-Reflection Learning Quest responses to the questions of *Overall, what part of this class did you find the most helpful for your academic experience at college?* and *If you were telling a friend about the course, what would you say?*:

Daniel: I thought this [the course] really helped me self-evaluate and better prepare myself for the future…. I haven't had a course that was so about myself and the critique and critical thinking of one's self-evaluation on schoolwork and everyday things.

Arjun: This course focused more on learning techniques and helping you develop a mature mind.

Brianna: Go in expecting so much information that will actually set you up for success.

This theme was distinguishable from the other two that follow as it is heavily tied to students applying academic skills learned to their other classes, as well as their overall academic mindset and outlook on the college experience, as a result of the first-year experience class. This is the second largest theme having subsumed two categories and 28 unique codes. This theme most closely aligned with RQ1 as it was comprised of self-regulated learning elements, as found in the two categories of Improved study habits and an Expanded mindset.

Improved study habits. Students in college are expected to manage their own learning (Bembenutty, 2011). Some students do not recognize this difference until they are already weeks into the semester (Dembo & Seli, 2016). A students' ability for self-regulated learning is a key factor in their collegiate success (Puzziferro, 2008).

The most frequently used codes in the Improved study habits category were *self-regulated learning* (47), followed by *studying better* (15), and *improved task strategies* and *applying to other classes* both being used 14 times apiece. See Figure 4.19 for all

codes in this category. Data from this category suggested the class positively influenced how most students studied. As Deja commented in an open-ended Final Self-Reflection Learning Quest response, “The way I study is different from when I studied before the class. This class helps you with your other classes and you can apply your knowledge.” Brianna offered a similar experience in her open-ended Final Self-Reflection Learning Quest response, “In this course I learned a lot more than I expected, mostly about myself and how bad my study habits used to be.”

Figure 4.19. Codes in the Improved study habits category.

Students provided examples in their open-ended Final Self-Reflection Learning Quest responses of how their study habits improved:

Daniel: When we went over the studying unit and how much you really should study, I applied that studying to my macroeconomics exam.

Geoffrey: In my geography class what I learned helped me to keep on top of the work.

Deja: I used what I learned for studying for my psychology class and I got an A+ on my final exam.

James: I bettered my study habits in my history class.

Students tended to gravitate toward the study techniques that would be most helpful in the areas in which they struggled. Kayla said in an open-ended Final Self-Reflection Learning Quest response,

> The test taking and study strategies were the most useful for me because test taking and studying is usually what I have the most difficulty in. I feel as if I'm more prepared to do work because I know different methods for retaining information.

Gamification can promote goal setting amongst learners (Bai et al., 2020). Students also emphasized in their open-ended Final Self-Reflection Learning Quest responses how learning academic success/study techniques enhanced their ability to set goals:

Daniel: I have been able to monitor my goals more after this class.

Kayla: The methods have enhanced the types of goals I make.

James: My ability to set goals, managing my time, changed for the better.

Ryan: I have learned to set goals for myself and get things done.

Hakulinen et al. (2015) found gamification elements in a class can improve students' time management. Time management/strategic planning was another area where students commented in their open-ended Final Self-Reflection Learning Quest responses about improvement in their metacognitive monitoring as a result of the class:

Daniel: After we go over a unit and I really think about my actions. After say our time management unit, I really thought about my time management more, even more then I do now and tried to help it.

Ryan: It helped me stick to what I am doing and not procrastinate.

Brianna: This class motivated myself to manage my time when coming to studying for a test and having to finish something with getting enough time to sleep for class the next day.

It should be noted, however, that two students, Aliyah and Andre, self-proclaimed that even at the conclusion of this class, they both continued to struggle with procrastination.

This category supported the overall theme of Students Perceived Their Academic Mindset and Study Habits to Have Improved as students shared examples of how they applied what they learned to their other classes, especially in terms of study strategies, test-taking strategies, goal setting, and time management. It differs from the Expanded

mindset category that follows which is more focused on student attitude than skill-based responses.

Expanded mindset. This category likely emerged as we spent a good deal of time in the class discussing and reading about the growth mindset in the class, namely in terms of persevering and realizing that failure is an opportunity to improve, not something that just happens to you (Dweck, 2007). Additionally, games can help students learn to fail-better and better transition from a high school to college environment (O'Brien & Pitera, 2019).

Bettering myself and *the growth mindset* were codes that were tagged the most frequently (eight times each) in the Expanded mindset category. See Figure 4.20 for all codes associated with this category.

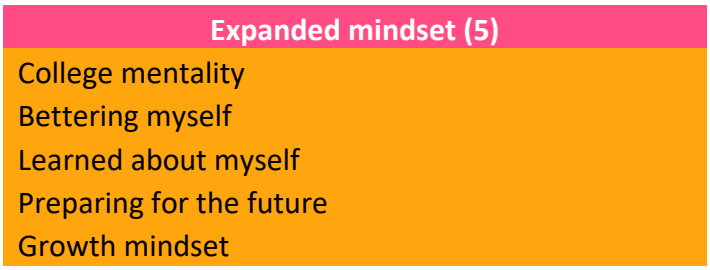

Figure 4.20. Codes in the Expanded mindset category.

In the students' open-ended Final Self-Reflection Learning Quest responses, they shared how the class helped them discover a college mentality:

> Arjun: This class helped me in developing a mental mind….speaking about the growth mindset is the most important thing I spoke of today.

Deja: I learned how to study better and improve my whole mentality for college life.

Andre: The aspect that motivated me the most was the growth mindset quests.

Aliyah: I used a growth mindset to do better in my classes.

The self-reflected questions/prompts not only proved useful in terms of providing data for this study, but afforded students the opportunity to reflect on their own learning (Everett, 2013; Mertler, 2017; Rapp, 2015), and as a by-product their mindset as well (Dweck, 2007). In answering a Final Self-Reflection Learning Quest question/prompt: *Was the course what you expected? Did anything surprise you about it?*, Andre expressed:

> It was completely different to what I thought it was and I was surprised at how personal some of the questions were. It made me think a lot about my mindset. [The class] is more about bettering yourself rather than improving other skills that are not important.

It was interesting to note that although Andre seemed optimistic about the growth mindset, he also said, "I had trouble applying some of the study techniques learned." Additionally, the majority of other students applied the code *bettering myself* to their studies. As Geoffrey shared in an open-ended Final Self-Reflection Learning Quest response, "the course pushed you to better yourself because everyone can better themselves…. helping to raise your GPA."

This category reflected a shift in students' attitudes towards academics, supporting the overall theme of Students Perceived Their Academic Mindset and Study

Habits to Have Improved as students shared examples of how their mindset and outlook on the college experience increased as a result of the class improved attitude is a significant benefit of gamification in higher education (O'Brien & Pitera, 2019). This category, coupled with *Improved study habits*, resulted in a robust overall theme, comprising skills and attitude, both of which are needed for academic success (Weinstein et al., 2016).

Theme Two: The Gamified Curriculum Served to Motivate Students. In high school, teachers work to motivate students to learn, but in college, professors expect students to already be self-motivated (Brinkworth et al., 2017; Dembo & Seli, 2016). Gamification has been found to yield increased motivational results (Harrold, 2015; Ling, 2018; Sailer et al., 2017), even when performance outcomes were not improved (Pilkington, 2018). Motivation is one of the main predictors of college success (Grimes, 1997; Levin & Levin, 1991).

Increased motivation is one of the most attributed concepts frequently touted as a benefit of gamification in the classroom (Barrio et al., 2016; Han, 2015; Kumar & Khurana, 2012; Nah et al., 2014; Stansbury & Earnest, 2017; Su & Cheng, 2015). Dominguez et al., (2013) found that gamification elements can help students better complete their homework. Gamification as a motivator was a frequent point of emphasis amongst students as reflected in their open-ended Final Self-Reflection Learning Quest responses:

> Arjun: After this class, I've been really motivated to do all my assignments.

Andre: The aspect that motivated me the most was the growth mindset quests.

Daniel: I already had motivation, but it just increased due to this class.

Geoffrey: It [the class] pushed you to better yourself because everyone can better themselves.

It should be noted that the category of Engagement almost became its own theme. However, because engagement and motivation are frequently linked together in gamification studies (Kuo & Chuang, 2016; Werbach & Hunter, 2012), engagement was best situated under the Student motivation category for the purposes of this research study.

Additionally, as a whole, most of the Descriptive codes, and many In Vivo codes, regarding the student's experience with specific gamification elements fell under the category of Encouragement/confidence builder. The Gamified Curriculum Served to Motivate Students theme is distinguishable from the other two themes as it involved more "will" to learn, rather than skill and ease of learning.

The Gamified Curriculum Served to Motivate Students theme most closely aligned with RQ2. This is the largest theme in comparison to the others in this study, as is depicted in Figure 4.17. This theme subsumed the following five categories: Wanting more, Student engagement, Student motivation, Collaboration, and Encouragement/ confidence builder (see Figure 4.21). Collectively, these categories were comprised of 71 codes.

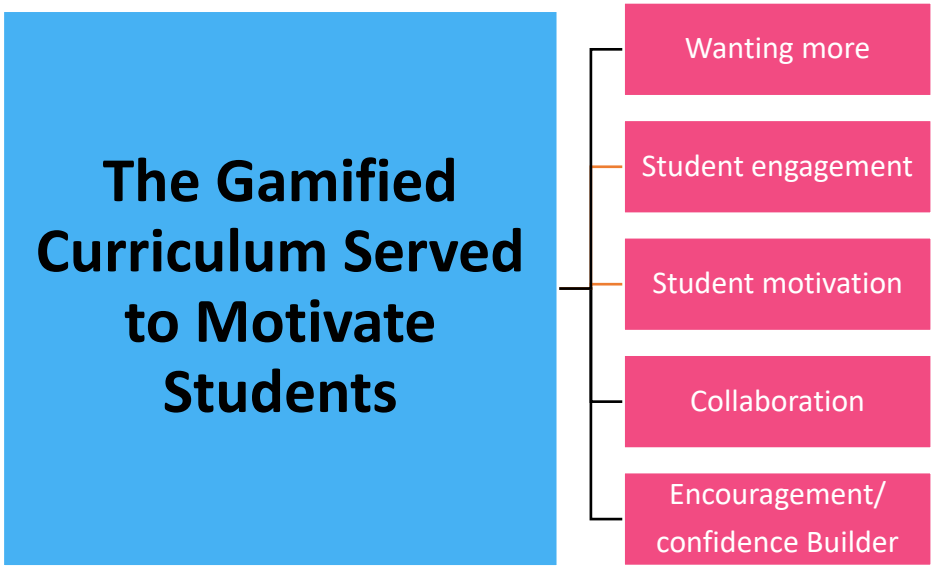

Figure 4.21. Categories subsumed into Theme two: The Gamified Curriculum Served to Motivate Students.

Wanting more. The students who enjoyed the gamified curriculum wanted even more, whether it be more games in this class, or to be able to use EdApp in other classes in the future. This aligns well with the research outcomes of O'Connor and Cardona (2019) who had conclusions with similar findings. While there were only four codes in this category, the students expressed a strong sentiment in desiring more. See Figure 4.22 for codes associated with this category.

Wanting more (4)
Wanting more games
Widespread implementation
Switching to EdApp sooner
Make the whole class online with EdApp

Figure 4.22. Codes in the Wanting more category.

It's not uncommon for college students to want more gamification after being exposed to it (O'Connor & Cardona, 2019). Two students, Geoffrey and Deja, stated in their open-ended Final Self-Reflection Learning Quest responses that they wanted even more games in the class. Additionally, Ryan said in an open-ended learning reflection response to a survey question, "I would have switched to EdApp sooner." Comments shared by other students in their open-ended Final Self-Reflection Learning Quest responses included:

James: The whole course should be on the EdApp with the games.

Andre: Use EdApp and make the whole class online.

Daniel: It should keep going for years to come and be implemented in education as a whole.

Wanting more as a category was housed in the Gamified Curriculum Served to Motivate Students theme as students clearly expressed wanting to see more gamification elements in academia.

Student engagement. This category reflects the students' enjoyment and involvement in the gamified curriculum, something not atypical when implementing gamification (Bai et al., 2020; Chang & Wei, 2016; Yildirim, 2017). Aesthetically pleasing apps help keep their attention (Shroff et al., 2020) When learners are engaged in a game-based app they develop and reinforce cognitive skills, making constant connections (Shroff et al., 2020). By incorporating gaming components, mobile apps can create an especially engaging and immersive learning environment (Shroff et al., 2020). The most used code was that of *gameplay* (31), followed by codes associated with the *leaderboard* (19) (see Figure 4.23).

Figure 4.23. Codes in the Student engagement category.

Students found the gamification curriculum engaging in different ways. Deja commented in a Final Self-Reflection Learning Quest response that she checked in to EdApp "just to see what's up." As well, Daniel said, "I enjoy it. I like to compete and games in engage me more in the classroom." Interestingly, even students like Brianna, who self-reported to not be a gamer, found value in the curriculum. Brianna shared in a Final Self-Reflection Learning Quest response, "I'm not really into games because I

don't think stuff like that is actually fun. But it went a different route in this class for me so I was pleased." Others appreciated the novelty, like James who said in his Final Self-Reflection Learning Quest response, "I felt good when I found out the class had game stuff in it because it's different than other courses." The gamified aspects also kept students involved in the class. Gamification elements can keep learners in a state of flow, even in non-game activities (Zichermann & Cunninghan, 2011). As Ryan expressed in a reflection journal assignment response, "I would start one quest and then keep on going."

Consistent with the findings of Landers and Landers (2014), the leaderboard proved to be an extremely effective engagement element for some students. This was reflected in the student's open-ended Final Self-Reflection Learning Quest responses:

> Andre: I liked being ranked for doing stuff.
>
> Brianna: Moving up on the board made me feel like I knew what I was doing.
>
> Daniel: Being on there [the leaderboard] meant I was doing something good.
>
> James: I liked seeing my name on the leaderboard.

Conversely, other students were ambivalent towards it, like Kayla, who although was frequently high on the leaderboard, said in a Final Self-Reflection Learning Quest response, "my main focus was just finishing my quests" which she found to be "attention grabbing." Aliyah said in her final Self-Reflection Learning Quest response that the leaderboard "didn't really matter to me" and Geoffrey said he "didn't care that much" about it. Such discrepancies as to leaderboard opinion are not uncommon in the existing research of Landers et al. (2017).

Students expressed in their Final Self-Reflection Learning Quest responses that EdApp was more engaging than Blackboard:

> Kayla: It's more interactive. It just felt cool. It was more than I was expecting.
>
> Ryan: EdApp is fun, colorful, and interesting.
>
> Deja: I love that games are part of the lesson and the stars remind me of coins in a game.

The students were engaged in many elements of EdApp, one of which was the chance to win an Amazon gift card in the Star Bar. Daniel said in an open-ended Final Self-Reflection Learning Quest response, "I never won one, but if I did I would have flipped out." He also said that he engaged with EdApp, "just for fun, honestly." Geoffrey said in an open-ended Final Self-Reflection Learning Quest response, "I just found it so interesting and unique."

Apart from the games, students also experienced different formats of questions, as well as free-response questions. The majority mirrored Kayla's response to a Final Self-Reflection Learning Quest question that she "enjoyed the balance." However, Arjun felt, "…there are too many questions to answer and sometimes I feel I end up answering the same things again and again." Such repetitiveness is not uncommon in gamification (Shroff et al., 2020).

Student motivation. The Student motivation category was the largest, with 35 codes including *feedback* (14), *choice* (10), *XP* (10), and *quests* (9) (see Figure 4.24).

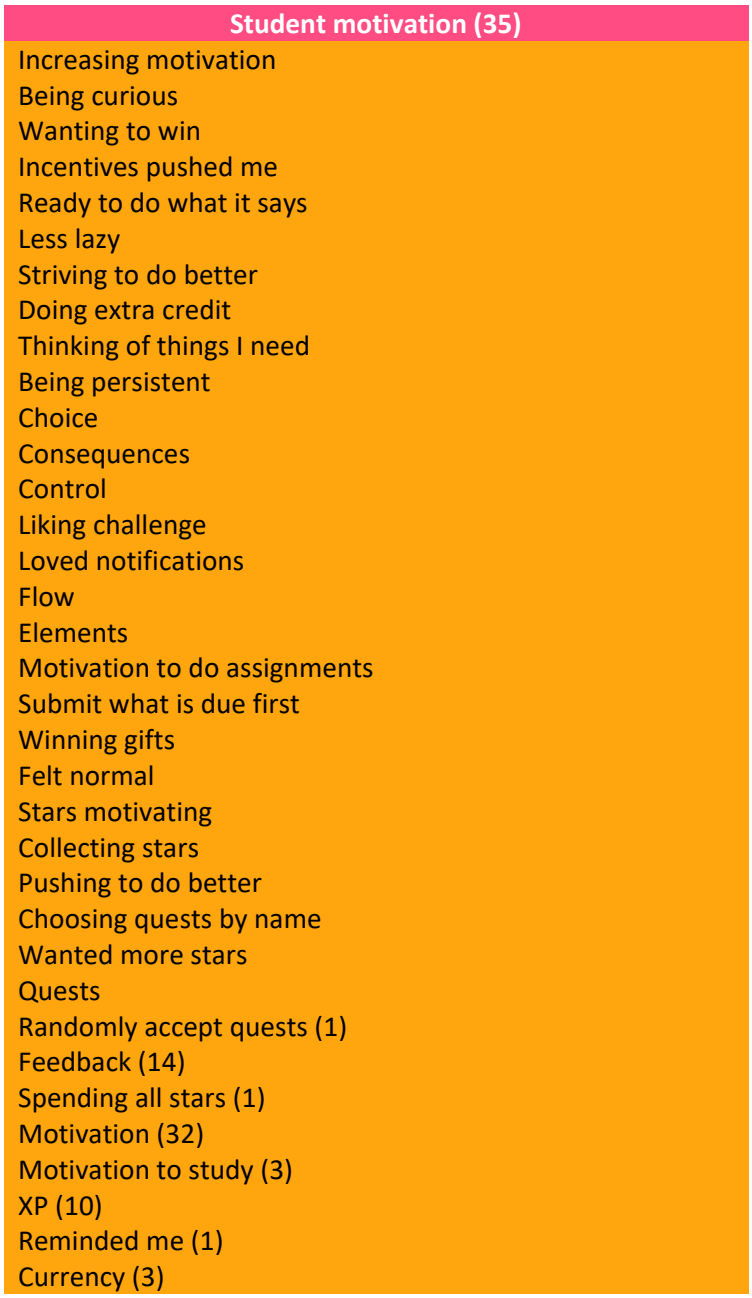

Figure 4.24. Codes in the Student motivation category.

At the forefront of gamification is its potential to motivate students (Kumar & Khurana, 2012; Nah et al., 2014; Su & Cheng, 2015). Motivation is essential to effective educational gamification (Burke, 2014, Sailer et al., 2017). Research largely suggests that gamification can serve to provide motivational benefits to students in educational

environments (Han, 2015; Kumar & Khurana, 2012; Morillas Barrio et al., 2016; Nah et al., 2014; Stansbury & Earnest, 2017; Su & Cheng, 2015), especially in comparison to traditional settings (Leaning, 2015; Stansbury & Earnest, 2017), providing added value and meeting the needs of today's students who have grown up with technology (Berns et al., 2016; Dyer, 2015).

