THE EFFECTIVENESS OF DIGITAL ESCAPE ROOM GAME GAMES TO DELIVER LEADERSHIP TRAINING: A MIXED METHODS STUDY

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ABSTRACT

Dr. Yi Yang, Advisor

Escape room games have emerged in the educational landscape over the last decade and are growing in popularity. Studies show that participants enjoy educational escape room games, however the data to demonstrate learning acquisition and behavior change is limited.

This study addressed the research question: How effective are escape room games as a leadership training activity? The researcher developed The Leadership Escape Game, a digital game, where participants explored the online space and solved puzzles and challenges to learn the SLII® leadership model (used with permission from the Ken Blanchard Companies). Effectiveness of the game was measured using the first three levels of the New World Kirkpatrick Model. Participants completed a learner satisfaction survey immediately after playing The Leadership Escape Game. The Leader Behavior Analysis II® (LBA II) was used as a pre-test, post-test, and 30-day post-test to measure learning acquisition. The LBAII® calculated Leadership Style Flexibility and Effectiveness scores that demonstrated understanding of the model with a scenario-based multiple-choice assessment. Behavior change was assessed using participant interviews at least 30 days following the game.

Results demonstrated that a digital escape room game is an effective way to deliver leadership training. Learner satisfaction results presented statistically significant and positive ratings about participation in The Leadership Escape Game. Leadership Style Flexibility and Effectiveness results across the three assessments demonstrated a statistically significant improvement in scores following the game. 30-day post-game interviews also presented evidence that participants applied what they learned with their employees. Additional analysis determined

that previous experience with escape rooms or the leadership content were not pre-requisites to success in The Leadership Escape Game.

DEDICATION

I dedicate this work to my strong and amazing daughter, Leah. For most of her childhood, I have been pursuing my academic journey. I began my master's program when she was five and my doctoral journey when she was ten.

Leah, you are my greatest source of encouragement and motivation. You helped me to stay focused, while also helping me step away and have fun on the journey. You inadvertently helped me to manage time because I did not want my academic pursuits to impact the precious and limited time we have together. I hope that in this journey you have seen the value of pursuing dreams and of pushing through challenges. We all have limits; we sometimes have to choose what we can or cannot do for a season, and that choosing and creating the balance of what is important is the control we have over our paths.

Leah, part-way through the program I was having a tough season. You asked me how school was going and you said, "When you're done, can I call you Dr. Mommy?" That moment plays in my mind on repeat and has propelled me forward. I hope that you are proud of your Dr. Mommy. I am extremely proud of you. LaOaVaEa YaOaUa!

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No one who achieves success does so without the help of others. ~Alfred North Whitehead

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Chapter 1 – Introduction

In the last decade, the growing popularity of escape room games within the entertainment industry inspired broad application of this game type in educational settings (Veldkamp et al., 2020). Given a series of puzzles and challenges, participants in an escape room game must accomplish an overarching objective, such as escaping the game area, within a defined amount of time (Nicholson, 2018). Puzzles may include math, word, logic, physical tasks, and a wide variety of individual challenges (Wiemker et al., 2015). Since 2012, escape room games have seen a significant growth in business in the United States (Nicholson, 2016b; Spira, 2019). As a result of this popularity, escape games have emerged in learning environments as a new way to engage students (Coffman-Wolph et al., 2017). Primary and secondary schools use escape games in a range of subjects such as math, history, and college preparation (Crossey, 2018; Daly, 2019; Davis, 2017). Escape games are also branching into higher education and training environments, such as healthcare education and security training (Dugan, 2018; Eukel et al., 2017; Gómez-Urquiza et al., 2019). Studies show that participants enjoy learning within an escape room game environment (Adams et al., 2018; Friedrich et al., 2018; Gómez-Urquiza, et al., 2019). To explore this phenomenon and address gaps within the literature, this study researched the efficacy of a digital escape room game to deliver leadership training.

Background

This study's foundational literature focused on four areas: leadership training, the SLII® leadership model, game-based learning, and an overview of escape room games. Each of these focus areas provide the groundwork for delivering leadership training in a digital escape game.

Leadership Training

Leadership training develops the knowledge and skills to support employee performance, development, and change management outcomes within an organization (Lacarenza et al., 2017; Sowcik et al., 2018). Delivery of leadership training occurs in a variety of mediums, such as conferences, residential training, projects, and workshop training programs (Clarke & Higgs, 2016).

Studies show that there is a statistically significant relationship between leadership training and leader influence on team performance (Olatunji et al., 2017). Lacerenza et al. (2017) conducted a study using the Kirkpatrick's Levels of Evaluation to determine the effectiveness of leadership training (Kirkpatrick & Kirkpatrick, 2016). Results from the study demonstrated that leadership training improves organizational outcomes. Additionally, "the results suggest that leadership training programs can lead to a 25% increase in learning, 28% increase in leadership behaviors performed on-the-job (i.e., transfer), 20% increase in overall job performance, 8% increase in subordinate outcomes, and a 25% increase in organizational outcomes" (Lacerenza et al., 2017, p. 1704).