In order for competence to be perceived, gamified activities should pose optimal challenges to the students (Kam & Umar, 2018). Through the gamified curriculum, students felt like they were "surpassing a challenge in class" and that "completing our work was a competition." There was also a certain degree of curiosity as Deja explained in a Final Self-Reflection Learning Quest response, "I did most of the quests to see what the badges would be." Andre said in a Final Self-Reflection Learning Quest response that he completed activities, "because I wanted to see what you could get." Kayla commented in a reflection journal assignment response that she looked forward to the badges and Aliyah said the rewards "made me feel like I was actually putting my time to use." Deja said in an open-ended Final Self-Reflection Learning Quest response that she did extra credit quests because, "they boost your spot on the board." Likewise, Kayla did them because she "wanted more stars." Earning stars was in fact the biggest motivation for both Kayla and Aliyah:

> Kayla: The stars motivated me to finish my quests. I think incentives pushed everyone a little harder. The stars were my biggest motivation because I wanted to play in the star bar.

Aliyah: Being able to earn stars to win gifts [her biggest motivation]. I felt like I was going to try and win a gift card.

As noted in some open-ended Final Self-Reflection Learning Quest responses, when playing the star bar, students thought of their personal desires:

Aliyah: I won't have to pay for nose rings or acrylic now.

Brianna: I was super excited and thought of things I needed that I can get with the money.

Kayla: I was like "oh this is cool." Is a nice incentive thinking about things I need. It motivated me to get more stars too.

It should be noted that as motivating as playing the star bar seemed to be for students, it also had the potential to disappoint as well. Andre explained in an open-ended Final Self-Reflection Learning Quest response, "However, it is disheartening because I won the first time and then I tried it like 100 times and I lost every single time." Kayla as well said, "The Amazon gift card thing was usually a challenge. I would end up spending all of my stars while trying to win." There were also students like Ryan, who commented in an open-ended Final Self-Reflection Learning Quest response that he did not spend any stars because he "wanted to save them and see how many I could get before the semester ends."

Feedback happens when a game provides the player with information about how they are doing, such as an achievement notification or a reminder that work is due (Werbach & Hunter, 2012). The notifications from EdApp motivated some students to complete their work. Ryan noted in an open-ended Final Self-Reflection Learning Quest

response, “EdApp always sends me notifications for every assignment and I tell myself that I need to complete the assignment.” He continued, “The class has motivated me to become less lazy and get things done.” Deja said, “it gives me reminders that I still have work.” Daniel said in a Final Self-Reflection Learning Quest response that when he received a notification, he was “ready to do what it says.” Arjun said the notifications “felt normal” to him as he was used to seeing notifications on his phone. Geoffrey said he completed the assignment that “first pops up.” Some students in their open-ended Final Self-Reflection Learning Quest responses said they finished assignments in the order they were due, while others chose randomly. Whereas, Andre made his decision based on “the names of the quest.”

While notifications served as reminders and motivators to a lot of the students, some students admitted they never turned their notifications on as they were instructed to do so, and Aliyah even turned hers off. This resulted in open-ended Final Self-Reflection Learning Quest responses such as “omg, I completely forgot! [about the star bar],” “I never saw it [star bar],” I wasn’t aware of it [star bar],” “I did not receive any notifications,” and “I didn’t do it [star bar], because I never saw it.”

Collaboration. With only five codes generated, *Collaboration,* one of the 6C’s of motivation (Turner & Paris, 1995), turned out to be an interesting category that emerged as it was not based on students in the class working together, but more of the collaborative experiences with university students outside of the class, such as the student tutors and computational science students who collaborated with our class in finding a gamification platform. The most frequently generated code that helped shape the Collaboration category was *help-seeking*, which is typically associated with self-

regulated learning (Weinstein et al., 2016), but I felt it was relevant to that of Collaboration in terms of motivation as student support has been associated with increased motivation (Sailer et al., 2017). See Figure 4.25 for all codes in this category.

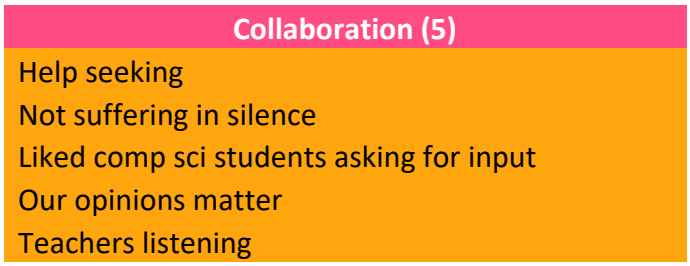

Figure 4.25. Codes in the Collaboration category.

Aliyah expressed in an open-ended Final Self-Reflection Learning Quest response that the most important thing she gained from the class was, "The fact that I actually went to the tutors. I am used to suffering in silence. Not only did I start using the tutors, I set a schedule when to see them". Deja also noted she "visited the tutors more than usual."

Students also offered words of appreciation in their open-ended Final Self-Reflection Learning Quest responses when the computational science students came to our class to help find a gamification app that would work best for their needs.

Andre: It made me feel that teachers are listening to students' feedback to improve the class.

Kayla: It gave me a sense that our opinions do matter when it comes down to how we learn and how we want to learn.

Deja: I felt like they cared and wanted what was best for us.

The Collaboration category is a reflection of the fact that collaboration contributed to empowerment (Furmedge, Iwata, & Gill, 2014) and buy-in (Nicol, Tsai, & Gaskell, 2004), leading to motivation (Turner & Paris, 1995).

Encouragement/confidence builder. This category proved to be where most of the gamification elements such as badges, leaderboard, leveling-up, and stars landed, with a total of 25 codes emerging. See Figure 4.26.

Encouragement/confidence builder (25)
Feeling like a champion
Giving assurance
Doing something good
Felt like I earned money
Doing a good job
Surpassing a challenge
Feeling accomplished
Positivity
Wanting what is best
Feeling confident
Feeling excited
Feeling good
Increased academic status
Feeling sensational
Feeling satisfied
Feeling happy
Leveling up in a game
Leveling up
Feeling like a girl scout
Buying something
Happy to buy something
Not having to pay
Easy A
Badges
Like I got a higher grade

Figure 4.26. Codes in the Encouragement/confidence builder category.

The category of Encouragement/confidence builder was especially relevant as at-risk students tend to be more engaged when receiving encouragement, in effect boosting confidence (Hughes, 2017). Gamification achievements can full a learner's need for competence (Sailer et al., 2017).

Badges are one of the most prominent gamification elements (Martens & Muller, 2017), earning them can signal competence to the student (Mah, 2016). Such competence can and promote motivation, and thus engagement (Ryan & Deci, 2000). Even before instruction began, when Andre heard the class was to include a gamified curriculum, he said he "felt confident." Overall, earning badges provided encouragement to students as a reflection of achievement (Martens & Muller, 2017; Werbach & Hunter, 2012), as offered in some student open-ended Final Self-Reflection Learning Quest responses to the question *How did you feel when you won an achievement badge?*:

Deja: They made me feel like I have accomplished something, like a girl scout!

Daniel: I felt sensational when I won a badge!

Ryan: It made me feel accomplished.

Cameron: I felt good earning the achievement badges.

Being on the leaderboard had a similar impact of encouragement on how students felt (Landers & Landers, 2014), fostering competence (Sailer et al., 2017), as identified in some of their open-ended Final Self-Reflection Learning Quest responses to the questions *Did you like seeing your name on the leaderboard? Why or why not?*:

Arjun: It makes me feel like I'm the champ.

Brianna: Like a BOSS!!!

Deja: I liked seeing my name on the leaderboard because it always gave me an assurance.

Students leveled up when they completed series of quests, earning various badges. Leveling up can convey status because when learning reaches a higher status it can be considered more advanced (Duggan & Shoup, 2013). This was a confidence builder according to student responses to the Final Self-Reflection Learning Quest question *How did you feel when you leveled-up in EdApp?*:

Deja: This [leveling-up] made me feel like I surpassed a challenge in class.

Arjun: It makes me feel like I do when I level-up in an actual game.

Andre: I like leveling-up because it makes me feel like I got a higher grade.

Likewise, earning stars was an achievement that also made students feel good (Xi & Hamari, 2018) as a resource acquisition and form of currency (Donovan et al., 2013; Werbach & Hunter, 2012), as indicated by their responses to the Final Self-Reflection Learning Quest prompt *Describe how you felt when you earned stars*:

Ryan: It made me feel like I did good on the assignment.

Brianna: It made me feel happy and accomplished.

James: I felt good earning those stars.

Arjun: It was like I earned money!

Andre expressed in a Final Self-Reflection Learning Quest response that he felt "good and happy to get to buy something [a chance to win a gift card] with his stars." Interestingly, although Andre liked the stars and leaderboard, he felt "nothing really" about badges which is not an uncommon finding within the existing research on gamification elements (Morris, Dragovich, Todaro, Balci, & Dalton, 2019).

Some students viewed the class as "an easy A" which may or may not boost confidence (Larrick, Burson, & Soll, 2007). But overall, students appreciated the encouragement that resulted from the class as Arjun shared in an open-ended Final Self-Reflection Learning Quest response, "This course gave me a lot of positivity."

Theme three: Students Perceived the Gamified Curriculum Made Their Learning Easier. A perception of fun (Bouca, 2012) coupled with app accessibility (Pechenkina et al., 2017), allows gamification to potentially provide a sense of ease for the learner (Bouca, 2012). This theme is the most aligned with RQ3, as a lot of the elements associated with the three categories of Learning easier, Stress reducer, and Accessibility, were a result of the EdApp gamification platform. This theme subsumed three categories (see Figure 4.27) and emerged out of the fewest codes (19 codes) of the three themes.

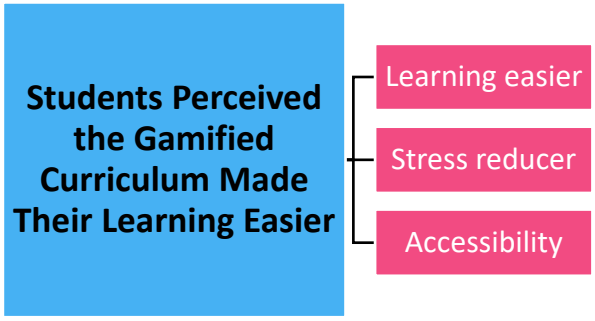

Figure 4.27. Categories subsumed into Theme three: Students Perceived the Gamified Curriculum Made Their Learning Easier.

Although the smallest in terms of numbers of codes, this theme's impact on the students' learning experience was profound. Through EdApp, students found the content to be more digestible which helped them to focus, as well as being more accessible which allowed them to work on the class from anywhere. They viewed the overall learning experience with the app as a stress-reducer instead of a burden. This theme most closely aligned with RQ3 and it differs from the other two themes in that it does not focus on applying skills elsewhere, or on the actual class content and elements, but more on the delivery vessel of the content on their experience.

Making learning easier. This category had 11 unique codes, with the most frequent ones being *helpful* (8), *not distracting* (6), and *making learning easier* (5) (see Figure 4.28). Of note in this category is not only what students shared about the positive aspects of EdApp, but also what it was not, e.g. annoying or distracting.

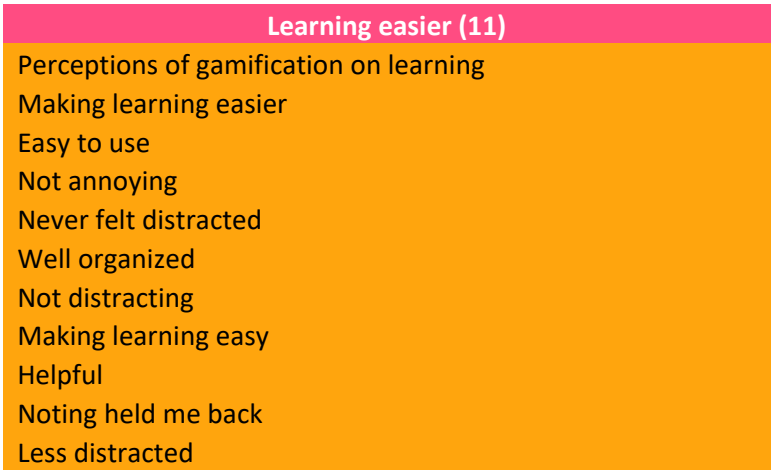

Figure 4.28. Codes in the Making learning easier category.

Gamification has been perceived as being easier (Brom et al., 2019). Ginns, Martin and Marsh (2013) suggested this could be due to adapting traditional instructional

language to a more conversational tone as well as the suggestion that motivational elements influence lower difficulty ratings. Tractinsky et al., (2000) suggested correlations between a system's perceived aesthetics and the perception of ease of use.

Deja said in an open-ended Final Self-Reflection Learning Quest response that she, "enjoyed all of the class. It made learning easier and less stressful." Kayla also expressed that, "The coursework is very understandable. The communication between the professor and the students is excellent." Six students offered Final Self-Reflection Learning Quest responses indicated that the class was "helpful" to them. Ryan said, "The parts that motivated me the most were the parts that related to me the most because they really helped me out and the notifications helped me to remember to do my work."

Many students also noted in their open-ended Final Self-Reflection Learning Quest responses that EdApp was easy to use. Arjun said, "It is fast and smooth, making it really not annoying to work on." Kayla said, "I like the layout of the app, everything is well organized." This may be a reason that students like James expressed that they "never felt distracted from the course." Deja said she "felt less distracted in this course than any of my other courses." When asked in the Final Self-Reflection Learning Quest prompt *if there were there any parts of the course that you felt were distracting from your learning experience,* Daniel said that, "nothing held him back." Not to imply that EdApp was not met with some criticism. Some students had encountered some issues with EdApp. Aliyah noted this in an open-ended Final Self-Reflection Learning Quest response, "It made me restart the lesson a few times," and both Geoffrey and Brianna said it did "glitch" at times.

Accessibility. Gamified apps can offer students access to educational content at any time and place the learner desires (Shroff et al., 2020). App usage is key for college learners, as it offers flexibility, automatic practice quizzes, feedback, peer comparison, and accessibility from wherever they are Pechenkina et al., 2017b). Most students tend to be fluent technology users and who have an expectation that teaching styles and content delivery should meet their needs and be adaptable (Chang et al., 2009). The category of Accessibility was developed out of only two codes, but this category held a lot of weight amongst the students (see Figure 4.29).

Figure 4.29. Codes in the Accessibility category.

When asked about the accessibility of EdApp, the convenience of access for example, students emphasized in their open-ended Final Self-Reflection Learning Quest responses.

Deja: I like the easy access of the app on my phone.

Daniel: I like how convenient it is to get to since I have the app and I like how convenient it is to login and how fast it is to get to quests.

Kayla: I like being able to get my work out of the way while I am working overnight shifts.

Andre: You can use it on the go with your phone and it was convenient if I was someplace else.

This category was not something I initially intended to measure in my research design, but it was a nice surprise that emerged from the data as a result of switching to the mobile platform of EdApp mid-semester, especially educational apps can benefit at-risk students (Zhang et al., 2015). Additionally, college students appreciate mobile learning applications for their usefulness, perceived ease of use, self-efficacy, and compatibility with how they want to learn, specifically in that they don't have to change their current routines to access them (Chung et al., 2015).

Stress reducer. The category of Stress reducer was also an unexpected finding from the qualitative data analysis. However, this category aligns well with the stress on college students as a result of the COVID-19 pandemic and the move to online instruction (Oe, Takemoto, & Ridwan, 2020) which drove universities to quickly reexamine ways to support remote learning through various platforms (Almarzooq et al., 2020). Although this category only had six codes (see Figure 4.30), the category of Stress reducer carried impact, as the class and its gamified curriculum appeared to reduce some pressure for students.

Stress reducer (6)
Taking weight off my chest
Sense of comfort
Feeling lighter
Felt like a break
laid back
Learning as stress escape

Figure 4.30. Codes in the Stress reducer category.

The Stress reducer category emerged as a result of the combination of the content they were learning such as stress-reducing techniques and the gamification

implementation in the class which provided a safe, low-stakes environment for learners (N. M. Meer & Chapman, 2014) with lower stress (Paniagua et al., 2019). This was found in four students open-ended Final Self-Reflection Learning Quest responses:

Kayla: I felt a sense of comfort because I am used to gaming systems and apps so that made the course difficulty easier.

Ryan: I lowered my stress and anxiety levels by doing what I learned in this class.

Arjun: This course gave me an opportunity to open up and made me feel light.

Deja: This app sort of felt like a break and I enjoyed learning the information. My other classes are like stress and work. This was more of a weight off of my chest.

On the extreme end of this spectrum, Aliyah said she expected this class to be laid back, but "not THIS laid back," which can sometimes be the perception when a gamified curriculum is used in the classroom (Brom et al., 2019).

This category differed from the other two subsumed under the theme, Students Perceived the Gamified Curriculum Made Their Learning Easier, as it focused more on the student's perceived mental state than app-accessibility or performance. Collectively, these three categories and this theme best support RQ3 as the mechanism of content delivery – a gamified curriculum initially implemented through Blackboard and then change to EdApp – notably impacted the students' perceptions in regards to the quality of their learning experience.

Member Checking

Member checking gives participants a chance to review findings in order to ensure accuracy (Mertler, 2017). I emailed the summarized themes to the participants and asked them to look everything over to make sure it was a complete and authentic representation of their experience. Although not a lot of feedback was received, likely due to students not checking their university email after the class concluded, I acclaim the importance of member checking in terms of ensuring accuracy. Additionally, it offered the students to learn a bit about how research works and that as participants, their opinions were respected and valued.

Converged Findings

In a review of the quantitative and qualitative analysis', four components were found to converge. First, Self Testing was found to be statistically significant (posttest $M = 21.30$, $SD = 5.33$, $p < .001$), and this was also supported qualitatively, for example in a Final Self-Reflection Learning Quest response by Kayla,

> The test-taking and study strategies were the most useful for me because test-taking and studying is usually what I have the most difficulty in. I feel as if I'm more prepared to do work because I know different methods for retaining information.

As well, in a Final Self-Reflection Learning Quest response by Deja who said "[I] self-test as a result of the class to make sure I know the information."

Second, when reviewing the themes that emerged from the qualitative analysis through the lens of the LASSI, each LASSI subscale topic fell within a theme as did each component of the 6 C's of Motivation (see Table 4.9).

Table 4.9. *Alignment Between the Themes, Learning and Study Strategies Inventory Subscales, and 6 C's of Motivation*

Theme	LASSI Subscale Topic	6 C's of Motivation
Students Perceived Their Academic Mindset and Study Habits to Have Improved	• Information Processing • Selecting Main Ideas • Test Taking Strategies • Self Testing • Time Management • Using Academic Resources	• Constructing meaning • Control • Choice
The Gamified Curriculum Served to Motivate Students	• Motivation • Attitude	• Challenge • Collaboration • Consequences
Students Perceived the Gamified Curriculum Made Their Learning Easier	• Anxiety • Concentration	

This is of interest as the LASSI subscale Concentration was more associated with making learning easier than as a skill asset with self-regulated learning due in part to the clear and organized design of EdApp. As well, the Making learning easier category revealed students were less distracted than in their other classes. Moreover, it's worth noting that Constructing meaning as part of the 6C's of Motivation situated itself best in the theme Students Perceived Their Academic Mindset and Study Habits to Have Improved instead of the theme Gamified Curriculum Served to Motivate Students since Constructing meaning was heavily tied to authentic learning (Nicholson, 2015). Which the Information Processing questions on the LASSI reflect authentic learning (see Table 4.10).

Table 4.10. *Information Processing Learning and Study Strategies Inventory Subscale Questions*

3. I try to find relationships between what I am learning and what I already know.
10. To help me remember new principles we are learning in class, I practice applying them.
18. To help me learn the material presented in my classes, I relate it to my own general knowledge.
22. I translate what I am studying into my own words.
35. I try to see how what I am studying would apply to my everyday life.
41. I try to relate what I am studying to my own experiences.

Further, the Information Processing posttest score strongly correlated with XP ($r = .903$, $p < .001$). This was also supported by the qualitative analysis and the emerged theme Students Perceived Their Academic Mindset and Study Habits to Have Improved. Specifically, the category of Improved study habits showed the reflective thinking of the students in their reflection journal assignments where students applied the learning and study skills offered towards helping them academically in their other classes as well as this class. As XP was scored based on the percentage of correct answers in any given quest, it stands to reason why there was a strong correlation between XP and the Information Processing posttest score.

Third, the Using Academic Resources posttest score correlated with Stars Earned ($r = .802$, $p = .005$). This was supported in the qualitative findings, in particular by a Final Self-Reflection Learning Quest response of Aliyah who shared,"[she] was not suffering in silence anymore as [she] started going to the tutoring center." Aliyah's response on the LASSI, Using Academic Resources subscale, showed an increase of 150%, further supporting the strong correlation found between the Using Academic Resources posttest score with the Stars Earned gamification element.

Last, both Aliyah and Kayla offered responses on their Final Self-Reflection Learning Quest about playing the star bar and how the chance of winning an Amazon gift card motivated them. In examining their specific student data on these gamification elements, both of these students spent the most stars in the class, 248 and 138 respectively. The next closest student was Andre at 88. The remainder of the class spent less than five stars, with students like Daniel wanting to see how many he could earn by the end of the semester and therefore did not spending any. Three students said they forget about the Star Bar because their EdApp notifications were not turned on.

Chapter Summary

Both quantitative and qualitative data were collected and analyzed as part of this mixed-methods action research study. Quantitative data was collected via the LASSI pretest and posttest scores, Likert and multiple-choice questions on an instructor designed Final Self-Reflection Learning Quest, and numbers of gamification elements earned. Qualitative data was collected through six journal reflection assignments and open-ended/free response questions/prompts included as a part of the Final Self-Reflection Learning Quest. Three themes emerged from the qualitative data (1) Students Perceived Their Academic Mindset and Study Habits to have Improved, (2) The Gamified Curriculum Served to Motivate Students, and (3) Students Perceived the Gamified Curriculum Made Their Learning Easier. Analyzing the quantitative data and the emergence of the three themes provided an increased understanding of the positive impact of the implementation of a gamified curriculum for at-risk college students enrolled in a first-year experience class.

CHAPTER 5

DISCUSSION AND IMPLICATIONS

This chapter looks at the study's findings in the context of existing literature pertaining to gamification as well as self-regulated learning, motivation, and students' perception of gamification. The purpose of this action-based research study was to evaluate the implementation of a gamified curriculum for at-risk students enrolled in a first-year experience course at JTU. Quantitative (LASSI pretest/posttest scores, Likert-scale/multiple choice Final Self-Reflection Learning Quest questions, and measurement of gamification elements) and qualitative (reflection journal assignments and Final Self-Reflection Learning Quest responses) were collected and analyzed. This chapter presents (a) discussion, (b) implications, (c) limitations, and (d) closing thoughts.

Discussion

It is essential to look at findings within current research regarding gamification in an educational context. To address my research questions, data were merged and analyzed through a mindset of self-regulated learning, motivation, and perceptions about gamified curricula. The discussion that follows is organized by my three research questions.

RQ1: How and in what ways did the implementation of a gamified curriculum impact at-risk students' self-regulated learning skills?

The gamified elements of the course as delivered through the EdApp platform gave students an enjoyable venue in which to improve upon their own self-regulated

learning as part of the course. This was not surprising, as when college students are given autonomy in gamified environments they tend to have stronger self-regulated learning skills than students in traditional, controlled settings (Lambert, 2017). Quantitatively, Self Testing was the only survey subscale to conclude with a statistically significant increase in students' scores from the start to the end of the research innovation. However, there were some strong correlations as noted in Table 4.6. Information processing strongly correlated with XP, Stars Earned, Stars Spent, Extra Credit Quests Completed, and the chance of winning a gift card motivating a student to do better in class. Concentration strongly correlated with Badges Earned, and Using Academic Resources strongly correlated with Stars Earned. However, what made this gamified experience unique was that the students were actually learning how to improve their study habits through the curriculum content in addition to engaging with the gamified elements, thus providing them with a double dose of opportunity to improve in the area of self-regulated learning. Qualitatively, the Students Perceived Their Academic Mindset and Study Habits to Have Improved theme identified how the opportunity for personal reflection allowed students to apply what they learned to their own lives and find meaning, showing how a gamification platform could be considered an ideal way to teach self-regulated learning skills such as goal setting and persistence through a growth mindset, especially as games exemplify these characteristics (Devedzic & Jovanovic, 2015; Educause, 2014; Gibson et al., 2015; Sailer et al., 2013; Tang & Kay, 2014). Each of these quantitative and qualitative findings supports the implementation of a gamified curriculum to have positively impacted the at-risk students' self-regulated learning skills. To follow is a

discussion of (a) LASSI subscale findings, (b) three of the 6 C's related to self-regulated learning, (c) goal-setting, and (d) the importance of having a growth-mindset.

LASSI self-regulated learning subscale findings. Of the ten LASSI subscales only one was found to be statistically significant, that of Self Testing ($p < .001$). Only three of the subscales were found to have a significant correlation. The information processing posttest score strongly correlated with engagement in XP ($r = .903$, $p < .001$), Stars Earned ($r = .891$, $p < .001$), Extra-Credit Quests Completed ($r = .833$, $p = .001$), and the chance of winning a gift card motivating a student to do better in class ($r = .854$, $p < .001$). The student's scores for the LASSI Information Processing subscale increased from the pretest ($M = 18.90$, $SD = 4.15$) to the posttest ($M = 23.20$, $SD = 3.52$). Last, the Using Academic Resources subscale posttest score from the LASSI strongly correlated with the Stars Earned gamification element ($r = .802$, $p = .003$).

Self Testing. The mean score of student responses for the Self Testing subscale of the LASSI at the start of the first-year experience course was 15.20 ($SD = 3.80$). The mean score of student responses for the Self Testing subscale of the LASSI after completing the first-year experience course was 21.30 ($SD = 5.33$). The increase of 6.10 in the mean score on the Self Testing subscale posttest suggests that participants' self-regulation regarding study strategies improved after experiencing the gamified curriculum innovation. This could be because students like Kayla found this to hold the most relevance for her academic experience. She said, "The test-taking and study strategies were the most useful for me because test-taking and studying is usually what I have the most difficulty in." She continued, "I feel as if I'm more prepared to do work because I know different methods for retaining information." Deja said, "When I'm in

lecture I self test myself to make sure I know the information." It should be noted that although the quest about self testing strategies was similar in size and scope to the other quests, students spent significantly more time on the self testing strategies quest, averaging 70 minutes engaged in comparison to an average of 42 minutes engaged on other quests, which aligns with the research of Landers & Landers (2014) which showed that higher time-on-task in a gamified environment correlated to better student performance.

Information Processing. Higher Education mobile apps can be used to foster knowledge acquisition and transfer (Hannon, 2017). The information processing posttest score strongly correlated with engagement in XP ($r = .903$, $p < .001$), Stars Earned ($r = .891$, $p < .001$), Extra-Credit Quests Completed ($r = .833$, $p = .001$), and the chance of winning a gift card motivating a student to do better in class ($r = .854$, $p < .001$). Additionally, the percentage change in the Information Processing subscale score strongly correlated with the number of Stars Spent ($r = .871$, $p < .001$). This is not surprising as game design elements in non-game contexts can help participants process information, meet their goals, and modify their behavior (Hamari et al., 2014; Putz et al., 2020; Treiblmaier et al., 2018) as well as trigger active learning processes to improve their knowledge retention (Gatti et al., 2019; Putz et al., 2020; Treiblmaier et al., 2018).

As noted in Table 4.10, the questions associated with Information Processing are reflective of authentic learning, which was also supported by the category of Improved study habits. As suggested in their Final Self-Reflection Learning Quest, students found relevance in what they were learning, which was of the utmost importance in encouraging them to employ self-regulated learning techniques (Berkling & Thomas, 2013). Daniel

said that “When we went over the studying unit and how much you really should study, I applied that studying to my macroeconomics exam.” Aliyah expressed that as a result of the class, “she started using the tutors and had a schedule on when to see them.” It is encouraging that the students like Geoffrey and Deja expressed specific examples in their Final Self-Reflection Learning Quest responses in applying academic strategies learned in our class to their psychology and geography classes. Geoffrey said, “In my geography class what I learned helped me to keep on top of the work.” Deja shared, “I used what I learned for studying for my psychology class and I got an A+ on my final exam.” Such application to their own lives is the ideal goal for an effective gamification system, that of transitioning from the gamification environment to a real-world setting (Nicholson, 2015).

Using Academic Resources. A strong correlation finding was that between Using Academic Resources and the number of stars earned ($r = .802$, $p = .003$). One possible explanation for this may be the goal orientation aspect which, for gamification, also has the potential to encourage the help-seeking component of self-regulated learning for students exposed to a gamified environment (Teh et al., 2013). Furthermore, with only ten participants, this study is potentially very sensitive to outliers, with Aliyah having by far the highest increase in Using Academic Resources while also being the top star spender in the class.

Three of the 6 C’s of Motivation that relate to self-regulated learning. For the purposes of interpreting the findings of this study, Constructing meaning, Control, and Choice are three of Turner and Paris’s 6 C’s of Motivation (1995) that most closely align with self-regulated learning.

Constructing meaning. In terms of Constructing meaning, digital games and game elements in the classroom will only enhance learning and motivation if they are designed to enable students to make an active connection between the game and the underlying topic of study (Erhel & Jamet, 2013; Moore-Russo et al., 2018; Prensky, 2001), which was evident in this study. The gamification in this course was user-centered and the activities were perceived by the student participants as relevant to the user (Nicholson, 2015). An example of this is Ryan, who said in a Final Self-Reflection Learning Quest response that what motivated him was "the parts that related to me the most because they really helped me out" and Aliyah who made a schedule to keep her on track with visiting the tutoring center. Students who actively generate meaning while adapting their thoughts, feelings, and actions as necessary to affect their learning are considered to be self-regulated learners (Boekaerts & Corno, 2005). Providing relevance for students in a gamified environment is essential in encouraging them to employ self-regulated learning techniques (Berkling & Thomas, 2013).

Control. Control is exemplified when students feel empowered by levels of access to and control over course topics as part of a gamified curriculum (Iosup & Epema, 2014). In this study, students were able to decide how much additional time they spent on a task by means of extra-credit quests. Students like Kristen completed them to boost her spot on the leaderboard, whereas others, such as Kayla and Aliyah, took advantage of extra-credit quests to afford them more opportunities to earn stars for a chance to win an Amazon gift card in the star bar as evidenced by the strong correlation between the Information Processing posttest score and Stars Earned ($r = .891$, $p < .001$), Extra-Credit Quests Completed ($r = .833$, $p = .001$), and the chance of winning a gift card motivating a

student to do better in class ($r = .854$, $p < .001$), as well as the percentage change in the Information Processing subscale score being strongly correlated with the number of Stars Spent ($r = .871$, $p < .001$).

Choice. When college students are given autonomy and choices through gamification, they tend to have stronger self-regulated learning skills than students in traditional, controlled settings (Lambert, 2017). Choice correlates both with a learner's ability to access and unlock content via multiple routes to success and with choosing sub-goals within the larger task (Deterding, 2012; Iosup & Epema, 2014; Lee & Hammer, 2011). As offered in the Final Self-Reflection Learning Quest responses to the prompt of *Describe your process of deciding which worlds (courses) and/or quests (lessons) to do first in EdApp*, students like Andre explained he chose what quest he completed first based on its name, whereas Arjun chose his quest randomly. Daniel completed his quests in the order in which they were released and Aliyah, Geoffrey, Kayla, and Ryan responded that they completed their quests based on their due dates. The fact that the students got to decide what quests they completed first empowered them through choice. Gamification quests can highlight the consequences of a goal, and they can emphasize the importance of a player's action within a situation (Sailer et al., 2013).

Goal Setting. Goal setting can be enhanced through gamified mechanics such as objective-oriented quests (Sailer et al., 2013). Striving for gamification achievements can be effective because of the clear goals they provide (Hamari, 2017). Students expressed in their Final Self-Reflection Learning Quest that their goal-setting ability increased as a result of this course. Daniel said he has "been able to monitor my goals more after this class" and Kayla said what she learned has "enhanced the types of goals" she makes.

James expressed that his "ability to set goals, managing my time, changed for the better." Ryan noted that as a result of the class he has "learned to set goals for myself and get things done." Students implementing goals in their own lives could support the notion that gamified environments can enable individuals' goal-setting (Sailer et al., 2013; Werbach & Hunter, 2012). This has been shown with many gamification elements, such as leaderboards (Bai et al., 2020; Landers et al., 2017) and achievements as secondary reward systems (Groening & Binnewies, 2019) as well as competence-based rewards such as points, currency, and progress bars (Tang et al., 2020). Specifically, XP is a common referent in gamification that can provide feedback and encourage students' adoption of goals (Tang et al., 2020). This was the case with Brianna, who said in a Final Self-Reflection Learning Quest response that the weekly assessments were her favorites because she could "earn XP and stars."

Importance of Having a Growth Mindset. When I initially decided to make The Growth Mindset (Dweck, 2007) part of the curriculum, it was because the university Provost recommended it to me, saying that it had been helpful to some students who had been struggling with math. I read it and was immediately drawn to the concept of viewing failure as an opportunity to learn and the importance of persistence (Dweck, 2007). At that time, I did not make the immediate connection that gamification also allows students the freedom to fail (Kapp, 2012) in contrast to traditional educational models that may only offer one chance to pass or fail (O'Brien & Pitera, 2019). It turned out the coupling of the growth mindset to gamification was a dynamic partnership, as freshmen typically find it challenging to move from a fixed mindset (Dweck, 2007). In a Final Self-Reflection Learning Quest response, Deja said she not only learned how to study better,

but that she also improved her whole mentality for college life. Games can help students become more at ease in low-stakes environments, teaching them that persistence can be more important than winning (O'Brien & Pitera, 2019), fostering emotional stamina (McGonigal, 2011). The growth mindset was reflected in the Final Self-Reflection Learning Quest responses by students as well: Arjun expressed that "This class helped me in developing a mental mind… speaking about the growth mindset is the most important thing I spoke of today." Aliyah said she "used a growth mindset to do better in my classes." In my course, XP did not affect students' grades, which afforded them the chance to develop mastery in a safe environment for taking risks (Kam & Umar, 2018). All of the aforementioned may be a reason that students expressed how their study habits improved as a result of the class.

The combination of self-reflective opportunities within the gamified lessons allowed for self-reflection (Zimmerman, 2000) and thus authentic application, as seen in the student responses on the Final Self-Reflection Learning Quest. Daniel thought the course "really helped me self-evaluate and better prepare myself for the future" and that he has not "had a course that was so about myself and the critique and critical thinking of one's self-evaluation on schoolwork and everyday things." Brianna said students taking the course should "go in expecting so much information that will actually set you up for success." And Arjun explained that the course "focused more on learning techniques and helping you develop a mature mind." As a result, I disagree with the notion that lessons in learning management systems such as EdApp are not suited to the higher levels found in Bloom's Taxonomy (Bratt, 2020). Students' experiences as part of this study suggest that one can provide a mix of activities within the system, with opportunities for real-life

application and self-reflection in free-response prompts. This can be accomplished with both video and written responses within the gamification platform as a form of metacognitive scaffolding to improve self-regulated learning (Tang & Wong, 2014). Students who are engaged and actively generating meaning while adapting their thoughts, feelings, and actions as necessary to affect their learning and motivation are considered to be self-regulated learners (Boekaerts & Corno, 2005).

RQ2: How and in what ways did the implementation of a gamified curriculum impact at-risk students' motivation?

It is important to note that motivation in this study was primarily measured by the LASSI Motivation subscale. The questions in this subscale (see Appendix B) applied to the students' academic experience as a whole, not just their first-year experience course. Consequently, although the across-the-board improvement in motivation for the academic experience was not statistically significant, one should not infer that the students were not motivated in this course specifically. The integration of virtual currency through the form of being awarded stars in the EdApp curriculum was identified by students to be a source of motivation. As shared by Kayla in her Final Self-Reflection Learning Quest response, "The Amazon gift card thing was usually a challenge. I would end up spending all of my stars while trying to win." Additionally, the amount of engagement in earning badges, stars, and XP, which in turn resulted in students' completion extra credit quests, are attributes directly associated with motivation (Yot-Domínguez & Marcelo, 2017).

Motivation through the use of a gamification curriculum can also be seen through relatedness and feelings of competence (Sailer et al., 2017). As depicted in the Final Self-Reflection Learning Quest responses of Brianna and Andre, authentic learning that

supports the basic need of relatedness (Deci & Ryan, 2002) was accomplished, as were feelings of competence in the encouragement/confidence builder category (Deci & Ryan, 2002). Brianna said the class motivated her to "manage my time when coming to studying for a test and having to finish something with getting enough time to sleep for class the next day" and Andre said he liked "leveling-up because it made me feel like I got a higher grade."

The discussion that follows covers (a) attitude and motivation, the two LASSI subscales associated with this research question, (b) challenge, collaboration and consequences (three of the six components) of the 6Cs of motivation (c) engagement, (d) flow, and (e) gamification elements.

Attitude and motivation. Gamification research by Yildirim (2017), Subhash and Cudney (2018), and O'Brien (2017) has shown an improvement in students' attitudes with the use of a gamification curriculum, while the research of Bilgin and Gul (2020) refutes this claim. The results of student study, as measured by the LASSI Attitude subscale, suggest that there was no statistically significant difference in the students' attitudes from having utilized a gamification curriculum.

Gamification has been found in the existing literature to yield increased motivational results (Harrold, 2015; Ling, 2018; Pilkington, 2018; Sailer et al., 2017). Quantitatively, this was not the case for the students in this study as the LASSI Motivation subscale did not indicate a statistically significant increase in score. However, qualitatively students did offer comments in their Final Self-Reflection Learning Quest about their experiencing an increased sense of motivation through the use of the gamification curriculum. Arjun said, "After the class I've been really been motivated to

do all of my assignments". Daniel said he already had motivation, "but it just increased after the class." Geoffrey noted that the class "pushed you to better yourself because everyone can better themselves." Overall, Brianna said the class "motivated me very much" and Andre said he was motivated the most by the growth mindset quests.