SLII® Leadership Model

SLII® is a leadership model that focuses on an individual's capacity to complete a specific task and guides the leader to choose an appropriate leadership style related to the level of direction and support needed by that individual (Wang & Knight, 1991). The two dimensions, direction and support, create a matrix of four leadership styles: directing, coaching, supporting, and delegating (Blanchard et al., 1993). The directing style (S1) supports the enthusiastic beginner (D1) with higher levels of instruction and guidance because the individual is new or lacking in the skill to complete the task, but is already motivated to be successful (Lynch, 2015;

Stręk, 2018). The coaching style (S2) supports a disillusioned learner (D2) with high levels of direction and also engages the individual to take more ownership of the task (Lynch, 2015; Thompson & Glasø, 2015). In the supporting style (S3), the skill of the capable but cautious contributor (D3) is higher and the ability to self-manage is improving, requiring less explicit direction from the leader, but still benefits from coaching and guidance (Blanchard et al, 2013; Lynch, 2015; Stręk, 2018; Thompson & Glasø, 2015). Finally, delegating (S4) is a leadership style where a self-reliant achiever (D4) has high skill and does not require explicit direction or motivation, requiring less intervention on the part of the leader (Blanchard et al, 2013; Chaneski, 2016; Lynch, 2015; Thompson & Glasø, 2015). As a model, SLII® provides a functional, prescriptive approach to supporting the needs of an individual in an operational and task-oriented manner.

Game-Based Learning

Game-based learning uses rules, objectives, challenges, rewards, feedback, and motivation within the constructs of a game activity for the purposes of gaining knowledge or skill (Braad, 2019; Farber, 2016). Hamari et al. (2016) studied game-based learning environments and concluded that there are mostly positive outcomes using game-based learning.

Studies show that game-based learning does influence successful outcomes, such as assessment scores and motivation for learning (Strickland and Kaylor; 2016; Sung and Hwang, 2012; Ward et al., 2017). Game elements such as narrative, scenario-based simulation, collaboration, and assessment with low-risk consequences, provide the mechanics to build an effective educational game (de Lope & Medina-Medina et al., 2017; Heldal et al., 2017; Juul, 2018). Research demonstrates that a necessary antecedent to desired learning outcomes is the rigorous effort to ensure a quality game design (Abbot, 2018; Arnab & Clarke, 2017). This study

utilized the Spiral Educational Game Development Model and the RETAIN rubric as research-based approaches to designing The Leadership Escape Game (Gunter et al., 2006; Lui & Au, 2018).

Escape Room Games

Escape room games engage participants in puzzles and challenges to achieve an overarching objective within a defined amount of time (Nicholson, 2015). The activities within the room are driven by a theme that immerses the player into a story and an overall mission to accomplish (Wu et al, 2018). Participants undertake visual puzzles, physical tasks, brainteasers, logic, and group or individual challenges (Wiemker, et al., 2015). The overarching objective may simply be to escape the room or could focus on a central challenge based on the game's theme.

Since 2012, escape room games have significantly grown in popularity in the United States (Nicholson, 2016; Spira, 2019). Chrosti (2017) reported that between 2012 and 2017, escape rooms were increasing in popularity by 300% each year since entry into the United States market. The market of social escape games peaked in 2016 and have been specifically popular within the millennial generation (Lama, 2018; Lama & Martín, 2021).

Escape Room Games in Learning Environments

Escape room games have emerged in learning environments as a new way to engage students in critical thinking, collaboration, and problem-solving (Coffman-Wolph et al., 2017; Veldkamp et al., 2020). Learners work together to solve problems and build knowledge through interactions in game-style experiences (Land et al., 2012). Pan et al. (2017) studied participants in a social, non-educational escape room and observed collaboration and communication skills (p. 1361). The collaboration and communication skills that are essential to be successful in

escape games are bolstered by elements of story and motivation, which are also ingredients in effective learning (García et al., 2018; Schein, 2010, pp. 14-15; Wiemker et al., 2015).

Breakout Edu (n.d.) is an example of a company that has successfully promoted escape game learning environments in schools and libraries. The company markets learner-centric escape games where students apply "critical thinking, collaboration, creativity, and communication," also known as the 4C's (What is Breakout EDU?).

Businesses primarily have used escape room games for team building exercises, but there has been a growing interest in expanding the use into training and education settings (Nicholson, 2015; Veldkamp et al., 2020). The healthcare industry is also beginning to use and publish studies on escape room games in training-related activities, such as in nurse education (Gómez-Urquiza et al., 2019). For example, one study created an escape game to train and assess nursing student skills on a specific medical scenario and concluded through a post-session survey that escape games were an engaging way to teach and assess (Brown et al., 2019).

Wu et al. (2018) created an escape game with a focus on leadership development. Medical students participated in the game to demonstrate the application of the "school's five leadership competencies (leading self, communication and influence, problem-solving, teamwork, systems thinking)" (p. 561). The measurements included a student survey where 92% said it was an excellent experience and 58% of the students self-reported using the leadership competencies.

As discussed earlier, the quality of game design is a pre-requisite for effective learning outcomes (Abbott, 208; Arnab & Clarke, 2017). This study leveraged the escapEd framework to support this game type's specific design mechanics when developing The Leadership Escape Game (Clarke et al., 2017).

Gaps in Escape Room Literature

Cain (2019) reported a primary challenge of escape game study is a lack of peer-reviewed literature on the design and evaluation of escape games in a learning environment.
Many studies leveraging escapes rooms in a learning setting measure the learner satisfaction through post-activity surveys and have seen positive responses (Cain, 2019; Friedrich et al., 2018; Wu, et al., 2018).

Eukel et al. (2017) present one of the few escape room studies to measure learning through assessment. Of the students that participated, 81% of the students demonstrated improved performance on the post-assessment. In summary, there is a gap in the literature that studies the impact of escape room games as a learning activity on the acquisition of learning outcomes (Styling, et al., 2018). This study researched the effectiveness of digital escape games at delivering a game-based leadership training using the SLII® leadership model.

Problem Statement

This study's research sought to address the above-stated gap in relation to the use of educational escape game. While escape room games are used as learning activities, there was limited data to confirm if it was an effective method beyond learner satisfaction (Cain, 2019; Eukel et al., 2017; Friedrich et al., 2018; Pan et al., 2017; Wu et al., 2018). The objectives of this study were to use learner satisfaction, learning acquisition, and behavior change as data points for determining the effectiveness of The Leadership Escape Game (Kirkpatrick & Kirkpatrick, 2016).

Purpose of the Study

The purpose of this study was to determine the efficacy of using a digital escape room game to deliver leadership training. Previous research in the use of educational escape games

have primarily focused on the satisfaction of learners, as noted in the problem statement. This study sought to contribute to current research through learner satisfaction, learning acquisition, and behavior change data following The Leadership Escape Game.

Significance of the Study

The significance of this study was found at the intersection of leadership training, game-based learning, educational escape games, the SLII® leadership model, learning within a digital space and an evaluation framework that considers learner satisfaction, learning acquisition, and behavior change. The Leadership Escape Game was developed for this study to deliver the SLII® model in a digital educational escape game. Permissions to use the model were provided by the Ken Blanchard Companies (See Appendix A). Using the Leader Behavior Analysis II® as an assessment tool, pre-game, post-game, and 30-day post-game data were collected to measure learning acquisition. Participant interviews also provided qualitative insight into satisfaction, learning acquisition, and behavior change outcomes. Additional analysis also helped the study determine the impact of previous experience with escape rooms and the leadership training on satisfaction and learning acquisition. As a mixed methods study, the data provided a thorough examination to the efficacy of a digital escape game to deliver leadership training.

Research Questions

The primary research question and secondary research questions addressed the study's intention to determine the effectiveness of delivering a leadership training in a digital escape room. The research questions were as follows:

Primary Research Question:

How effective are escape room games as a leadership training activity?

Secondary Research Questions

Q1. How satisfied are learners with the escape room game leadership training activity?

Q2. How does the use of escape room games improve Leadership Style Flexibility?

Q3. How does the use of escape room games improve Leadership Style Effectiveness?

The hypotheses for each of the secondary research questions are presented in further detail in Chapter 3.

Theoretical Framework: Game-Based Learning

This study was based on the theoretical framework of game-based learning. Studies show that educational games are "effective alternatives to traditional didactics with retention that is at least equal to, and often promotes better attitudes about learning than the traditional methods" (Pitt et al., 2015, p. 1013). Game-based learning is connected to motivation, learner engagement, behavior change, and learning achievement (Tsai et al., 2016). Game-based learning is also associated with the psychology of memory connections imprinting on the brain (Pitt et al., 2015). Gallegos et al. (2017) conclude that game-based learning is engaging, enhances learning, and is generally well-received by participants.

Game-Based Learning Theory

Kim et al. (2009) highlight the key advantages for applying game-based learning. In game-based learning, students acquire knowledge that they can test in a low-risk environment, adapt decisions based on failures and success, collaborate with others to improve tactics, and reattempt strategies. Hamari et al. (2016) studied various factors within game-based learning and concluded that there are mostly positive outcomes from these activities. In a review of game-

based learning studies, Jabbar and Felicia (2016) conclude, “Game design must be accompanied with multiple learning tools and interesting tasks and materials that facilitate and help students to explore and complete gaming and learning activities in accordance with their needs and abilities” (p. 29). Sung & Hwang (2013) synthesize assertions that game-based learning stems from a natural form of learning, where children gain skills through play.

Simulation is another component of game-based learning that facilitates experiential learning (McLaughlin, 2019). McCall (2012) defines simulation games as “rule-based, artificial conflict or competition that simulates dynamically one or more real-world systems” (p. 9). Dack et al. (2016) cautions that a poor simulation or experiential design can impede learning and produce undesirable results, therefore clarity of expectations and the development of accurate experiences that elicit learning over amusement are necessary.

Game-Based Learning and Escape Room Games

Gomez-Urquiza et al. (2019) conducted an escape room using game-based learning as a theoretical framework and measured participant satisfaction. Results showed that participants enjoyed the activity and predicted that the activity will help them apply what was learned. The authors connected the motivation that results from game-based learning to increased interest and cognitive engagement.

Sung & Hwang (2013) highlight that collaborative learning promotes engagement and competency development. Escape room games leverage collaboration and teamwork in order to achieve the outcomes of the room (Nicholson, 2015). Research into the use of escape games in an elementary classroom shows that the collaborative nature of gaming influences socials skills and the desire to learn (Brown et al., 2019).

Perrotta et al. (2013) describe the mechanisms that are included in a game designed for learning. These mechanisms include rules, goals, a story, levels, interaction, uncertainty, feedback, and social components. Escape room games also include many of these components. In an escape game, participants are introduced to the objectives, rules, and narrative of the game in which they are about to engage (Nicholson, 2016). The players work together to search, observe, work through the uncertainty, and solve the challenges (Nicholson, 2015). The story the players are working through in the game allows an interactive and empathetic simulation of real life, within which the learners can explore ideas, test out solutions, and receive feedback of success or failure, leading to reattempts at solutions and learning outcomes (Nicholson, 2018). Escape room games provide a unique experience that capture the above-described requirements of game-based learning, simulation, and experience that builds a strong argument for using it as a training environment.