6 C's of Motivation. Although there is a paucity of research correlating the Six C's, as a whole, to actual gameplay (Rieber et al., 2001), the individual elements can be explored (Aldemir et al., 2018). Three of the 6 C's of Motivation (Turner & Paris, 1995), Constructing meaning, Control, and Choice were already discussed in terms of self-regulated learning under the response to RQ1. It is more applicable here to address the three remaining C's of Motivation: Challenge, Collaboration, and Consequences.

Challenge. In order for competence to be experienced by the learner, gamified activities should pose optimal challenges to the student (Kam & Umar, 2018). Challenges in gamified curriculums can predict student learning while increasing engagement (Hamari et al., 2016). Students voiced their pleasure in terms of the challenges they conquered in the course. This was seen in the reflection journal assignment comments of Deja "surpassing a challenge in class" and Daniel responding that "completing our work was a competition." These students' responses supported the notion that the motivational appeal of games may be their ability to provide players with challenges to master, thereby enabling feelings of greater competence (Mekler, Brühlmann, Tuch, & Opwis, 2017).

Collaboration. Meeting students' needs for relatedness can be fostered by creating shared goals (Sailer et al., 2017) and achievements (Sillaots, 2015). In this study, collaboration did not result from peers in class working together but rather from the students' collaboration with the computer science students who helped to identify the

right gamification platform for the class. Kayla said in a Final Self-Reflection Learning Quest response, “It gave me a sense that our opinions do matter when it comes down to how we learn and how we want to learn.” Or, as Deja said in her Final Self-Reflection Learning Quest response, “I felt like they cared and wanted what was best for us.” Collaboration was additionally enabled, as made evident by my at-risk students shared having reached out to other students in the tutoring center for help. As found in Aliyah’s reflection journal assignment response, “[she] was not suffering in silence anymore as [she] started going to the tutoring center.” In support of Aliyah’s reflection journal assignment response, her score on the LASSI Using Academic Resources subscale showed an increase of 150% from the pretest to the posttest.

Consequences. Gamified feedback through badges and leaderboards have the potential to promote and satisfy the need for student competence (Peng, Lin, Pfeiffer, & Winn, 2012; Rigby & Przybylski, 2009; Rigby & Ryan, 2011; Ryan, Rigby, & Przybylski, 2006; Sailer et al., 2017). Students reported in their Final Self-Reflection Learning Quest responses feeling encouraged and that their confidence improved through engagement with the gamification curriculum, as observed with regards to the terminology of “leveling-up.” Deja said, “This [leveling-up] made me feel like I surpassed a challenge in class” and Arjun expressed that “It makes me feel like I do when I level-up in an actual game.” Andre liked leveling-up “because it makes me feel like I got a higher grade.”

This is important because when some learners know their peers have done well, they may strive to do better in the course activities themselves (Bai et al., 2020). This aligns with the research conclusions of Xi and Hamari (2018) who found when learners

have the chance to learn new skills, set goals, and receive feedback, they are likely to increase their competence, their desire for self-mastery, and their desire to celebrate their achievements. Regarding winning a badge, Aliyah said in her Final Self-Reflection Learning Quest, “it made me feel like I was actually putting my time to use” and Daniel said badges made him feel “sensational.”

Engagement. Students will engage with what they love to do (Pitoyo, 2019). A heightened sense of competency also promotes intrinsic motivation, encouraging a higher level of engagement (Bai et al., 2020; Ryan & Deci, 2000). Motivation can be an important predictor of achievement by influencing the amount of time spent on learning (Cakiroglu et al., 2017; Chang & Wei, 2016; Davis et al., 2018; Groening & Binnewies, 2019; Sánchez-Martín et al., 2017; Yildirim, 2017), which implies that the more engaged students are, the more chance they will succeed (Zainuddin et al., 2020). Gamification elements are designed for enhancing engagement and motivation (Kim & Lee, 2015; Lee & Hammer, 2011) and they effectively do so, according to Chairoglu et al. (2017). Additionally, gamified elements allow students to fail and try again (Bilgin & Gul, 2020). Student engagement as part of this first-year experience course was reflected in the qualitative outcome category of Engagement. Codes like *loved it, enjoying learning, doing it for fun, liked being ranked, looking forward to it, and attention grabbing* were generated and subsumed into the Engagement category. This finding supports the existing research that gamified environments are effective for student engagement (Chairoglu et al., 2017; Kim & Lee, 2015; Lee & Hammer, 2011; Zainuddin et al., 2020).

Gamification elements. Gamification curriculum elements can keep learners in a state of flow in activities not typically associated with gameplay (Zichermann &

Cunninghan, 2011). Student achievement can satisfy needs for competence and autonomy better than classical classroom goal-setting (Groening & Binnewies, 2019). As identified in the descriptive statistical outcomes of the self-reflection end of the semester survey Likert-rating scale questions, the mean score of 3.90 (*SD* = 1.60) on the question *Leveling-Up and Badges motivated me to perform better on my lessons* indicated that students agreed that the gamification elements built into the EdApp curriculum positively impacted their motivation and overall course performance.

As research largely suggests that gamification can serve to provide motivational benefits to students in educational environments (Barrio et al., 2016; Han, 2015; Kumar & Khurana, 2012; Nah et al., 2014; Stansbury & Earnest, 2017; Su & Cheng, 2015), a discussion of motivation as it pertains to flow, rewards, leaderboards, and badges follows.

Flow. Flow theory employs high concentration, focusing on activities with significant pleasure and intrinsic motivation (Nakamura & Csikszentmihalyi, 2009). Ryan in particular noted in a reflection journal assignment that he "would start on one quest and then keep on going." It seemed likely that the ease of the EdApp platform enabled this in comparison to the more cumbersome Blackboard LMS. This supports the outcomes of Nakamura and Csikszentmihalyi (2009) that establishing clear objectives, appropriate challenges, and immediate feedback positively impacts performance and progress. In the EdApp gamification curriculum, the process of leveling-up also may have served to promote flow (Bai et al., 2020).

Rewards. Skinner's theory of operant conditioning (1938) suggests that learning is controlled by positive and negative reinforcement. In line with feedback schedules and evaluation (Linehan et al., 2015), gamification provides rewards, badges, and points at

varying intervals in order to maintain learners' interest (Kapp, 2012), providing positive reinforcement (Woolfolk, 1998). Gamification embraces highly structured patterns of behavioral management, feedback loops, and reward mechanics in order to influence participant behavior (Linehan et al., 2015). For two students in this study in particular, earning and spending the virtual currency of stars at the star bar for a chance to earn an Amazon gift card was highly motivating. Indeed, this appeared to be the most effective form of engagement for Aliyah and Kayla who, upon review of the EdApp analytics, spent the most stars in the course at 248 and 138 respectively. As stated by Aliyah and Kayla in their Final Self-Reflection Learning Quest responses, earning stars was in fact the biggest motivation for each. Kayla said, "The stars motivated me to finish my quests. I think incentives pushed everyone a little harder. The stars were my biggest motivation because I wanted to play in the star bar." And, Aliyah expressed that her biggest motivation was "being able to earn stars to win gifts" and that she wanted "to try and win a gift card."

Virtual goods are valuable game assets that can be translated into real-world value, such as points in a game being a form of virtual currency (Dyer, 2015). In addition, virtual goods have been designated has a top mechanic in terms of engagement (Chang & Wei, 2016). Both Aliyah and Kayla indicated in their Final Self-Reflection Learning Quest responses the thought of things they needed or wanted personally while playing in the star bar. Aliyah said, "I won't have to pay for nose rings or acrylic now," while Kayla said, "like 'oh this is cool'. It was a nice incentive thinking about things I need. It motivated me to get more stars too."

Achievements are not only positively associated with needs satisfaction, but they can also be a predictor of autonomy and competence satisfaction (Xi & Hamari, 2018). This was made evident by student responses to earning stars in their Final Self-Reflection Learning Quest entries. James said he "felt good earning those stars" and Arjun said, "It was like I earned money!"

Leaderboards. Leaderboards as a source of motivation is seen with mixed results within the existing literature (Sailer et al., 2017), but they tend to be more successful if the users are at the same performance level (Landers & Landers, 2014). The at-risk students in this study were generally at the same level, but their utilizations of the leaderboard were mixed, which makes sense as social comparison via leaderboards tends to yield positive or negative responses based on downward or upward trajectories (Hew, Huang, Chu, & Chiu, 2016). For most students, as offered in the Final Self-Reflection Learning Quest, being on the leaderboard had a positive impact. Arjun said, "It makes me feel like I'm the champ" and Deja said, "I liked seeing my name on the leaderboard because it always gave me an assurance." Both Daniel and Kayla said it made them feel like they were doing something good. However, others were less enthusiastic about the leaderboard, like Ryan, who indicated that he "did not really check the leaderboard" because he "mostly I forgot about it."

As identified in the descriptive statistical outcomes of the Final Self-Reflection Learning Quest Likert-rating scale questions, the mean score of 3.60 (SD = 1.70) on the question *The leaderboard motivated me to perform better on my quests* indicated that students agreed that this particular gamification elements built into the EdApp curriculum positively impacted their motivation and overall course performance.

Badges. Although badges have been known to provide encouragement to students as a measure of achievement (Martens & Muller, 2017; Werbach & Hunter, 2012), there were students in this study like Andre who were not particularly motivated by them. In alignment with the research of Morris et al., (2019), who found badges did not provide clear motivational support toward learning goals, Andre's response that he felt "nothing really" in his reflection journal assignment indicated that badges did not provide him motivation. However, other students identified having appreciated the badges in their Final Self-Reflection Learning Quest responses. Deja said, "They made me feel like I have accomplished something, like a girl scout!" Daniel felt "sensational," while Ryan felt "accomplished" when earning badges.

Extra-Credit. To earn additional stars, students completed extra-credit quests, some of which had a time limit, which has been shown to motivate students (Pitoyo, 2019). As identified in the EdApp analytics, students completed approximately five extra-credit quests on average ($M = 5.20$, $SD = 3.39$). Deja said in a Final Self-Reflection Learning Quest question that she did extra credit quests because "they boost your spot on the board." As well, Kayla responded having completed the extra credit quests because she "wanted more stars." Aliyah acknowledged in a Final Self-Reflection Learning Quest entry that she completed most of the extra credit quests to "just see what they were." Additionally, Andre shared having completed some because he "wanted to see what you could get."

RQ3: What were at-risk students' perceptions about the gamified curriculum on the quality of their learning experience?

Overall, students' perceptions of their experience with the gamified curriculum were very positive, and everyone shared that they liked the design of EdApp. In fact, they wanted more gamification, as observed in their open-ended Final Self-Reflection Learning Quest responses. James expressed that "the whole course should be on the EdApp with the games" and Andre said to "use EdApp and make the whole class online." Ryan wished we "would have switched to EdApp sooner" and Daniel said "it [EdApp] should keep going for years to come and be implemented in education as a whole."

Although students' Concentration and Anxiety did not show statistically significant improvement in their overall academic experience at college, as expressed by their LASSI posttest scores, there was a strong correlation between Concentration and badges earned ($r = .808$, $p < .002$). Moreover, as seen in the emerged theme of the qualitative data in Students Perceived the Gamified Curriculum Made Their Learning Easier, students identified the gamified curriculum as reducing their stress and making the content less distracting. The following codes generated from the student comments offered in both the Final Self-Reflection Learning Quest responses and their reflection journal assignments were subsumed into the three categories that supported this theme: *never felt distracted, easy to use, well organized, not distracting, accessible, using it on the go, feeling lighter, sense of comfort, and learning as stress escape.* This positive student perception of the gamification elements was also found in the research of O'Connor and Cardona (2019).

The discussion which follows addresses (a) the LASSI subscales associated with concentration and anxiety, (b) the perception of gamification as easy, (c) various gamification elements, and (d) the design of EdApp.

Concentration and Anxiety. Some gamification methods can be distracting, countering motivation and engagement (Brom et al., 2019). Students' concentration scores on the LASSI subscale of Concentration of this study did not show statistically significant improvement, but students remarked in their Final Self-Reflection Learning Quest how the EdApp platform was free of distractions. Kayla said, "I like the layout of the app, everything is well organized." Additionally, a strong correlation was observed between Concentration and the number of badges earned ($r = .808$, $p = .002$), which may reflect the attitudes of students like James, who expressed that he "never felt distracted from the course," or Deja, who said she "felt less distracted in this course than any of my other courses." In his response to the Final Self-Reflection Quest prompt of *was there anything distracting in the course*, Daniel shared, "nothing held him back." This may be due to the purposeful, simplistic design of EdApp (O'Brien & Pitera, 2019), which is free of the kinds of information and graphics that could be perceived as extraneous and distracting (Brom et al., 2019).

Gamification has been suggested as a platform to reduce anxiety levels in students (Paniagua et al., 2019) by offering low-stakes learning environments and allowing an opportunity for failure, which appeals to first-year college students (O'Brien & Pitera, 2019). Although students' mean anxiety scores on the LASSI did not decrease from their post survey response ($M = 13.40$) in comparison to their pre survey response ($M = 13.80$), students did perceive the class to be a stress reducing force in their lives. As found in

their Final Self-Reflection Learning Quest responses, Kayla expressed she "felt a sense of comfort because I am used to gaming systems and apps so that made the course difficulty easier," while Deja said, "This app sort of felt like a break and I enjoyed learning the information. My other classes are like stress and work. This was more of a weight off of my chest."

Perception of gamification as easy. The presence of game elements can seduce learners into thinking a task will be easy (Brom et al., 2019), perhaps due to the aesthetics implying ease of use (Tractinsky et al., 2000). Students like Aliyah implied in a reflection journal assignment that the course was easy, even though the content itself was thorough. She said "I did expect this course to be laid back, but not THIS laid back." From the qualitative analysis, the code *easy A* was tagged four times, and in this same vein, Deja shared in a Final Self-Learning Reflection Quest response that she felt this course was an "easy A" and Aliyah touted the course as a "GPA boost."

Gamification Elements. Although the discussion of literature detailing students' experience with and perception of gamification elements was covered in the motivation section of this chapter, some additional findings related to student perception follow as gamification as a whole may not necessarily effective, but specific game design elements have distinct psychological effects (Sailer et al., 2017).

As observed between this study's outcomes and that of Brom et al. (2019), students were indifferent to XP as a standalone gamification element, but they were more vocal in their attitudes regarding XP as displayed on the leaderboards. Brianna said in her Final Self-Reflection Learning Quest response that XP "in general were more like a bonus to me." As well, Geoffrey shared he "didn't care for the XP much" and Kayla said

her main focus was “to just finish her quests, not earn XP”. It has been suggested that XP could count toward the overall grade (Bai et al., 2020), but I have mixed feelings about this, because it contradicts somewhat with the aspect of students having the freedom to fail since mechanics can serve to reinforce the fact that failure is neither a setback nor an outcome; rather, failure is an indication that more work is needed to master the skill or knowledge required (Educause, 2014). Students can learn to view failure as an opportunity instead of becoming overwhelmed and helpless (Lee & Hammer, 2011). In this study, I did like seeing how students cared about their points through leaderboard positioning even though XP had no impact on their grades. Ryan noted in his Final Self-Reflection Learning Quest response that he would not have had “anything to try for if there was not a leaderboard”. Laster (2010) found linking XP to grades could result in better outcomes, but I question how associating XP to grades may turn that element into an external rather than internal motivator. Additionally, the leaderboards provided participants a sense of competence (Nebel, Schneider, Beege, & Gunter, 2017; Sailer et al., 2017), as supported by a Final Self-Reflection Learning Quest response from Brianna, who said being on the leaderboard “makes you feel like you know what you are doing!”

Students in this research aligned with the student perceptions of the research by Dicheva, Irwin, and Dichev (2019) as well as the research by Donovan et al. (2013) in that they tended to be more excited about the virtual star currency than badges. Brianna noted in her final Self-Reflection Learning Quest earning stars made her feel, “like a BOSS!!!” However, leaderboards and badges can also promote a sense of competence (Bai et al., 2020; Sailer et al., 2017), which was the case for students like Deja, who said in a Final Self-Reflection Learning Quest response that she felt like she had

"accomplished something" when earning a badge. Badges have also been shown to have a positive effect on low performing students (Abramovich et al., 2013). In this study the reviews were mixed with some students expressing indifference, like Andre who felt "nothing really," which could be because in this course badges had a non-utilitarian function within the platform (Hakulinen et al., 2015). Thus, it is possible the students did not really have a need to invest in badges (Bai et al., 2020).

The design of EdApp. Students really liked EdApp, as it met the characteristics of being transparent, fun to use, and aesthetically pleasing; having a comprehensible organization of course content; and being easily accessible at all times of the day (Shroff et al., 2020). Students expressed in their reflection journal assignment responses that EdApp was more engaging than Blackboard. Kayla noted that "It's more interactive. It just felt cool. It was more than I was expecting." Ryan liked that EdApp is "fun, colorful, and interesting," while Kristen said, "I love that games are part of the lesson and the stars remind me of coins in a game."

Many students also noted that EdApp was easy to use. Arjun said in a Final Self-Reflection Learning Quest response, "It is fast and smooth, making it really not annoying to work on." As well, Kayla said, "I like the layout of the app, everything is well organized." However, it should be noted that students did encounter some hiccups with EdApp. Aliyah noted in a Final Self-Reflection Learning Quest response, "It made me restart the lesson a few times," and both Geoffrey and Brianna said it did "glitch a little," which was denoted in the code *glitches* that was generated in the qualitative data analysis. However, these glitches did not appear to temper their perception of the experience overall.

Implications

A discussion of personal implications, implications for other first-year experience course instructors, and future research implications follows.

Personal Implications

In the future, I will not place as much emphasis on a narrative; rather, I will instead allow students to ascribe their own meaning to the content through appropriate self-reflection opportunities and free response questions. I will also engage a focus group of students in the design process with the hopes of providing more opportunities for collaboration, choice, and control amongst quests. Clear and consistent communication, with properly delineated goals, will be key from the onset of the course. Personally, I have learned a great deal from this study in terms of the following: (a) the use of narrative in a gamified curriculum, (b) student buy-in, (c) collaboration, (d) choice and control, (e) importance of initial communication, (f) goals, and (g) utilizing a matrix.

Use of narrative in a gamified curriculum. As someone with a background in screenwriting, I was convinced that establishing a narrative would play a role in the gamification's success (Koivisto & Hamari, 2019), as interweaving rewards within a story can help create a cohesive gamified experience (Sheldon, 2011). The use of a narrative was also a means of trying to enhance the gamification experience on Blackboard. However, it became readily apparent that the students were not engaged or interested in the narrative at all, with only two of the 10 students having even watched the videos. This may be because the videos and accompanying badges were not necessarily essential for student comprehension of the core instructional message, and thus students did not reserve the time or energy to engage with what they perceived as extraneous

details (Garner, Brown, Sanders, & Menke, 1992). In fact, the presence of a narrative in a game-based context may not even be as beneficial for college learners (Adams, Mayer, Koenig, & Wainess, 2012) as it is for children (Sandberg, Maris, & Hoogendoorn, 2014). Task meaningfulness can result more from aesthetically pleasing gamification elements than the narrative (Sailer et al., 2017). Although superfluous narratives do not elicit real meaning in a gamified environment (Donovan et al., 2013), I was pleased that the students were able to find their own relevance through self-reflection and the application of their newly acquired academic skills to their own lives. In the future, I would maintain more of a focus on reflection and application activities instead of forcing a narrative onto a group of learners who are discovering themselves during their first year at college and want the opportunity to discuss their experiences. Arjun said in a Final Self-Reflection Learning Quest response that the course surprised him a lot because "[I] spoke about my personal problems which doesn't happen." Having this added element of personal connection may help standalone gamification elements avoid being considered shallow or superficial, as suggested in the research outcomes of Bogost (2011).