Methodology Overview

The study followed an explanatory sequential mixed method approach where quantitative data was collected and analyzed first, followed by a collection and analysis of qualitative data (Creswell, 2014). Data collection revolved around the participants' experience with The Leadership Escape Game. This study is characteristic of a longitudinal cohort study where the same individuals participate in data collection across multiple points of time, even though condensed for the purposes of this study (Pajo, 2018).

A mixed methods research design was determined the most appropriate approach to collect all three facets of evaluation for this study. Quantitative data addressed the research questions measuring the extent to which learners were satisfied with The Leadership Escape Game and the calculation of learning acquisition data from assessments. Qualitative data from

participant interviews provided insight into the application of the model following The Leadership Escape Game as well as commentary on contributing factors to learner satisfaction and learning acquisition.

The population for this study consisted of people leaders and those with direct coaching influence on leaders. The sample of the people leader population was drawn from various leadership organizations and networks. Based on a medium effect in G*Power, the target sample size was calculated at 64 participants, however a minimum of 30 participants was required to begin analysis. The target sample size for the interviews consisted of a minimum 10 participants who completed at least Survey #1 pre-test, Survey #2 post-test, and completed the Leadership Escape Game. (Mason, 2010).

Operationalization of Variables and Constructs

The Leadership Escape Game developed for this study was a digital learning activity that taught the SLII® leadership model. The effectiveness of this digital escape room game to deliver leadership training was measured using learner satisfaction, learning acquisition, and behavior change data.

A post-game survey collected learner satisfaction data from participants. The learner satisfaction survey questions were based on previous escape room game studies, adapted to align with the scope of this study, and validated using Lawshe's Content Validity Ratio (Lawshe, 1975). The statements within the survey collected participation reactions to the game in terms of enjoyment and perceived value as a leadership training.

Learning acquisition was measured using the Leadership Style Flexibility and Leadership Style Effectiveness scores calculated by the SLII® Leader Behavior Analysis II® (Blanchard et al., 2013; Kirkpatrick & Kirkpatrick, 2016). The Leadership Behavior Analysis II® (LBA II®)

presented 20 scenario-based multiple-choice questions and asked participants to select the most appropriate leadership actions. The results translated into Leadership Style Flexibility and Leadership Style Effectiveness scores. These scores demonstrated understanding of the model and were used to compare participant knowledge before and after playing The Leadership Escape Game.

Participants were also invited to discuss their experience and the impact of The Leadership Escape Game in an interview at least 30 days following the game. The primary goals for the interview were to determine if the participants applied the leadership training within their professional contexts and to determine the long-term transfer of learning into practice. The interviews also provided qualitative phenomenological data to triangulate the quantitative data expressed in the satisfaction survey and learner assessments (Creswell, 2014; Kirkpatrick & Kirkpatrick, 2016).

Data Collection

Quantitative data was collected using Qualtrics. Prior to playing The Leadership Escape Game, participants were sent a link to Survey #1. This survey collected demographic data and presented the LBA II® as a pre-game assessment. The assessment questions found in the LBA II® were presented with the multiple-choice answer options. The data from the assessments were used to calculate the Leadership Style Effectiveness and Flexibility scores based on the LBA II® scoring rubric. Permissions to use the LBA II® Self-Questionnaire and Self-Scoring rubric were provided by the Ken Blanchard organization (See Appendix A). Immediately following The Leadership Escape Game, participants were sent a link to Survey #2, which included the learner satisfaction survey and the post-game assessment. 30 days following the game, participants were sent a link to Survey #3, the 30-day post-test using the LBAII®. At least

30 days following the game, participants who completed Survey #1, The Leadership Escape Game, and Survey #2 were invited to participant in an interview. The qualitative data was collected through the Zoom session recording and interview transcription. The transcripts were coded and analyzed using Atlast.ti 8.

Definition of Relevant Terms

The key terms found within this study utilize the following definitions.

An *escape room* (a.k.a. *escape game*, *escape room game*). A game where players are engaged in a story or theme, search for clues, solve puzzles, and complete tasks within a specific timeframe to achieve an overarching objective, such as escaping the physical room where the game is played (Nicholson, 2018).

Game-Based Learning (GBL). The use of rules, objectives, challenges, rewards, feedback, and motivation within the time and parameters of a game activity for the purposes of gaining knowledge or skill (Braad, 2019; Farber, 2016).

SLII®. A leadership model that focuses on an individual's skills around a specific task and diagnoses the level of direction or support that is required to successfully complete the task (Wang & Knight, 1991). There are four leadership styles that are found within the SLII® model: Directing, Coaching, Supporting, and Delegating. These leadership styles are based on a spectrum of directive and supportive behavior (Blanchard et al, 2013).

Directive Behavior. One of two leadership style dimensions that describes the level of instruction and guidance provided by the leader for the task (Cote, 2017).

Supportive Behavior. The second leadership style dimension that describes how leaders leverage soft skills, such as listening, communication, coaching, and emotional intelligence (Hersey et al., 2001).

Enthusiastic Beginner (D1). An individual who is lacking in knowledge and skill to accomplish a stated goal but is motivated to do well and to be successful (Stręk, 2018).

Directing (S1). The leadership style that uses high directive and low supportive leadership behaviors to support an enthusiastic beginner's need for higher levels of instruction and less external motivation from the leader when tackling a specific task (Lynch, 2015).

Disillusioned Learner (D2). An individual who is lacking in skill or has slight competence and is lacking in motivation or is discouraged (Thompson & Glasø, 2015).

Coaching (S2). The leadership style that uses high directive and high supportive leadership behaviors to support a disillusioned learner who is lacking in skill and in motivation (Hersey et al, 2001; Lynch 2015).

Capable, but Cautious Contributor (D3). An individual who has skill in a task, but has a varying level of motivation or commitment (Thompson & Glasø, 2015)

Supporting (S3). The leadership style defined by its collaborative approach, uses low directive and high supportive behavior to build on an individual's skill and to identify ways of building commitment in a capable, but cautious contributor (Lynch, 2015, Stręk, 2018).

Self-Reliant Achiever (D4). An individual who is accomplished, seen as an expert, is confident in completing the identified task, and is in a position to inspire others (Blanchard et al, 2013; Thompson & Glasø, 2015).

Delegating (S4). The leadership style that allows for the self-reliant achiever's skill and commitment to shine unhindered and empowers them in decision-making and autonomy through low directive and low supportive leadership behavior (Lynch, 2015; Thompson & Glasø, 2015).

Leadership Style Flexibility. A measurement based on the Leader Behavior Analysis II ® Self-Questionnaire that identifies the equitable application of all four leadership styles (Dunnagan, 2014; Zigarmi et al., 1991).

Leadership Style Effectiveness. A measurement based on the Leader Behavior Analysis II ® Self-Questionnaire that identifies a leader's ability to choose the most appropriate leadership style for the presented scenario (Blanchard et al., 1993).

People leader. Individuals who coordinate, direct, influence, and build professional relationships with employees who directly report to the leader to achieve organizational and mutual goals (Fielder, 1967; Raffo & Clark, 2018; Stogdill, 1950).

Assumptions

There were four assumptions considered for this study: two related to leadership training and two regarding methodology. It was assumed that participants would not have mastered the concepts of the SLII® model and would have had limited exposure to the model prior to playing The Leadership Escape Game. This assumption would appear through lower assessment scores on the pre-test than on the post-tests. It was further assumed that participants would have the opportunity to apply the SLII® behaviors between completing the training and the 30-day follow-up interview. Regarding the study methodology, it was expected that participants would answer the learner satisfaction survey and interview questions honestly and completely. When completing the learning assessments, it was assumed that the participants would not experience assessment fatigue or recognize answers to assessment questions because correct answers were not be provided during the study.

Delimitations and Limitations

The primary limitation was that participants were recruited through a convenience sample involving leadership organizations and networks. Recruitment practices initially partnered with two leadership organizations, but needed to expand due to low response and retention. A secondary limitation identified the potential of the COVID-19 global pandemic on participation. The target population of people leaders for this study were found to have elevated levels of stress, anxiety, and depression, especially as they perceived to be taking on more work and saw organizations threatened with downsizing due to the economy (Graf-Vlachy, et al., 2020). Though no direct relationship can be drawn between the pandemic and this study's results, based on literature, there was a potential influence on participant capacity to engage and participate in the study.

The primary delimitation for this study was that the escape game was designed by the researcher. There were no existing escape games to teach SLII®, presenting the need for the development of the game. To ensure game quality, the researcher partnered with an SLII® subject matter expert, an escape game designer, and professionals in learning & development to pilot the design of the game. Assessment of game quality was determined using the RETAIN rubric (Gunter et al., 2008).

Organization of the Study

Using learner satisfaction, learning acquisition, and behavior change data, this study explored the effectiveness of a digital escape room game to deliver leadership training. Studies demonstrate the value of leadership training and game-based learning in terms of achieving learning outcomes (Lacarenza et al., 2017; Strickland and Kaylor, 2016; Ward et al., 2017). Studies also demonstrate that participants enjoy educational escape game and find them valuable

as a learning experience (Friedrich et al., 2018; Veldkamp et al., 2020). This study researched the effectiveness of a digital escape game to deliver leadership training by the impact of The Leadership Escape Game on satisfaction, learning acquisition and behavior change data.

Chapter 1 introduced the study of a digital leadership escape room game. Chapter 2 will provide a literature review of leadership training, the SLII® model, game-based learning theory, and escape room games as basis for this study. Chapter 3 will discuss the methodology and design of the study. Chapter 4 will share the research findings. Finally, Chapter 5 will present the discussion, conclusions, and recommendations.

Chapter 2

Literature Review

Escape rooms, originally found in the game and entertainment industries, have recently been used by organizations for team-building and educational activities (Coffman-Wolph, et al., 2017; Eukel & Morell, 2021; Nicholson, 2015). The emergence of escape room games in educational environments inspired research to determine the effectiveness delivering leadership training in a digital escape room game. The literature review for this study begins with a foundational overview of leadership training, including the design and evaluation of leadership training solutions. The next section reviews the SLII® model taught within The Leadership Escape Game developed for this study. The third section reviews game-based learning, the study's theoretical framework. The discussion provides an overview of game-based learning concepts, design, and two models that provided structure to designing The Leadership Escape Game. The final section reviews the history of escape games, applications in learning environments, and considerations for escape game design. Each of these sections builds the case for use of an escape room game as a leadership training activity.