Student buy-in. The moment that made me truly appreciate action-based research was when I was able to switch gears and tell my students we were going to try a different platform other than Blackboard to employ our gamification. Their faces lit up. Andre said in the Final Self-Reflection Learning Quest response it made him feel like "teachers are listening to students' feedback to improve the class." In the future, I would do a pilot study with a group of students before committing to a particular platform, as instructors should put great thought into the best approach for meeting the particular students' needs and abilities (Brom et al., 2019).

It was wonderful to observe the class of peers engage with each other on this discovery process. The computer science students spoke to the students in their kind of language, meeting the 18-year-olds on their level. And the students were no doubt more forthcoming with them about what they wanted in a gamification platform than they would have been with me as their instructor. Bringing in peer leaders to help move us forward is something I will continue to do. I learned to not be afraid of making changes when something is not working and to not be embarrassed at admitting failure but rather to embrace it as a learning opportunity for the whole class. It was, honestly, a splendid example of the Growth Mindset coming to life right in front of the class.

Collaboration. Gamification research should not be restricted to motivation, satisfaction, academic achievement, and engagement; it should also include the potential to promote teamwork and group cohesion (Bilgin & Gul, 2020). As a group, my students were rather introverted, which is probably why they were so comfortable writing reflection responses. In a future implementation, I would add items to quests, perhaps adding extra-credit quests, to promote teamwork (Donovan et al., 2013) while realizing a more socially interactive experience that can help users develop social competence (Tang et al., 2020) through cooperative and collective gamification approaches (Koivisto & Hamari, 2019). I would also use the video discussion feature in EdApp, asking students to comment on various questions and concepts via the video chat. An emphasis on a more social gamification experience would likely help build the participant's social status, resulting in better retention rates and skill acquisition (De-Marcos, Garcia-Lopez, & Garcia-Cabot, 2016).

Choice and control. In future gamification settings, I will incorporate more choices of quests and activities within the quests, as I support the notion that learners should believe they have freedom as a result of their own decisions to choose tasks or challenges presented to them (Turner & Paris, 1995). An important element of incorporating gamification elements into academic courses is to provide students with a sense of control over how their learning takes place (Shroff et al., 2020). Moreover, when college students are given autonomy and choices through gamification they tend to have stronger self-regulated learning skills than students in traditional, controlled settings (Lambert, 2017).

Importance of initial communication. At least a third of the class admitted they did not have their EdApp notifications turned on, even though they were initially instructed to do so. In the future, I will make sure students actually turn on their notifications, since this can be useful in keeping students up to date with content (Garbrick & Clariana, 2015; Kaneko et al., 2015).

I was admittedly confused as to why half of the students continued to not be aware of the gamified elements in Blackboard (narrative videos and badges) even though this was reviewed in class three times. This confusion with initial gamification criteria is not without precedent (Huang, Hew, & Lo, 2019). Like in Huang et al.'s (2019) study, I did introduce the gamification rules, but I did not follow up enough with the students to ensure understanding. We did not have this problem with EdApp, as the platform was self-explanatory and clear from the onset, and unlike Blackboard, it was a platform designed specifically for gamification.

Goals. Clear goals can help structure the learning task and increase the learner's feeling of competency and sense of autonomy (Brom et al., 2019). Learners who have a clear goal are more likely to complete a task than those who are simply told to do their best (Jung, Schneider, & Valacich, 2010). Therefore, I would also tie more specific short-term and long-term goals to the rewards (Huang et al., 2019). During this study, badges were awarded for completing quests; however, it would be more effective to have them match specific objectives or goals of the course (Bai et al., 2020). Incorporating badges into a leaderboard as a different means of social comparison than points (Bai et al., 2020) or markers (Hamari, 2017) may be something I would consider, especially as leaderboards require participants to set their own goals, striving to place themselves at the top (Landers et al., 2017).

Utilizing a matrix. If time allowed, I would consider using a taxonomy matrix like Toda (2019) incorporated in his research. Such a deep dive would be exciting to explore, as the elements of the matrix relate to performance/measurement, environment, social/personal interaction and student experience. See Figure 5.1. Based on this study, I would not likely use the fictional aspects, especially on an effective platform like EdApp in which a narrative would like come across as superfluous and perhaps cumbersome, potentially decreasing the ease of use. No matter how well a class is gamified, it will become cumbersome if the work to keep it going takes too much effort (Hung, 2017). Students may also perceive the gamification platform as being too difficult, with too many details associated with each task (Antonaci et al., 2015). For example, if different game-like scenarios are presented throughout the course (e.g., Antonaci et al., 2015), the student will need to devote time and energy to learning the rules and parameters of each

novel situation. This could distract the student from comprehending the intended learning objectives.

Figure 5.1. Taxonomy design (Toda et al., 2019).

Implications for Other First-year Experience Course Instructors

The use of a gamified curriculum in first-year experience courses can assure a student-centered learning experience that stands in contrast to the traditional professor-as-lecturer model, and there can be an appropriate balance between games and relevant content on which students can self-reflect. Traditional content can be refined with key salient points being emphasized on the gamified platform. Students can be savvy consumers that expect technical accessibility and adaptability of content at their fingertips, which can be addressed by the adoption of mobile apps to deliver gamified curriculum in a higher education setting. It is my position that first year-experience courses can benefit immensely from gamification, as is discussed from the following

perspectives: (a) student-centered learning, (b) keeping it personal, (c) refining content, (d) implications for retention, and (e) widespread adoption of mobile apps.

Student-centered learning. Teaching in front of the class while trying to make gamification work in Blackboard was not successful, but what did work best for the students was shifting everything to EdApp. One of the most interesting things about this transition was that I as the teacher suddenly found myself taking more of a side role. Once all of the material was loaded into EdApp and the games were set up, I was able to sit back and watch and help students when needed. This suggests that in order for gamification to be implemented in first-year experience courses, a paradigm shift from the teacher as lecturer to that of the teacher stepping off stage as a monitor (Lengyel, 2020) will be necessary. It should be noted, however, that the time commitment in setting up this system on the backend is significant (Bratt, 2020).

Keeping it personal. In order to keep the first-year experience intimate, there had to be plenty of opportunity for self-reflection and communication. In contrast to the assumption that gamification is more time-consuming for the instructor—especially with technical issues (Daubenfeld & Zenker, 2015) and the increased amount of grading required in order to keep up with rewards and achievements (Evans, 2016)—a key benefit of gamification is that once the content is loaded into a platform like EdApp, the professor will have sufficient time to reach out to students personally and to spend time thoughtfully responding to their reflections. While the technology of EdApp functioned as it was intended to do, instructors can only do what a human being can do, like reaching out and offering sincere encouragement or an additional level of support tailored to students. In this study, three of the ten participants said they opened EdApp because they

received an email reminder from the instructor that an assignment was due. These email communications were not generic and sent to the class as a whole; rather, they were personally written to each student. Thus, the gamification elements are only as effective as the instructor and their intentional communications.

Refining content. It has been said that gamification is not about technology or a digital platform but rather the design and development of innovative instruction which incorporates game elements into activities (Zainuddin et al., 2020). I fully support this assertion; however, the technology is not irrelevant. I certainly could not have executed the gamification platform without EdApp. Contrary to the notion that one of the downsides of gamification is that it is administratively time consuming (de Freitas & de Freitas, 2013; Dias, 2017), especially in terms of design (Evans, 2016; Moore-Russo et al., 2018; Rashid & Suganya, 2017), the EdApp platform made the delivery of my instruction easier and better. This platform had preformatting that was applied to all text, which helped to make my content look inviting. It forced me to take what would have otherwise been a busy PowerPoint and distill it down to salient points to be presented with ample white space and the capacity for scrolling and swiping as mandated by the necessary constraints of the EdApp platform. This ensured a clear and effective experience for my users. Implementing gamification platforms can change, for the better, how classes are taught and how the content is presented. It has been suggested that, similar to the swiftly changing field of gaming, the study and usage of gamification requires a constant review of research findings as it continues to evolve (Hulsey, 2015) both technologically and pedagogically (Banfield & Wilkerson, 2014; Barneva et al., 2017; Toyama, 2015). I do not disagree with this, but perhaps it is not the instructor who

has to bear the whole burden anymore. Since using EdApp in my spring 2020 course, the company has already made numerous updates, including more collaborative video functions as well as the ability to automatically adapt previously prepared PowerPoint slides to their templates. The more widespread gamification LMS platforms become, and the more they compete for adoption, the more they are likely to continually refine and update their product, which will free the instructor to focus more on student relationships and keeping their content, not the platform technology, current.

Implications for retention. Successful first-year experience courses can aid in student retention (Mah, 2016; Titus, 2004). Thus, the consequences of gamification supporting an effective class experience in this discipline is far reaching for universities both in terms of financial implications and degree completion rates (Johnson, 2012; Pechenkina et al., 2017).

Widespread adoption of mobile apps. College students are flexible technology users who will expect teaching and class delivery to meet their needs and adapt to changes in their environment (Chang et al., 2009). The reuse and varying learning pathways offered by apps are also pedagogically significant (Shroff & Keyes, 2017). Mobile apps can provide a practical immersive learning experiences for building a solid learning foundation in many subjects (Shroff et al., 2020). App usage is key for college learners, as it offers flexibility, automatic practice quizzes (such as the "brain boost" function in EdApp), feedback, peer comparison, and accessibility from wherever they are (Pechenkina et al., 2017). Mobile apps can help personalize learning experiences (Pechenkina et al., 2017) for freshmen students who are at higher risk of dropping out relative to students who are more senior in class standing (O'Keefe, 2013; Ryan, 2004).

Implications for Future Research

The conclusions yielded by a study like this could be augmented by further research specific to the first-year college experience. In addition, studies specific to the learner characteristics of the participant would be valuable in increasing communication, participation, and trust. Longer, larger studies would merit greater methodological and statistical rigor. Studies examining personal dashboards in comparison to public leaderboards, as well as those focusing on goal-setting theory in terms of self-regulated learning and gamification, are encouraged. Finally, a comparison of gamification experiences on various learning management systems could serve to inform implementation decisions at universities. Regarding recommendations for future research, a discussion follows in in terms of the need for more (a) gamification studies specific to the first-year college experience, (b) participant focused studies, (c) longer and larger studies, (d) dashboard studies, (e) goal-setting theory studies, and (f) LMS studies.

Gamification studies specific to the first-year college experience: Knowledge of how to gamify an activity in relation to specific educational contexts is limited (Dichev & Dicheva, 2017), suggesting that additional gamification studies specific to first-year experience courses are needed, which is especially important for first-year college retention (Pechenkina et al., 2017). Researchers should consider participant characteristics and educational contexts as moderating variables, as there is very limited research about which game elements, if any, improve outcomes for what type of learners and in what contexts (Brom et al., 2019).

Participant-focused studies. Studies examining individual attributes and the role of the user have been a suggested area of future study (Koivisto & Hamari, 2019),

especially in terms of the types of learners and the extent of user interest in gamification (Bai et al., 2020), since what motivates one person may not have the same effect on another (Lopez & Tucker, 2019). It would also be interesting to study this in conjunction with various dynamics such as participation, communication, and trust (Bilgin & Gul, 2020), being that it took my students some time to trust me with the intent of the gamified platform. I believe trust was truly garnered when I brought in the computer science students to help devise a platform to better suit our classes' needs. Like Kayla said in a Final Self-Reflection Learning Quest response, "It gave me a sense that our opinions do matter when it comes down to how we learn and how we want to learn."

Longer and larger studies. This study only had ten participants and took place within a seven-week duration amidst a major learning interruption due to the COVID-19 pandemic. Ideally, sample sizes should be large enough for methodological rigor (Brom et al., 2019) allowing for richer quantitative analysis and being long enough in duration to diminish novelty effects (Bai et al., 2020; Hanus & Fox, 2015; Koivisto & Hamari, 2019). Specifically, a larger population would allow for focus groups with interviews (Rapp, 2015), adding additional depth to the student perceptions and experience. Also, once the novelty diminishes, gamification findings tend to not be as positive (Attali & Arieli-Attali, 2015), whereas in traditional environments, instruction can be carried out without a decrease in interest derived from the loss of novelty frequently associated with gamification (Barrio et al., 2016).

Dashboard studies. Some studies have shown that public leaderboards can harm motivation and satisfaction (Hanus & Fox, 2015). It has also been proposed that the lowest ranking students should not be shown on the board to avoid them having a

negative perception (Jian, Liu, Yu, & Voida, 2017). This, or perhaps that of private leaderboards for individual use (Haque, O'Broin, & Kehoe, 2017), may be an area of future study to consider. It was been suggested that a personal dashboard, or some other progress tracker only visible to the student, may appeal to their sense of achievement (Bai et al., 2020).

Goal setting theory studies. As student learning goals and motivation can be related (Morris et al., 2019), it would be interesting to study this relationship in terms of a narrower focus on a handful of gamification elements, such as a leaderboard, badges, or currency. The use of currency would be especially interesting to me given my students' engagement with earning stars in this study. That alone is worth investigating, but what I would like to explore, or at least encourage additional research to explore, is if there is a relationship between individuals' goals and their desiring stars. In this study, some students wanted to play the star bar to win a gift certificate and others just wanted to see how many stars they could get and to keep their star count high, while other students were ambivalent towards the stars. It surprised me that the students who wanted a high count did not spend them at the star bar, even when the semester was coming to an end. I thought XP would have served this type of desire, allowing these "star savers" to freely spend stars. Was this because of the more visually appealing representation of stars in contrast to numerically represented scores, or could these students simply be "savers" by their very nature? Additionally, I would also measure the numbers of assignments turned in late—or early—as originally planned to be examined in this study (prior to COVID-19), especially as learners who complete assignments on time or early tend to have better

success than those who put off finishing tasks (Michinov, Brunot, Le Bohec, Juhel, & Delaval, 2011).

Learning management system studies. Augmenting an LMS with game-based elements is an area for future study (Zainuddin et al., 2020). Additionally, mobile apps are becoming more prevalent in higher education (Pechenkina et al., 2017), but more research should be conducted regarding what makes these apps especially effective, which is of relevance to both academicians and designers (Hirsh-Pasek et al., 2015). We should recognize that it will take additional time for instructors to enter what amounts to double the information into both a traditional LMS like Blackboard and a gamified platform like EdApp (O'Brien & Pitera, 2019). Research is needed to examine the impact of utilizing two learning platforms, one being specialized to gamification and the other being the traditional LMS, to see if students perform better with just one or both, especially as the traditional LMS takes more time and effort on the part of instructors.

Limitations

It is important to note the limitations of one's work so future research can address these areas. There were four primary limitations identified within this study: (a) the COVID-19 pandemic, (b) action research design, (c) self-reported data, and (d) the novelty effect.

The COVID-19 Pandemic

As a result of the COVID-19 pandemic, universities across the country had to undergo a massive shift to online learning that quickly underscored the importance of utilizing engaging LMSs (Bratt, 2020) and relying on virtual platforms (Oe et al., 2020). Prior to the pandemic, I was using Blackboard in my first-year experience course,

coupled with in-person instructor lectures. I would first lecture with a PowerPoint at the front of the room, then pause for students to complete self-reflective journal questions on their computers, and finally resume the lecture. Fortunately, I had already explored a different curriculum, EdApp, prior to the state closing down all universities as a result of the COVID-19 pandemic, forcing the entire course online. In using EdApp's instruction and self testing, student reflection became seamless within each quest on the EdApp platform, supporting a synchronous learner agency (Bratt, 2020). Although students adjusted well to the EdApp platform in this course, the university directed all faculty to extend assignment deadlines and let students know submission expectations for the remainder of the semester were flexible. This was a challenge as the structure gamification affords does not replace standard rules or requirements (Berkling & Thomas, 2013). In addition, students were informed by the registrar they could choose a pass or fail option instead of a letter grade. Nobody in this study chose the pass/fail option for this course; however, knowing that they could elect this option likely led students to turn in work after the due dates, and this negated the possibility of using assignments being turned in early or on time as any sort of measure of self-regulated learning, as was initially planned for this study. In addition, college students around the world were under stress as a result of the changes necessitated by the COVID-19 pandemic (Oe et al., 2020) and my students were no exception. Some lost jobs, the majority had to return home, and one student reported having been hospitalized as a result of being infected with COVID-19. When surveyed whether or not the transitions associated with COVID-19 decreased their motivation or their ability to turn in

assignments on time, the students' mean score responses were 3.7 and 3.8 on a Likert-scale of 0 to 5, respectively.

Action Research Design

Another limitation of this study is that action research is not generalizable (Stringer, 2014), since it allows for the researcher to be an active participant in the learning process (Mills, 2011) taking place in their own context-specific educational space (Creswell, 2017; Herr & Anderson, 2015). Consequently, my findings are specific to the at-risk students at JTU taking the first-year experience course. It is also possible that my own biases toward some of the participants could have influenced how I interpreted the data.

Originally, before the COVID-19 pandemic, I was going to have more group quests as the semester progressed since this would have promoted teamwork and cooperation (Donovan et al., 2013) as part of a more socially interactive experience designed to help users develop social competence (Tang et al., 2020) through cooperative and collective gamification approaches (Koivisto & Hamari, 2019). The fact that everyone had dispersed as a result of the campus closing, coupled with the university's allowance for the students to have relaxed assignment deadlines, meant that group work was not readily feasible. This is a limitation of the study, since collaboration in a gamified context can significantly impact the students' experience (O'Brien & Pitera, 2019), as relationships represent the social aspect of games. Such relationships do not have to be only competitive, but they can encompass sharing with friends and helping others. Collaboration can be fostered both within and outside of the game (Werbach &

Hunter, 2012), as it can enhance both self-regulated learning (Tang & Kay, 2014) and motivation (Sailer et al., 2017; Turner & Paris, 1995).

Self-Reported Data

My qualitative data was reported by students through reflection journal assignments and the Final Self-Reflection Learning Quest. As such, the use of self-reported data is a limitation of my study (Li, Worch, Zhou, & Aguiton, 2015). It is possible my students may have responded in a certain way to please or upset me which can be a limitation to research (Mertler, 2017).