Current State of Leadership Training

Leadership training, noted in the 2019 ATD State of the Industry report as executive development and managerial and supervisory, has steadily comprised 17 - 20% of organizational learning content over the last five years (ATD, 2019). Olatunji et al. (2017) concluded from a survey about leadership program availability and work performance, "that leadership training is indeed a strong predictor for delivery prospect of respective work teams in an organisation and, by extension, the entire productivity prospect of an organisation" (p. 7). Organizations invest a significant amount of their learning budget on leadership training, but organizations believe it is

a worthwhile investment because leadership training is linked to organizational growth (Connally & Morris, 2017; Grant, 2019).

Overview of Leadership Training

Lacarenza et al. (2017) define leadership training as “programs that have been systematically designed to enhance leader knowledge, skills, abilities, and other components" (p. 1687). Leadership skills that are considered essential include communication, inspiration, empowerment, and providing feedback, which all contribute to employee satisfaction and leadership effectiveness (Grant, 2019).

A 2017 meta-analysis of 335 leadership training studies reviewed the effectiveness of leadership training programs and made recommendations of design and implementation practices. Key findings of the study discuss that, using Kirkpatrick’s levels of evaluation, leadership training is considered effective based on learner satisfaction, knowledge acquisition, behavior change, and business results (Kirkpatrick & Kirkpatrick, 2016; Lacarenza et al., 2017). Studies also show that employees identify observed behavior change in their leaders following leadership training. Tafvelin et al. (2019) determined a positive relationship of an employee’s rating of their leader when that leader had attended leadership training. Another study noted behavior change in leaders, based on observer assessment data, following leadership training (Duygulu and Kublay, 2011). In general, studies show statistically significant relationships between team performance and the application of leadership training (Olatunji et al., 2017).

Evaluation of Leadership Training

The desired outcome of evaluation is to collect data and tell a compelling story of success and opportunity (Church, 2017, pp. 32-33). The New World Kirkpatrick Model (also known as the Four Levels of Evaluation) is a prevalent model for the evaluation of learning and

development programs, including leadership development (Lacarenza et al., 2017 Kirkpatrick & Kirkpatrick, 2016; Reio et al., 2017).

Kirkpatrick's model defines four levels of evaluation that measure the effectiveness of a learning event. The four levels include: 1) Reaction, 2) Learning, 3) Behavior, and 4) Results (Kirkpatrick & Kirkpatrick, 2016). Level one focuses on the reaction and satisfaction of the learners and aims to measure the "degree to which participants find the training favorable, engaging, and relevant" (p. 39). Level two measures knowledge following the learning event using assessment tools. An example of measuring acquisition of knowledge is to include a pre-test and a post-test that measures the variance in score from before and after the learning event (Reio et al., 2017). A level three evaluation measures the "degree to which participants apply what they learned during training when they are back on the job" (p. 49). This measurement can be collected through various methods. An example includes interviews that ask participants how they applied the training to indicate a relationship between the training and a transfer of learning into practice. Level four evaluation focuses on measurable performance metrics and the impact the training has had on those results.

This study focused on measurements within the first three levels. A post-session learner satisfaction survey measured the level one reaction. The Leader Behavior Analysis II®, as provided by the Ken Blanchard companies, served as a measurement of level two learning acquisition through pre-session, post-session, and 30-day follow-up assessments. Level three behavior was determined through 30-day post-session interviews that asked participants about application of the training. Further detail of these data collection methods is included in the next chapter.

Leadership Training Design

Multiple studies present key design strategies for effective leadership development programs. Following a literature review of 500 leadership development techniques, Turner et al. (2018) concluded that one of the most essential characteristics is the use of real-world problems as the basis for design. This is in alignment with adult learning principles, such as Knowles' (1980) andragogy, that highlights the motivation and orientation of solving real-world problems.

In a study of 336 leadership training events, Lacarenza et al. (2017) discovered a few design components that make leadership training effective. The authors noted that voluntary programs have lower attendance but greater results, possibly caused by higher innate motivation. Self-administered leadership is less effective than one facilitated by an instructor. Face-to-face instruction is considered more effective than virtual environments, due to limitations with meaningful practice (Lacarenza et al.). However, the innovation of using videos and discussion boards can help build new ways to engage students, build consistency of programs, and are considered more cost-effective (Sowcik et al., 2018).

Grant (2019) studied the effectiveness of a leadership training program within a large organization and proposed five design recommendations. These recommendations include identifying relevant, challenging, and interesting content, using multiple delivery methods, providing opportunities to practice, identifying an appropriate length for the content, and using a facilitator who can help learners connect content to practical application principles. Action learning is also a common theme in leadership training design that includes the use of discussion, reflection, problem-solving, discovery, and collaboration (Blackler & Kenny, 2004; Lester, 2015). The collaborative nature of action learning supports communication and team leadership behaviors (Day et al., 2014). A common success factor is a clear connection to organizational

outcomes, philosophy, and the expectation of leaders to apply the leadership training (Clarke & Higgs, 2016).

Leadership Training Games

Henriksen and Børgesen (2016) studied two leadership training games and concluded that games can promote leadership learning when supplemented by informal activities that solicit participant discussion. Using an escape game to teach students about a medical school's leadership principles, the researchers concluded, "Overall, students found the Escape Room activity to be an effective and innovative learning experience for application of leadership skills and collective problem-solving in a high-pressure situation" (Wu et al., 2018, p. 561). Games can also support the demonstration of leadership behaviors within the context of the game. Pan et al. (2017) observed player dynamics and noted individuals that had experience playing a similar game would step into a leader role, providing directions and support. The leader would change throughout the game when there were multiple individuals with experience. The researchers noted that in the context of the game, while the purpose was not to learn leadership skills, the game provided opportunities to practice leadership skills in an innocuous situation (Pan et al.).