Novelty Effect

The novelty effect, as defined by Clarke and Sugrue (1988), is the tendency for performance to initially improve when new technology is instituted—not because of any actual improvement in learning or achievement, but rather in response to increased interest in the new technology. "The increased attention paid by students sometimes results in increased effort or persistence which yields achievement gains. If they are due to a novelty effect, these gains tend to diminish as students become more familiar with the new medium" (Clarke & Sugrue, 1988, pp. 75-76). While the students in my study were accustomed to using computers, tablets, and smart phones, their learning of course-related concepts via EdApp was novel for each of them. This study taking place over seven weeks seemed to keep their interest piqued in this new learning modality. A longer study could lead to different results because the students would become more accustomed to using EdApp, and the potential return to old learning habits would resume. Hanus and Fox (2015) and Hamari et al. (2014) identified as well the novelty effect to be a limitation in their gamification studies.

Closing Thoughts

When originally planning for this study, I thought students would be sufficiently engaged in a gamified curriculum delivered through Blackboard as long as there was a compelling and relatable narrative. However, after a few weeks, it became abundantly clear my presumption was incorrect. It was at this turning point that I truly appreciated the value of action research in that I could shift gears to solve the problem. Such a shift was not to influence the findings of this study but rather to ensure my students had the best opportunity to learn with a platform that would better meet their needs. Deciding on the adoption of EdApp as a class, and engaging the students in the process, was invaluable as we grew together, a real-life example of the Growth Mindset in action that I had not anticipated but certainly cherished.

It has been said that, at the very least, gamification will not result in any detrimental outcomes for students (O'Connor & Cardona, 2019), but there are many more possibilities than this to consider. I personally look forward to exploring how gamification platforms can be used to deliver content in a way that still allows college freshmen to delight in their freedom of assigning their own meaning and relevance to content while simultaneously enjoying academic growth and confidence building. After all, who doesn't want to feel "like a BOSS!!!"?

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APPENDIX A

GAMIFICATION IN BLACKBOARD

Table A.1. *Gamification Elements Used in Blackboard*

World	Quests	Objectives/Goal
The Mindsets	• The LASSI	• To see how you learn
	• Getting Acquainted	• To share a little about yourself with others in the course so we can all get to know you.
	• Making a Plan	• To make a plan for your final project, Trying Something New with a Growth Mindset
	• Grow Your Mindset	• To assess your current mindset.
Inside the Mindsets	• Growth Minded Goals	• To reflect on your mindset and understand how others developed theirs
	• One Second Everyday	• To start document what you are learning for your final project
	• Mindsets Change the Meaning of Failure	• To change the meaning of failure

World	Quests	Objectives/Goal
	• Anxiety	• To develop strategies to manage anxiety in various academic situations
The Truth about Ability and Accomplishment World	• Concentrate!	• To reduce distractions
	• Your Ideal College Environment	• To discover how you like to learn
	• The Feynman Technique	• To learn strategies for retaining information
	• I can do it!	• To assess and enhance your motivation.

Figure A.1. Units of study were denoted as levels.

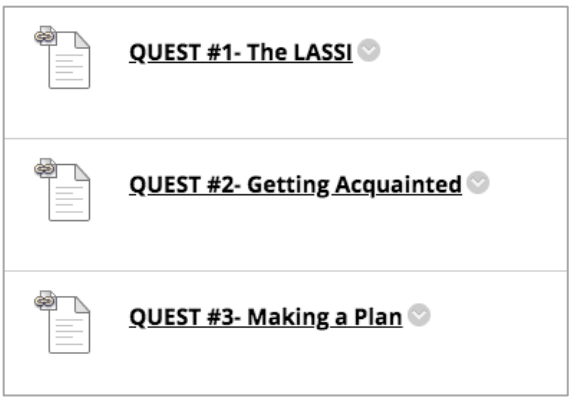

Figure A.2. Within each level were quests.

Quest Goal

Share a little about yourself to others in our course, so we can all get to know you!

Objectives

1. To update your profile in Blackboard:

- For a short how-to video, check out https://www.youtube.com/watch?v=uTaWcFURUf4.
- To access the Global Navigation Menu, click on the drop-down arrow to the right of your name in the upper right corner.
- Add any information that you like.
- Upload an appropriate digital image of an avatar you would like to use this semester. A quick Google search gives you a bunch of choices of free avatar makers (or a bitmoji works great too!).

2. To share information about yourself with the class on Flipgrid.

- Main Flipgrid page for our class: https://flipgrid.com/univ101
- Introduction page for our class: https://flipgrid.com/9c020fb0
- Tell us:
  - Your name
  - Your hometown
  - Your major (if you have one)
  - A fun fact about yourself
  - Something you have always wanted to learn to do, but haven't tried or had the time to.
  - (You are welcome to reply to any of your classmates' posts, but it's not required.)

Figure A.3. Each quest contained a goal and objectives.

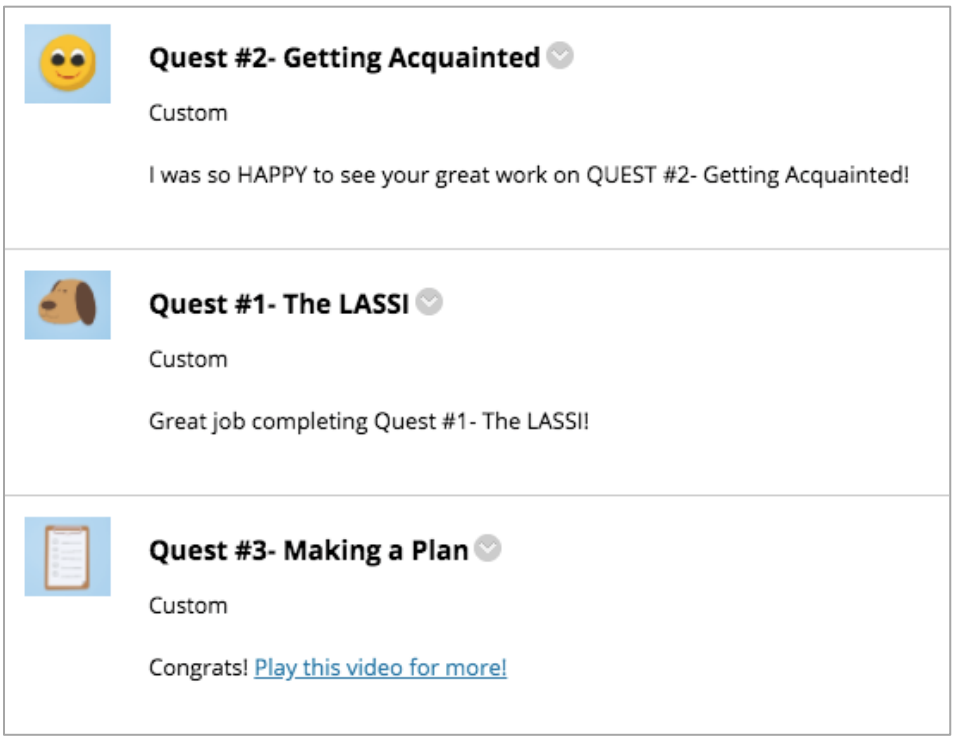

Figure A.4. After quests were completed, students received XP under My Grades and badges under My Achievements.

Figure A.5. Some badges had a congratulatory video.

Figure A.6. The course map was shown in the video.

Figure A.7. The video also gave students the opportunity to learn something new from a JTU professor or staff member to aid in their academic experience at the university.

Note. A JTU computer science professor offers students informational advice in the video.

Figure A.8. Completion map as depicted in the video.

Figure A.9. World completion badges.

Figure A.10. Example of surprise currency bonus item.

APPENDIX B

LEARNING AND STUDY STRATEGIES INVENTORY (LASSI)

Try to answer according to how well the statement describes you, not how you think you should be or what others do. There are no right or wrong answers to these statements. Please work as quickly as you can without being careless and please answer all the items.

1. Even when study materials are dull and uninteresting, I manage to keep working until I finish.
   - ○ Not at all typical of me
   - ○ Not very typical of me
   - ○ Somewhat typical of me
   - ○ Fairly typical of me
   - ○ Very much typical of me

2. When it is difficult for me to complete a course assignment, I do not ask for help.
   - ○ Not at all typical of me
   - ○ Not very typical of me
   - ○ Somewhat typical of me
   - ○ Fairly typical of me
   - ○ Very much typical of me

3. I try to find relationships between what I am learning and what I already know
   - ○ Not at all typical of me
   - ○ Not very typical of me
   - ○ Somewhat typical of me
   - ○ Fairly typical of me
   - ○ Very much typical of me

4. I find it hard to stick to a study schedule.
   - ○ Not at all typical of me
   - ○ Not very typical of me
   - ○ Somewhat typical of me
   - ○ Fairly typical of me
   - ○ Very much typical of me

5. In taking tests, writing papers, etc., I find I have misunderstood what is wanted and lose points because of it.
   - ○ Not at all typical of me
   - ○ Not very typical of me
   - ○ Somewhat typical of me
   - ○ Fairly typical of me
   - ○ Very much typical of me

6. I concentrate fully when studying.
   - ○ Not at all typical of me
   - ○ Not very typical of me
   - ○ Somewhat typical of me
   - ○ Fairly typical of me
   - ○ Very much typical of me

7. When I am struggling in one or more courses, I am too embarrassed to admit it to anyone.
   - ○ Not at all typical of me
   - ○ Not very typical of me
   - ○ Somewhat typical of me
   - ○ Fairly typical of me
   - ○ Very much typical of me

8. When I decide to study, I set aside a specific length of time and stick to it.
   - ○ Not at all typical of me
   - ○ Not very typical of me
   - ○ Somewhat typical of me
   - ○ Fairly typical of me
   - ○ Very much typical of me

9. During class discussion, I have trouble figuring out what is important enough to put in my notes.
   - ○ Not at all typical of me
   - ○ Not very typical of me
   - ○ Somewhat typical of me
   - ○ Fairly typical of me
   - ○ Very much typical of me

10. To help me remember new principles we are learning in class, I practice applying them.
    - ○ Not at all typical of me
    - ○ Not very typical of me
    - ○ Somewhat typical of me
    - ○ Fairly typical of me
    - ○ Very much typical of me

11. When it comes to studying, procrastination is a problem for me.
    - ○ Not at all typical of me
    - ○ Not very typical of me
    - ○ Somewhat typical of me
    - ○ Fairly typical of me
    - ○ Very much typical of me

12. If I am having trouble with a writing assignment, I seek help from resources available at my college such as the writing center, learning center, or tutoring center.
    - ○ Not at all typical of me
    - ○ Not very typical of me
    - ○ Somewhat typical of me
    - ○ Fairly typical of me
    - ○ Very much typical of me

13. I find it difficult to maintain my concentration while doing my coursework.
    - ○ Not at all typical of me
    - ○ Not very typical of me
    - ○ Somewhat typical of me
    - ○ Fairly typical of me
    - ○ Very much typical of me

14. I only study the subjects I like.
    - ○ Not at all typical of me
    - ○ Not very typical of me
    - ○ Somewhat typical of me
    - ○ Fairly typical of me
    - ○ Very much typical of me

15. When preparing for an exam, I create questions that I think might be included.
    - ○ Not at all typical of me
    - ○ Not very typical of me
    - ○ Somewhat typical of me
    - ○ Fairly typical of me
    - ○ Very much typical of me

16. I have difficulty identifying the important points in my reading.
    - ○ Not at all typical of me
    - ○ Not very typical of me
    - ○ Somewhat typical of me
    - ○ Fairly typical of me
    - ○ Very much typical of me

17. When work is difficult, I either give up or study only the easy parts.
    - ○ Not at all typical of me
    - ○ Not very typical of me
    - ○ Somewhat typical of me
    - ○ Fairly typical of me
    - ○ Very much typical of me

18. To help me learn the material presented in my classes, I relate it to my own general knowledge.
    - ○ Not at all typical of me
    - ○ Not very typical of me
    - ○ Somewhat typical of me
    - ○ Fairly typical of me
    - ○ Very much typical of me

19. There are so many details in my textbooks that it is difficult for me to find the main ideas.
    - ○ Not at all typical of me
    - ○ Not very typical of me
    - ○ Somewhat typical of me
    - ○ Fairly typical of me
    - ○ Very much typical of me

20. I review my notes before the next class.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

21. I have difficulty adapting my studying to different types of courses.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

22. I translate what I am studying into my own words.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

23. I put off studying more than I should.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

24. Even if I am having difficulty in a course, I can motivate myself to complete the work.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

25. My mind wanders a lot when I study.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

26. I stop periodically while reading and mentally go over or review what was said.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

27. I am not comfortable asking for help from instructors in my courses.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

28. I feel very panicky when I take an important test.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

29. I have a positive attitude about attending my classes.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

30. When I study for a test, I have trouble figuring out just what to do to learn the material.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

31. Even if I do not like an assignment, I am able to get myself to work on it.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

32. I would rather not be in school.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

33. I set goals for the grades I want to get in my classes.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

34. When I am taking a test, worrying about doing poorly interferes with my concentration.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

35. I try to see how what I am studying would apply to my everyday life.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

36. I have trouble understanding exactly what a test question is asking.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

37. I worry that I will flunk out of school.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

38. To help make sure I understand the material, I review my notes before the next class.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

39. I do not care about getting a general education, I just want to get a good job.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

40. I find it hard to pay attention during lectures.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

41. I try to relate what I am studying to my own experiences.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

42. I dislike most of the work in my classes.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

43. I review my answers during essay tests to make sure I have made and supported my main points.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

44. When studying, I seem to get lost in the details and miss the important information.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

45. I do not put a lot of effort into doing well in my courses.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

46. If I find that a course is too difficult for me, I will get help from a tutor.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

47. I am very easily distracted from my studies.
- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

48. It is hard for me to decide what is important to underline in a text.

- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

49. To check my understanding of the material in a course, I make up possible test questions and try to answer them.

- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

50. Even when I am well prepared for a test, I feel very anxious.

- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

51. I set aside more time to study the subjects that are difficult for me.

- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

52. I test myself to see if I understand what I am studying.

- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

53. Courses in certain subjects, such as math, science, or a foreign language, make me anxious.

- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

54. I end up “cramming” for every test.

- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

55. When I listen to class lectures, I am able to pick out the important information.

- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

56. When I am studying, worrying about doing poorly in a course interferes with my concentration.

- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

57. I do poorly on tests because I find it hard to plan my work within a short period of time.

- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

58. If I get distracted during class, I am able to refocus my attention.

- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

59. In my opinion, what is taught in my courses is not worth learning.

- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

60. When I do not understand how to use a method or procedure presented in one of my courses, I ask another student to teach me so that I can do it on my own.

- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

61. I need a college degree to fulfill my ambitions.

- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

62. My personal relationships interfere with my college responsibilities.

- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

63. The cost of my education is a major concern.

- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

64. In the last hour, I decided to change an aspect of my study routine.

- ○ Not at all typical of me
- ○ Not very typical of me
- ○ Somewhat typical of me
- ○ Fairly typical of me
- ○ Very much typical of me

After responding to the above statements, click the "Submit" button to view you results.

Submit Your Answers

APPENDIX C

REFLECTION JOURNAL PROMPTS

JTU COVID-19 Resources and Selecting Main Ideas World

- Which topics or strategies helped you the most in this world in terms of how you reflect on your own learning?
- What did you like the best, and what did you like the least in this world, and why?

Brain Health & Time Management World

- Which topics or strategies in this world helped you set goals and manage your time at college?
- What did you like the best, and what did you like the least in this world, and why?

Growth-Minded Study Tips & Academic Resources World

- Which topics or strategies in this world did you find helpful in terms of what you should do when you need academic support at college?
- Has your motivation to complete assignments and study for tests changed as a result of taking this class? Please explain.
- What did you like the best, and what did you like the least in this world, and why?

Goal Setting & Self Testing World

- Which topics or strategies in this world helped you complete your assignments and study for your exams?
- Please cite an example where you employed something you learned in this class to another course you are taking.
- What did you like the best, and what did you like the least in this world, and why?

Stress Reducing Tips and Test-Taking Strategies World

- Overall, what part of this class to did you find the most helpful for your academic experience at college?
- What did you like the best, and what did you like the least in this world, and why?

APPENDIX D

FINAL SELF-REFLECTION LEARNING QUEST

* Students responded to Likert-scale statements with a slider:
0) *Strongly Disagree* to (5) *Strongly Agree*

- Was this course what you expected? Did anything surprise you about it?
- How is this course different from other classes you have taken?
- Would you describe this course as better, worse, or just different than other ones you have taken?
    - Better
    - Worse
    - Just different
- Describe how you felt when you found out this class was going to have game-like elements in it.
- What aspects of the course motivated you the most, and why?
- If you were telling a friend about the course what would you say?
- Has your motivation to complete assignments and study for tests changed as a result of this class? Please explain.
- Has your ability to set goals, manage your time, and seek support from on campus resources changed as a result of this class? Please explain.
- All of the transitions associated with COVID-19 decreased my motivation this semester.*
- All of the transitions associated with COVID-19 decreased my ability to turn my assignments in on time.*
- What is your favorite thing about Blackboard?
- What's something you **don't **like about Blackbaord?

- During the first half of the semester did you ever look at the achievements area on Blackboard for our class to see if you had any badges?
    - I NEVER looked at the achievements section in Blackboard.
    - I looked FREQUENTLY at the achievements section in Blackboard
    - I only looked ONCE OR TWICE at the achievements section in Blackboard.
- During the first half of the semester, did you choose to watch any of the animated videos associated with the badges in the achievement section in Blackboard?
    - I did not even know they existed.
    - No
    - Yes
- How did it make you feel when the computer science students came and gave the class a survey to help us find a learning platform that better suited what you and your classmates wanted?
- EdApp has a lot of the elements I was hoping for in a gamification platform for our class.*
- How do you usually access EdApp?
    - Computer
    - Phone
    - Tablet
- What is your favorite thing about EdApp?
- What's something you **don't** like about EdApp?
- How did you feel when you got notifications from EdApp?
- EdApp reminders motivated me to finish my quests.*
- What is your favorite way to answer questions in EdApp?
    - CIRCLE the answer
    - CLICK the answer
    - DRAG the answer
    - Select the correct CHAT BUBBLE answer
    - TYPE out the answer
    - Strongly Agree/Disagree SLIDER
- What is your favorite way to read content in EdApp?
    - BULLETED Lists
    - Clicking on EXPANDABLE lists
    - SCROLLING thru text sequences with arrows
- What is your favorite activity/game in EdApp?
    - Jeopardy
    - Building entire sentences with a word bank
    - Filling in missing letters while timed
    - Filling in the missing words of a sentences with a word bank
    - Word Searches
    - Drawing a line to connect pairs of information
- What was the #1 thing that usually made you open EdApp?
    - I knew it was time to complete my work
    - I received a notification from EdApp
    - I received an email that an assignment was due

    - I wanted to check the leaderboard
    - I wanted to play the Star Bar
- I liked our lessons being referred to as quests.*
- How often do you open EdApp?
    - Everyday
    - Once a week
    - 2-6 times a week
    - Every 2 weeks
    - Every 3-4 weeks
- Some of you finished your quests early, before the due date. If this was you, what motivated you to work ahead?
- Did you like the balance of free response questions and games, or would you prefer more of one than the other?
- Which experience did you like the most on EdApp?
    - Reading Content
    - Answering Questions
    - Checking the Leaderboard
    - Playing Games in the lesson
    - Playing the Star Bar to win a gift certificate
- Is there anything else you would like to say about our worlds and/or quests?
- Explain how it felt to level up.
- How did you feel when you earned an achievement badge?
- Leveling-Up and Badges motivated me to perform better on my lessons.*
- I liked the appearance and types of badges in EdApp.*
- Describe how you felt when you earned stars.
- Earning stars motivated me to answer questions correctly.*
- Did you spend your stars at the Star Bar for a chance to win Amazon gift cards? Why or why not?
- If you won a gift card, describe how you felt when you won.
- The chance of winning gift cards motivated me to perform better in the class.*
- The increase of gift card values from $5 to $20 during the course also increased my desire to win one.*
- How often did you check the leaderboard?
    - Frequently, I was curious to see the stats.
    - Never
    - Only when I was working on my quests
    - Rarely
    - Whenever I received a notification
- The leaderboard motivated me to perform better on my quests.*
- Describe your process of deciding which worlds (courses) and/or quests (lessons) to do first in EdApp
- Did you like seeing your name on the leaderboard? Why or why not?
- Would your XP points have mattered to you if there was not a leaderboard? Why or why not?