Leadership Training Summary

Leadership training is considered an effective pursuit to influence organizational and team performance (Lacarenza et al., 2017; Tafvelin et al., 2019). The quality of design for a leadership training game is shown to be an important factor of successful outcomes (Clarke & Higgs, 2016; Grant, 2019). Ruben et al. (2018) state that a leadership development program should include experiences that are, "powerful, promote reflection, reinforce guiding values, encourage the adoption of new and better practices, and most importantly find ways to reinforce new messages, models, and behaviors throughout the culture of the organization" (p. 248).

SLII® Leadership Model

There are two primary models of Situational Leadership as of current day. The leadership model employed in this study is SLII®. Permissions to use the materials and assessments were provided by The Ken Blanchard Companies (See Appendix A).

Situational Leadership History

Situational leadership originated in 1969 by Paul Hersey and Ken Blanchard (Stręk, 2018). The first iteration of the model was called the Life Cycle Theory of Leadership and was updated a decade later to Situational Leadership (Kuchynková, 2016). The model has evolved over the years to address criticisms of inaccurate assumptions (Meier, 2016). Towards the end of the 1970's and the beginning of the 1980's, Ken Blanchard and his wife began a leadership training organization, Blanchard Training and Development Inc. With a team of researchers, they attempted to address the criticisms of situational leadership through research and created the Situational Leadership ® II model along with the Leader Behavior Analysis (LBA) assessment (Blanchard et al., 1993). The Center for Leadership Studies is an organization founded by Hersey that also provides a version of situational leadership based on the original constructs (Center for Leadership Studies, 2021). Between the two organizations, the situational leadership models are considered to be the most accepted and applied leadership models in organizations (Thompson & Glasø, 2018).

SLII® Overview

SLII® is considered a type of contingency leadership theory that promotes adapting one's leadership style to the situation (Henkel & Bourdeau, 2018). The foundation of situational leadership asserts that there is not one style of leadership that works as a default, blanket approach, but instead there is a spectrum of styles that must be employed depending on the

specific situation (Northouse, 2016). The leader must apply different styles based on the task and the level of direction or support needed by the performing individual (Hersey et al., 2001). Researchers define situational leadership as a model that focuses on an individual's capacity to complete a specific task and guides the leader to choose a matching leadership style related to the direction and support levels needed by that individual (Lynch, 2015; Wang & Knight, 1991). Walls (2019) describes the benefits of situational leadership as a model that is characterized by flexibility, collaboration, and adaptation to individual development needs in terms of competence and commitment.

Development Levels within the Situational Leadership® II Model

The diagnosis of development levels is a foundational skill within the SLII® Model. A situational leader evaluates an employee's competence and commitment around a specific task to determine the level of directive or supportive behavior needed to effectively lead the employee towards success with that task (Cote, 2017). The model relies on the concept of developmental needs of the employee in relation to the task. Some researchers use language from the Hersey iteration of the model and refer to the development levels as readiness levels (Tortorella & Fogliatto, 2017).

The development levels are based on two dimensions that describe the capability and willingness of the employee to complete the task: competence and commitment (Bosse et al., 2017). Competence considers skill and commitment focuses on motivation or attitude (Henkel & Bourdeau, 2018). Thompson and Glasø (2018) define competence "as the follower's task-relevant knowledge and skills gained through formal education, on-the-job training and experience" (p. 575). Competence encompasses the knowledge, skill, and experience of the individual in relation to the specific task (Bosse et al.). The second dimension, commitment, is

described in terms of motivation and confidence in relation to completing the task (Thompson & Glasø). Bosse et al. (2017) further describe commitment as self-assurance, confidence, steadfastness, willingness, and desire to complete a task. An important consideration is that there will be variation in competence and commitment within an individual in relation to a specific task over time (Northouse, 2016). This variation lends to the premise of situational leadership needing to be adaptive, not to the individual as a whole, but to the orientation of the individual towards a specific goal or task.

The development levels are on a spectrum and the leader must identify where on the spectrum the individual is in relation to the task at hand in order to provide the appropriate leadership style, which may change over time (Northouse, 2016). The spectrum creates four distinct development levels that help to define the potential needs for the employee (Stręk, 2018).

Enthusiastic Beginner (D1). The first development level describes an individual with a low level of task competence but has a high level of commitment (The Ken Blanchard Companies, 2013). This individual is new to completing the task and therefore is lacking in knowledge and skill to independently accomplish it, but is motivated and committed to be successful (Cote, 2017; Stręk, 2018).

Disillusioned Learner (D2). The second development level describes an individual with low to slight levels of competence, but demonstrates low commitment (Cote, 2017; The Ken Blanchard Companies, 2013). This stage is reflective of the quote, “There is no growth in the comfort zone, and there is no comfort in the growth zone” (Unknown, n.d.). The individual may exhibit disappointment or frustration because they are lacking in skill, but also are lacking motivation or commitment to continue developing and completing the task (Stręk, 2018; Thompson & Glasø, 2015).