- Did you do any of the Extra-Credit Quests? Why or why not?
- EdApp has a Brain Boost function; did you ever play it? Why or why not?
- Were there any parts of the course that you felt were distracting from your learning experience? Please explain.
- If you were in charge and could make any changes to the course you wanted, what would they be?
- What is the most important thing we have discussed here today?
- Is there anything else you would like to add?

APPENDIX E

UNIVERSITY OF SOUTH CAROLINA

CONSENT TO BE A RESEARCH SUBJECT

Study Title: The Implementation of a Gamified Curriculum Designed for a First-Year Experience University Course

KEY INFORMATION ABOUT THIS RESEARCH STUDY:
You are invited to volunteer for a research study conducted by Candace Bruder-Brasseur (brasse@uscb.edu). Apart from being the instructor of the UNIV 101 course in which you are enrolled, I am a Curriculum and Instruction doctoral student, with a concentration in Educational Technology, at the University of South Carolina under the direction of Dr. Michael M. Grant (michaelmgrant@sc.edu; 803-777-6176) in the department of Educational Studies.

The purpose of this study is to evaluate the implementation of a gamified curriculum in a University 101 first year experience course at the University of South Carolina Beaufort (USCB). You are being asked to consent to participate in this study because you are currently enrolled in the spring section of UNIV 101 at USCB. This study will involve the 15 participants enrolled in this section of the course.

Gamification strategies can potentially increase student engagement in the classroom. As such, I am conducting a research study to evaluate the effectiveness of a gamified UNIV 101 curriculum on students' self-regulatory learning skills and motivation. I am also interested in how students perceive a gamified curriculum on the quality of their learning experience.

If you agree to participate, you will be invited to share your experiences during the course to help inform my research.

PROCEDURES:
If you agree to participate in this study, you will do the following:
1. Complete a 10-minute survey at the beginning and end of the course.
2. Complete five reflective journal entries that are already part of the course syllabus. (This will not create extra work for you.)
3. Participate in a 30-minute focus group with 4-8 of your classmates at the end of the semester.

DURATION:
Participation in the study only involves the 16 weeks of the Spring 2020 semester in which you are enrolled in the course.

RISKS/DISCOMFORTS:
I foresee no risks to subjects beyond those that are normally encountered when completing activities in a classroom.

However, during the focus group, others in the group will hear what you say, and it is possible that they could tell someone. I cannot guarantee what you say will remain completely private, but I will ask that you and all other group members respect the privacy of everyone in the group.

BENEFITS:
This study may contribute to you having a better understanding of self-regulated learning techniques, such as goal setting, strategic planning, time management, assignment and study strategies, as well as getting help when needed. By participating in this study you may also increase your metacognitive monitoring skills as you reflect on learning techniques that work best for you in a college environment.

COSTS:
There will be no costs to you for participating in this study.

PAYMENT TO PARTICIPANTS:
You will not be paid for participating in this study.

VOLUNTARY PARTICIPATION:
Participation in this research study is voluntary. You are free not to participate by excluding your data or declining to participate in the data collections. You may also stop participating at any time, for any reason without negative consequences and your grade in the course will not be affected. In the event that you do withdraw from this study, the information you have already provided will be kept in a confidential manner. If you wish to withdraw from the study, please call or email me at brasse@uscb.edu.

Questions about your rights as a research subject are to be directed to, Lisa Johnson, Assistant Director, Office of Research Compliance, University of South Carolina, 1600 Hampton Street, Suite 414D, Columbia, SC 29208, phone: (803) 777-6670 or email: LisaJ@mailbox.sc.edu.

I have been given a chance to ask questions about this research study. These questions have been answered to my satisfaction. If I have any more questions about my participation in this study, or a study related injury, I am to contact Candace Brasseur at 843-208-8030 or by email at brasse@uscb.edu.

As indicated by my signature below, I agree to participate in this study. I have been given a copy of this form for my own records.

Signature of Subject / Participant Date

Researcher's Signature Date

APPENDIX F

PEARSON CORRELATIONS

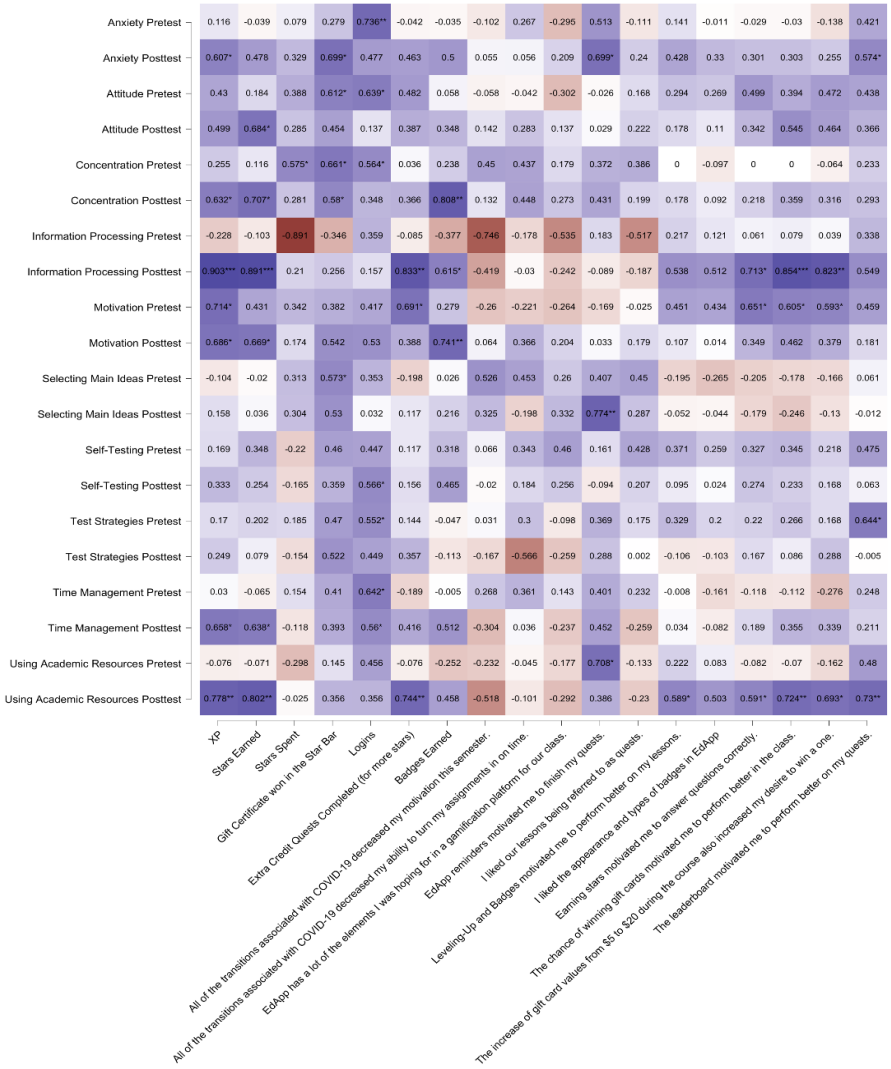

Figure F.1. Heatmap of Pearson's *r* values depicting strength of correlations between LASSI subscale scores (both pretest and posttest) and gamification element scale values. Darker shades indicate stronger correlations, and $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

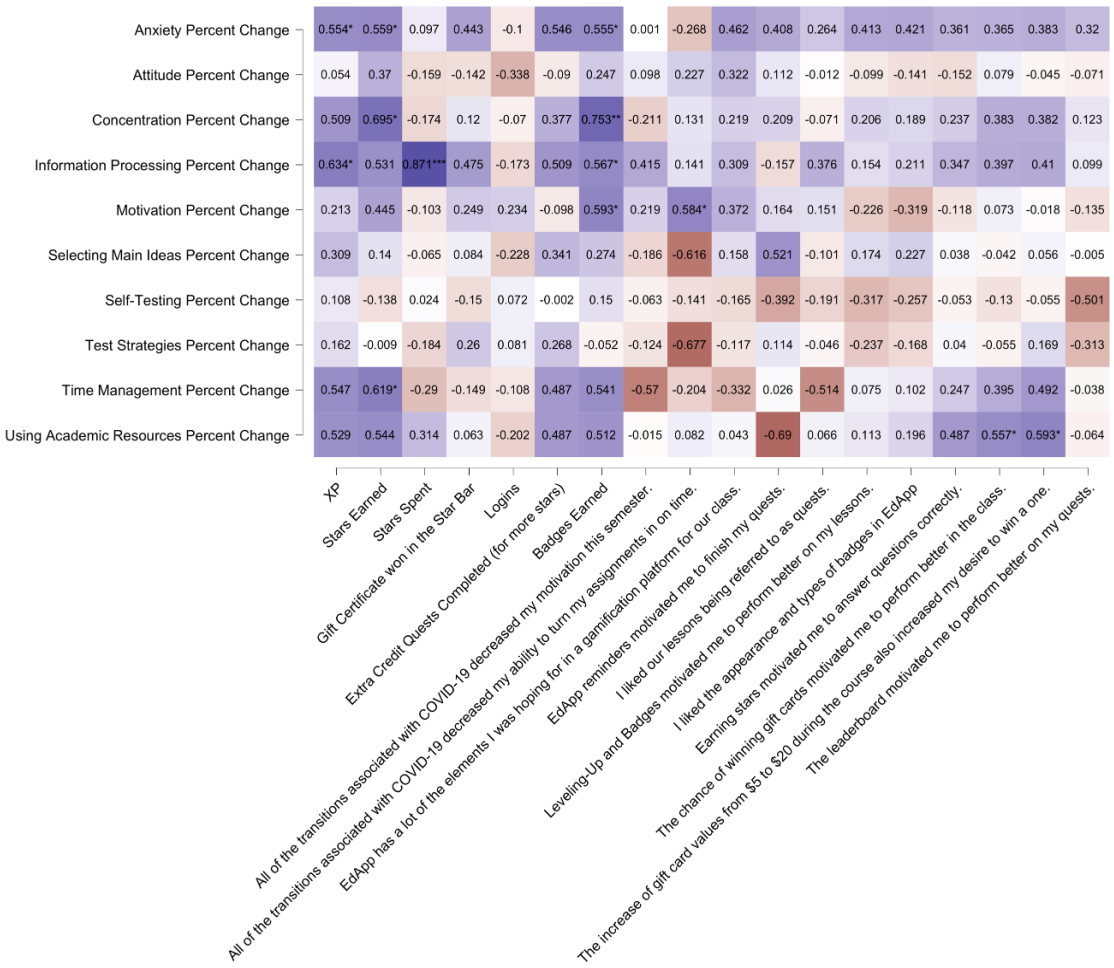

Figure F.2. Heatmap of Pearson's r values depicting strength of correlations between percent changes in n LASSI subscale scores (from pretest to posttest) and gamification element scale values. Darker shades indicate stronger correlations, and $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

APPENDIX G

TRANSITION METHOD IN SPREADSHEET GENERATED BY DELVE

First-Year Experience Dissertation

Order of Code in List	Nested Level	Code Name	Number of Snippets	Code Description	Code URL
1	>	Analytical Memos	16	Aliyah equates gamification with the course being "easy" In terms of notifications should also note that people turned them off. Future study- personalities and gamification (i.e. Daniel/Kayla vs. Aliyah Look at stress levels in comparison to other classes- the game aspect does seem to lessen this With Ryan ed app notifications helped with metacognitive monitoring Ryan also mentions flow with keeping on going Felt normal for Arjun- notifications on phone- students are used to this, not annoying Andre talks about the mindset but then can't apply what he learned to other classes James contradicted himself- said he did not go to the star bar, but he won 2x- don't think he knew it was called the star bar Aliyah- may be mistaking the platform as easy without learning Deja- knew their was a leaderboard, did not know it was called that Both Aliyah and Andre said they still procrastinate Ryn- good quote about the parts that motivated him being helpful	https://app.delvetool.com/projects/1304/codes/34278
				The purpose of this action research study will be to evaluate the implementation of a gamified curriculum for at-risk students enrolled in a first-year experience course at JTU.	
2	>	**RQ1- Self-Regulated Learning**	47	**How and in what ways does the implementation of a gamified curriculum impact at risk students' self-regulated learning skills?**	https://app.delvetool.com/projects/1304/codes/34249
3	>>	**Applying to other classes**	14		https://app.delvetool.com/projects/1304/codes/35149
4	>>>	helpful	8	as pertains to other classes	https://app.delvetool.com/projects/1304/codes/35349
5	>>	**Extra-Credit**	4	can also put under motivation	https://app.delvetool.com/projects/1304/codes/35485
6	>>	**Goal Setting/Monitoring**	8	Need to look up SRL goal setting theory	https://app.delvetool.com/projects/1304/codes/34262
7	>>>	reminds me	1	notifications help keep students on track	https://app.delvetool.com/projects/1304/codes/35445
8	>>	**Help-Seeking**	5		https://app.delvetool.com/projects/1304/codes/34266
9	>>>	not suffering in silence	2	student went to the tutors bc of this class	https://app.delvetool.com/projects/1304/codes/35441
10	>>	**Making learning easier**	5		https://app.delvetool.com/projects/1304/codes/35165
11	>>	**Meta-Cognitive Monitoring**	9		https://app.delvetool.com/projects/1304/codes/34267
12	>>>	bettering myself	8	most discuss in relation to being a better student	https://app.delvetool.com/projects/1304/codes/35195
13	>>>	college mentality	4	related to mature meta-cognitive thinking	https://app.delvetool.com/projects/1304/codes/35148
14	>>>	completing school work	3	applies to motivation and self-regulated learning	https://app.delvetool.com/projects/1304/codes/35383
15	>>>	getting things done	1		https://app.delvetool.com/projects/1304/codes/35458
16	>>>	growth mindset	8	Was a very important aspect for the students- mindset is relevant for at-risk students	https://app.delvetool.com/projects/1304/codes/35194
17	>>>	improving as a student	2	VERY IMPORTANT	https://app.delvetool.com/projects/1304/codes/35439
18	>>>	learned about myself	1	Good quote	https://app.delvetool.com/projects/1304/codes/35141
19	>>>	less lazy	1		https://app.delvetool.com/projects/1304/codes/35374
20	>>>	loving notifications	1		https://app.delvetool.com/projects/1304/codes/35427
21	>>>	motivation to do assignments	2		https://app.delvetool.com/projects/1304/codes/35180
22	>>>	motivation to study	3		https://app.delvetool.com/projects/1304/codes/35152
23	>>>	staying focused	2		https://app.delvetool.com/projects/1304/codes/35452
24	>>>	thinking about my actions	1		https://app.delvetool.com/projects/1304/codes/35451
25	>>	**Self-Instruction**	2		https://app.delvetool.com/projects/1304/codes/34265
26	>>>	retaining information	1		https://app.delvetool.com/projects/1304/codes/35425
27	>>>	self-testing	1		https://app.delvetool.com/projects/1304/codes/35359
28	>>	**Strategic Planning**	11		https://app.delvetool.com/projects/1304/codes/34263
29	>>>	managing time	8		https://app.delvetool.com/projects/1304/codes/35181
30	>>>	procrastinating	1		https://app.delvetool.com/projects/1304/codes/35486
31	>>	**Struggling to apply**	2	referencing time management and study strategies	https://app.delvetool.com/projects/1304/codes/35412
32	>>	**Task Strategies**	14	All of these are areas in which students felt they improved as a result of the course	https://app.delvetool.com/projects/1304/codes/34264
33	>>>	improving study habits	3		https://app.delvetool.com/projects/1304/codes/35381
34	>>>	more prepared	1		https://app.delvetool.com/projects/1304/codes/35330
35	>>>	note-taking	1		https://app.delvetool.com/projects/1304/codes/35360
36	>>>	studying better	15		https://app.delvetool.com/projects/1304/codes/35171
37	>>>	studying is different than before	1		https://app.delvetool.com/projects/1304/codes/35443
38	>>>	test-taking strategies	1		https://app.delvetool.com/projects/1304/codes/35329
39	>	**RQ2- Motivation**	32	**How and in what ways does the implementation of a gamified curriculum impact at-risk students' motivation?**	https://app.delvetool.com/projects/1304/codes/34250
40	>>	**Challenge**	4		https://app.delvetool.com/projects/1304/codes/34257
41	>>>	participating in a competition	1		https://app.delvetool.com/projects/1304/codes/35429
42	>>>	pushing to do better	1	can prob combine with one below	https://app.delvetool.com/projects/1304/codes/35434
43	>>>	striving to do better	1		https://app.delvetool.com/projects/1304/codes/35395
44	>>>	surpassing a challenge	1		https://app.delvetool.com/projects/1304/codes/35447
45	>>	**Choice**	10		https://app.delvetool.com/projects/1304/codes/34256
46	>>>	buying something	1	is quite different than the normal class experience- good choice	https://app.delvetool.com/projects/1304/codes/35418
47	>>>	choosing quests by name	1	what you name quests is important	https://app.delvetool.com/projects/1304/codes/35416
48	>>>	flow	1	Also RQ. 3 - can prob combine with below	https://app.delvetool.com/projects/1304/codes/35376
49	>>>	keep on going	1	important bc of flow	https://app.delvetool.com/projects/1304/codes/35459
50	>>>	randomly select quests	1		https://app.delvetool.com/projects/1304/codes/35184
51	>>>	submitting what is due first	9	note that this is still what motivates the most- so use reminders via feedback	https://app.delvetool.com/projects/1304/codes/35163
52	>>>	taking weight off my chest	1		https://app.delvetool.com/projects/1304/codes/35446
53	>>	**Collaboration**	0	May want to include responses to computer science students	https://app.delvetool.com/projects/1304/codes/34259
54	>>	**Consequences**	4		https://app.delvetool.com/projects/1304/codes/34261
55	>>>	being curious	2	can fall under all 3 RQs *wanted to see what you could get* GOOD QUOTE for doing extra-credit	https://app.delvetool.com/projects/1304/codes/35420
56	>>>	collecting stars	4		https://app.delvetool.com/projects/1304/codes/35189
57	>>>	happy to buy something	1		https://app.delvetool.com/projects/1304/codes/35205
58	>>>	incentives pushing	1	all RQs- can prob combine with one below	https://app.delvetool.com/projects/1304/codes/35432
59	>>>	incentivising	2		https://app.delvetool.com/projects/1304/codes/35339
60	>>>	Like I earned $	1		https://app.delvetool.com/projects/1304/codes/35188
61	>>>	looking forward to	1	can go in motivation	https://app.delvetool.com/projects/1304/codes/35337
62	>>>	more engaging	1	under perceptions as well	https://app.delvetool.com/projects/1304/codes/35450
63	>>>	not having to pay	2		https://app.delvetool.com/projects/1304/codes/35440
64	>>>	spending all stars	1		https://app.delvetool.com/projects/1304/codes/35338
65	>>>	stars motivating	3		https://app.delvetool.com/projects/1304/codes/35433
66	>>>	wanting to win	3		https://app.delvetool.com/projects/1304/codes/35430
67	>>>	winning gifts	1		https://app.delvetool.com/projects/1304/codes/35353

Figure G.1. Detailed view of transition method in a spreadsheet generated by Delve, part 1 of 2.

68	>>	Constructing Meaning	3		https://app.delvetool.com/projects/1304/codes/34260
69	>>>	earning money	1	"Like i have earned money" GOOD QUOTE for at-risk	https://app.delvetool.com/projects/1304/codes/35407
70	>>>	increasing motivation	1		https://app.delvetool.com/projects/1304/codes/35453
71	>>>	Not just a lecture	1		https://app.delvetool.com/projects/1304/codes/35143
72	>>>	preparing for the future	3		https://app.delvetool.com/projects/1304/codes/35442
73	>>>	putting time to use	1	relevance	https://app.delvetool.com/projects/1304/codes/35354
74	>>>	reminding me of coins in a game	1		https://app.delvetool.com/projects/1304/codes/35448
75	>>>	thinking of things I need	3		https://app.delvetool.com/projects/1304/codes/35179
76	>>	Control	0		https://app.delvetool.com/projects/1304/codes/34258
77	>>>	always check-in	1		https://app.delvetool.com/projects/1304/codes/35157
78	>>>	interactive	1		https://app.delvetool.com/projects/1304/codes/35327
79	>>>	ready to do what it says	1	regarding ed app notifications	https://app.delvetool.com/projects/1304/codes/35365
80	>>	wanted more stars	2		https://app.delvetool.com/projects/1304/codes/35341
81	>	RQ3- Perceptions of Gamification on Learning Expe	116	What are at-risk students' perceptions about the gamified curriculum on the quality of their learning experience?	https://app.delvetool.com/projects/1304/codes/34251
82	>>	Ambivalence	3		https://app.delvetool.com/projects/1304/codes/35492
83	>>>	I forgot	4	Most people who said this had notifications shut off- feedback is important! May move to to self-regulated learning section.	https://app.delvetool.com/projects/1304/codes/35204
84	>>>	not caring	2		https://app.delvetool.com/projects/1304/codes/35437
85	>>	Elements	1		https://app.delvetool.com/projects/1304/codes/35491
86	>>>	Badges	15		https://app.delvetool.com/projects/1304/codes/34276
87	>>>	Currency	23		https://app.delvetool.com/projects/1304/codes/34271
88	>>>	Feedback	14	Kameron had his notifications turned off	https://app.delvetool.com/projects/1304/codes/34275
89	>>>	Leaderboard	17		https://app.delvetool.com/projects/1304/codes/34273
90	>>>	Leveling-Up	11		https://app.delvetool.com/projects/1304/codes/34270
91	>>>	Quests	9		https://app.delvetool.com/projects/1304/codes/34269
92	>>>	XP	10		https://app.delvetool.com/projects/1304/codes/34272
93	>>	Encouragement/confidence booster	0	may fall under motivation too	https://app.delvetool.com/projects/1304/codes/35498
94	>>>	being ranked	1	is like a game- his response is positive, could also go under challenge in motivation	https://app.delvetool.com/projects/1304/codes/35419
95	>>>	doing a good job	3		https://app.delvetool.com/projects/1304/codes/35340
96	>>>	doing something good	1	"meant I was doing something good"- GOOD quote for at-risk	https://app.delvetool.com/projects/1304/codes/35457
97	>>>	feeling accomplished	5	important for at-risk students	https://app.delvetool.com/projects/1304/codes/35391
98	>>>	feeling confident	1		https://app.delvetool.com/projects/1304/codes/35196
99	>>>	feeling enjoyment	7	may combine with fun code- these are pretty generic.	https://app.delvetool.com/projects/1304/codes/35161
100	>>>	feeling excited	5		https://app.delvetool.com/projects/1304/codes/35146
101	>>>	feeling good	8		https://app.delvetool.com/projects/1304/codes/35187
102	>>>	feeling happy	5		https://app.delvetool.com/projects/1304/codes/35168
103	>>>	feeling like a champion	1	Good Quote- "It makes me feel like I am the champ"	https://app.delvetool.com/projects/1304/codes/35409
104	>>>	feeling satisfied	1	Can go under motivation too	https://app.delvetool.com/projects/1304/codes/35368
105	>>>	feeling sensational	1		https://app.delvetool.com/projects/1304/codes/35369
106	>>>	flipping out	1		https://app.delvetool.com/projects/1304/codes/35370
107	>>>	giving assurance	1	important for encouragement	https://app.delvetool.com/projects/1304/codes/35363
108	>>>	leveling up in a game	1		https://app.delvetool.com/projects/1304/codes/35405
109	>>>	like a girl scout	1	possible badge quote- also applies to motivation	https://app.delvetool.com/projects/1304/codes/35362
110	>>	Feeling nothing	5		https://app.delvetool.com/projects/1304/codes/35200
111	>>	Felt normal	1		https://app.delvetool.com/projects/1304/codes/35183
112	>>	Gameplay	31		https://app.delvetool.com/projects/1304/codes/34274
113	>>>	balance of activity-type	6		https://app.delvetool.com/projects/1304/codes/35164
114	>>>	games	2		https://app.delvetool.com/projects/1304/codes/35361
115	>>>	prefer free response	3		https://app.delvetool.com/projects/1304/codes/35185
116	>>>	wanting more games	4		https://app.delvetool.com/projects/1304/codes/35346
117	>>	Increasing academic status	7	Is a perception that the gamification is easy	https://app.delvetool.com/projects/1304/codes/35438
118	>>>	easy A	4	Think the gamification made the grade seem easy	https://app.delvetool.com/projects/1304/codes/35358
119	>>>	like I got a higher grade	1	equating rewards with learning/grades	https://app.delvetool.com/projects/1304/codes/35203
120	>>	Losing is disheartening	1	can be in motivation too	https://app.delvetool.com/projects/1304/codes/35169
121	>>	Not using notifications	10	Students who forgot or did not know of these things had notifications shut off	https://app.delvetool.com/projects/1304/codes/35417
122	>>	Positive/motivating perceptions	0	Maybe break down further: fun as an escape for stress, encouragement, confidence booster, etc.	https://app.delvetool.com/projects/1304/codes/35490
123	>>>	cool	1	in relation to gamification	https://app.delvetool.com/projects/1304/codes/35335
124	>>>	different from other courses	2		https://app.delvetool.com/projects/1304/codes/35350
125	>>>	doing it for fun	6	appreciate- that this gave them a break from stresses- may combine with that category	https://app.delvetool.com/projects/1304/codes/35177
126	>>>	enjoying learning	4		https://app.delvetool.com/projects/1304/codes/35398
127	>>>	interesting	4		https://app.delvetool.com/projects/1304/codes/35176
128	>>>	loved it	1	regarding ed app notifications	https://app.delvetool.com/projects/1304/codes/35333
129	>>>	making learning easy	2		https://app.delvetool.com/projects/1304/codes/35389
130	>>>	positioning on the leaderboard	2		https://app.delvetool.com/projects/1304/codes/35449
131	>>>	unique	1		https://app.delvetool.com/projects/1304/codes/35343
132	>>>	widespread implementation	1	Possible quote- about gamification experience	https://app.delvetool.com/projects/1304/codes/35456
133	>>	Repetitive	1		https://app.delvetool.com/projects/1304/codes/35193
134	>>>	being persistent	1		https://app.delvetool.com/projects/1304/codes/35364
135	>>>	doing busy work	1	can prob combine with one below	https://app.delvetool.com/projects/1304/codes/35410
136	>>>	feeling like busy work	2		https://app.delvetool.com/projects/1304/codes/35348
137	>>>	long lessons	1		https://app.delvetool.com/projects/1304/codes/35199
138	>>>	running out of time	1		https://app.delvetool.com/projects/1304/codes/35396
139	>>>	too many questions	1		https://app.delvetool.com/projects/1304/codes/35192
140	>>	Stress-Reducing	0		https://app.delvetool.com/projects/1304/codes/35493
141	>>>	feeling lighter	1		https://app.delvetool.com/projects/1304/codes/35178
142	>>>	felt like a break	1		https://app.delvetool.com/projects/1304/codes/35160
143	>>>	laid back	1		https://app.delvetool.com/projects/1304/codes/35352
144	>>>	learning as stress-escape	5	may combine with doing it for fun important part of perception of gamification	https://app.delvetool.com/projects/1304/codes/35387
145	>>>	positivity	1	encouragement-	https://app.delvetool.com/projects/1304/codes/35179
146	>>>	Sense of comfort	1		https://app.delvetool.com/projects/1304/codes/35423
147	>	RQ4	28		https://app.delvetool.com/projects/1304/codes/34252
148	>>	Accessibility	5		https://app.delvetool.com/projects/1304/codes/34268
149	>>>	checking-in	1	frequency of use	https://app.delvetool.com/projects/1304/codes/35386
150	>>>	using it on the go	1		https://app.delvetool.com/projects/1304/codes/35414
151	>>	Colorful	1		https://app.delvetool.com/projects/1304/codes/35375
152	>>	Easy to use	1		https://app.delvetool.com/projects/1304/codes/35344
153	>>>	not annoying	1		https://app.delvetool.com/projects/1304/codes/35182
154	>>	Glitches	5		https://app.delvetool.com/projects/1304/codes/34277
155	>>	Less distracted	1		https://app.delvetool.com/projects/1304/codes/35174
156	>>>	attention grabbing	1		https://app.delvetool.com/projects/1304/codes/35342
157	>>>	never felt distracted	1	can prob combine with one below	https://app.delvetool.com/projects/1304/codes/35351
158	>>>	not distracting	6		https://app.delvetool.com/projects/1304/codes/35397
159	>>>	nothing distracting	3		https://app.delvetool.com/projects/1304/codes/35208
160	>>>	nothing held me back	1		https://app.delvetool.com/projects/1304/codes/35371
161	>>>	well organized	1		https://app.delvetool.com/projects/1304/codes/35331
162	>>	Making the class online	2		https://app.delvetool.com/projects/1304/codes/35421
163	>>	More than expected	1		https://app.delvetool.com/projects/1304/codes/35332
164	>>	Response to Input on App	0		https://app.delvetool.com/projects/1304/codes/35496
165	>>>	our opinions matter	1		https://app.delvetool.com/projects/1304/codes/35426
166	>>>	teachers listening	1		https://app.delvetool.com/projects/1304/codes/35413
167	>>>	wanting what is best	1		https://app.delvetool.com/projects/1304/codes/35444
168	>>	Switching sooner	1		https://app.delvetool.com/projects/1304/codes/35460

Figure G.2. Detailed view of transition method in a spreadsheet generated by Delve, part 2 of 2.

APPENDIX H

EXCEL SHEET OF FINAL THEMES

Students Perceived Their Academic Mindset and Study Habits to Have Improved	The Gamified Curriculum Served to Motivate Students			Students Perceived the Gamified Curriculum Made Their Learning Easier
Improved study habits	**Wanting more**	**Student motivation**	**Collaboration**	**Making learning easier**
Self-regulated learning	Wanting more games	Increasing motivation	Help seeking	Perceptions of gamification on learning
Improving as a student	Widespread implementation	Being curious	Not suffering in silence	Making learning easier
Constructing meaning	Switching to EdApp sooner	Wanting to win	Liked comp sci students asking for input	Easy to use
Strategic planning	Make the whole class online with EdApp	Incentives pushed me	Our opinions matter	Not annoying
Self-instruction		Ready to do what it says	Teachers listening	Never felt distracted
Improved task strategies	**Student engagement**	Less lazy		Well organized
Goal setting/monitoring	More engaging	Striving to do better	**Encouragement/confidence builder**	Not distracting
Metacognitive monitoring	Keep on going	Doing extra credit	Feeling like a champion	Making learning easy
Self testing	Feeling enjoyment	Thinking of things I need	Giving assurance	Helpful
Studying is different than before	Loved it	Being persistent	Doing something good	Noting held me back
Applying to other classes	Enjoying learning	Choice	Felt like I earned money	Less distracted
Managing time	Always check in	Consequences	Doing a good job	
Studying better	Positioning on leaderboard	Control	Surpassing a challenge	**Stress reducer**
Retaining information	Liked being ranked	Liking challenge	Feeling accomplished	Taking weight off my chest
Putting time to use	Interactive	Loved notifications	Positivity	Sense of comfort
More prepared	Colorful	Flow	Wanting what is best	Feeling lighter
Notetaking	Games	Elements	Feeling confident	Felt like a break
Thinking about my actions	Reminding me of coins in a game	Motivation to do assignments	Feeling excited	laid back
Completing school work	Interesting	Submit what is due first	Feeling good	Learning as stress escape
Getting things done	Not just a lecture	Winning gifts	Increased academic status	
Test-taking strategies	Cool	Felt normal	Feeling sensational	**Accessibility**
More prepared	Looking forward to it	Stars motivating	Feeling satisfied	Accessibility
Staying focused	Participating in competition	Collecting stars	Feeling happy	Using it on the go
	Flipping out	Pushing to do better	Leveling up in a game	
Expanded mindset	Different from other courses	Choosing quests by name	Leveling up	
College mentality	Doing it for fun	Wanted more stars	Feeling like a girl scout	
Bettering myself	Unique	Quests	Buying something	
Learned about myself	Balance of activity type	Randomly accept quests	Happy to buy something	
Preparing for the future	Gameplay	Feedback	Not having to pay	
Growth mindset	Attention grabbing	Spending all stars	Easy A	
	More than expected	Motivation	Badges	
	Checking in	Motivation to study	Like I got a higher grade	
	Leaderboard	XP		
		Reminded me		
		Currency		

Figure H.1. Detailed view of Excel spreadsheet depicting final themes.

APPENDIX I

LASSI SURVEY QUESTIONS GROUPED BY SUBSCALE

Anxiety Scale (ANX)

28. I feel very panicky when I take an important test.
34. When I am taking a test, worrying about doing poorly interferes with my concentration.
37. I worry that I will flunk out of school.
50. Even when I am well prepared for a test, I feel very anxious.
53. Courses in certain subjects, such as math, science, or a foreign language, make me anxious.
56. When I am studying, worrying about doing poorly in a course interferes with my concentration.

Attitude Scale (ATT)

14. I only study the subjects I like.
29. I have a positive attitude about attending my classes.
32. I would rather not be in school.
39. I do not care about getting a general education, I just want to get a good job.
42. I dislike most of the work in my classes.
59. In my opinion, what is taught in my courses is not worth learning.

Concentration Scale (CON)

6. I concentrate fully when studying.
13. I find it difficult to maintain my concentration while doing my coursework.
25. My mind wanders a lot when I study.
40. I find it hard to pay attention during lectures.
47. I am very easily distracted from my studies.
58. If I get distracted during class, I am able to refocus my attention.

Information Processing Scale (INP)

3. I try to find relationships between what I am learning and what I already know.
10. To help me remember new principles we are learning in class, I practice applying them.
18. To help me learn the material presented in my classes, I relate it to my own general knowledge.
22. I translate what I am studying into my own words.
35. I try to see how what I am studying would apply to my everyday life.
41. I try to relate what I am studying to my own experiences.

Motivation Scale (MOT)

1. Even when study materials are dull and uninteresting, I manage to keep working until I finish.
17. When work is difficult, I either give up or study only the easy parts.
24. Even if I am having difficulty in a course, I can motivate myself to complete the work.
31. Even if I do not like an assignment, I am able to get myself to work on it.
33. I set goals for the grades I want to get in my classes.
45. I do not put a lot of effort into doing well in my courses.

Selecting Main Ideas Scale (SMI)

15. When preparing for an exam, I create questions that I think might be included.
20. I review my notes before the next class.
26. I stop periodically while reading and mentally go over or review what was said.
38. To help make sure I understand the material, I review my notes before the next class.
49. To check my understanding of the material in a course, I make up possible test questions and try to answer them.
52. I test myself to see if I understand what I am studying.

Test Strategies Scale (TST)

5. In taking tests, writing papers, etc., I find I have misunderstood what is wanted and lose points because of it.
21. I have difficulty adapting my studying to different types of courses.
30. When I study for a test, I have trouble figuring out just what to do to learn the material.
36. I have trouble understanding exactly what a test question is asking.
43. I review my answers during essay tests to make sure I have made and supported my main points.
57. I do poorly on tests because I find it hard to plan my work within a short period of time.

Time Management Scale (TMT)

4. I find it hard to stick to a study schedule.
8. When I decide to study, I set aside a specific length of time and stick to it.
11. When it comes to studying, procrastination is a problem for me.
23. I put off studying more than I should.
51. I set aside more time to study the subjects that are difficult for me.
54. I end up "cramming" for every test.

Using Academic Resources Scale (UAR)

2. When it is difficult for me to complete a course assignment, I do not ask for help.
7. When I am struggling in one or more courses, I am too embarrassed to admit it to anyone.
12. If I am having trouble with a writing assignment, I seek help from resources available at my college such as the writing center, learning center, or tutoring center.
27. I am not comfortable asking for help from instructors in my courses.
46. If I find that a course is too difficult for me, I will get help from a tutor.
60. When I do not understand how to use a method or procedure presented in one of my courses, I ask another student to teach me so that I can do it on my own.

APPENDIX J

INSTITUTIONAL REVIEW BOARD APPROVALS

UNIVERSITY OF SOUTH CAROLINA

OFFICE OF RESEARCH COMPLIANCE

INSTITUTIONAL REVIEW BOARD FOR HUMAN RESEARCH
DECLARATION of NOT RESEARCH

Candace Brasseur (Bruder)
820 South Main St.
Wardlaw 133
Columbia, SC 29208 USA

Re: **Pro00091636**

Dear Ms. Candace Brasseur:

This is to certify that research study entitled ***The Implementation of a Gamified Curriculum to Increase Self-Regulated Learning Skills and Motivation for At-Risk Students in a First-Year Experience Course: An Action Research Study*** was reviewed on **8/2/2019** by the Office of Research Compliance, which is an administrative office that supports the University of South Carolina Institutional Review Board (USC IRB). The Office of Research Compliance, on behalf of the Institutional Review Board, has determined that the referenced research study is not subject to the Protection of Human Subject Regulations in accordance with the Code of Federal Regulations 45 CFR 46 et. seq.

No further oversight by the USC IRB is required. However, the investigator should inform the Office of Research Compliance prior to making any substantive changes in the research methods, as this may alter the status of the project and require another review.

If you have questions, contact Lisa M. Johnson at lisaj@mailbox.sc.edu or (803) 777-6670.

Sincerely,

Lisa M. Johnson
ORC Assistant Director and IRB Manager