Capable, but Cautious Contributor (D3). The third development level describes sufficient or high levels of competence with a variable level of commitment (Cote, 2017). The individual has the capability to perform the task but may be experiencing a range of commitment from insecurity and discouragement through enthusiasm and moderate motivation (Stręk, 2018; Thompson & Glasø, 2015).

Self-Reliant Achiever (D4). The fourth development level describes both high competence and commitment, meaning high skill and motivation (Cote, 2017; The Ken Blanchard Companies, 2013). This individual is accomplished, seen as an expert, is confident in completing the identified task, and is in a position to inspire and educate others (Blanchard et al, 2013; Thompson & Glasø, 2015).

Leadership Behaviors

As is similar with other contingency theory-based models, such as the Tannenbaum-Schmidt Continuum of Leader Behavior (1973) and Fielder's Contingency Model (1967), situational leadership employs a dichotomous approach to leadership support through the lens of task direction and relationship (Hersey et al., 2001). Early iterations of situational leadership referred to the two components as task behavior and relationship behavior (Henkel & Bourdeau, 2018). SLII® has updated the language to directive and supportive behaviors (The Ken Blanchard Companies, 2013).

Directive Behavior. Directive behavior describes the level of instruction and guidance provided by the leader for the task (Cote, 2017). Hersey et al. (2001) define the relative term of task behavior as, "The extent to which leaders are likely to organize and define the roles of the members of their group (followers) and to explain what activities each is to do and when, where, and how tasks are to be accomplished" (p. 117). High directive behavior techniques include

providing explicit directions, timelines, procedures, evaluation, planning, and is characterized by the leader providing most of the communication (Graham & Trendafilova, 2016; Northouse, 2016). Low directive behavior is applied by a leader as their employee's skill around the task improves and no longer needs the detailed guidance (Raza & Sikandar, 2018).

Supportive Behavior. Supportive behavior describes how leaders leverage soft skills, such as listening, communication, coaching, and emotional intelligence (Hersey et al., 2001). Graham and Trendafilova (2016) describe supportive behavior techniques as "two-way communication, giving praise and encouragement, and showing social and emotional support" (p. 69). The goal of these behaviors is to improve confidence, security, collaborative problem-solving, and communication (Northouse, 2016). High supportive behavior involves active encouragement and motivation by the leader, where low supportive behavior supports the employee's existing motivation towards the task (Raza & Sikandar, 2018).

Leadership Styles

The directive and supportive behaviors described above create a matrix of four leadership styles that comprise the SLII® model. The four leadership styles include directing, coaching, supporting, and delegating (Blanchard et al., 1993). Each of the styles match to one of the above-described development levels as a prescriptive approach to providing the right leadership for the individual in relation to the identified task (Bosse et al., 2017).

Directing Style (S1). The directing style, identified as S1, supports the development level of an enthusiastic beginner (D1) with higher levels of instruction and guidance because the individual is new to the task or is lacking skill, but is already motivated to be successful (Lynch, 2015; Stręk, 2018). To match the low competence and high commitment, the leader must leverage high directive and low supportive behaviors (Cote, 2017). Leaders applying this style

will demonstrate setting goals, providing more explicit directions, monitoring progress, teaching, modeling expectations, developing action plans, and providing frequent feedback (The Ken Blanchard Companies, 2013; Lynch, 2015; Stręk, 2018). This style shifts focus onto directive behaviors in order to successfully accomplish the task and decreases focus on the supportive behaviors (Northouse, 2016).

Coaching Style (S2). The coaching style (S2) uses high directive and high supportive leadership behaviors to support the above-described disillusioned learner (D2) who is lacking in skill and in motivation (Hersey et al, 2001; Lynch 2015). Because the skill level is still novice, the leader leverages directive behaviors to explicitly define the task expectations and will also apply supportive behaviors to motivate and build confidence within the individual (Northouse, 2016; Stręk, 2018). Using a balance of direction and support, the leader will demonstrate ongoing coaching and feedback, provide more context and purpose for the task, explore concerns, collaborate to solve problems, and offer intentional encouragement (The Ken Blanchard Companies, 2013).

Supporting Style (S3). The supporting style (S3) matches the capable, but cautious contributor (D3) development level where the skill of the employee is higher and the ability to self-manage is beginning to improve, therefore the leader will apply low directive and high supportive behaviors (Cote, 2017). The leader steps back from providing explicit direction to allow the individual more autonomy around the task, while also providing higher levels of support, coaching, and guidance, as needed, to promote motivation. As described earlier, a capable, but cautious contributor (D3) has sufficient levels of competence, but a variable level of commitment (Lynch, 2015, Blanchard et al, 2013; Stręk, 2018; Thompson & Glasø, 2015). The Supporting leadership style is defined by its collaborative approach to build on an individual's

skill and to identify ways of building commitment (Lynch). Stręk (2018) states, "The desirable goal at this stage is to strengthen subordinates in the belief that they are the right individuals to perform the entrusted task" (p. 47). The intention is to empower and enable individuals with skill to feel confident in decision-making and developing towards becoming a D4 self-reliant achiever (Lynch). Leaders using the supporting style demonstrate more communication via questioning and listening, expressing faith in the individual's capabilities, leveraging reflection and feedback, and works towards providing the individual with more autonomy and ownership (The Ken Blanchard Companies, 2013; Northouse, 2016).

Delegating Style (S4). The delegating style (S4) allows the self-reliant achiever (D4) to complete the task with minimal guidance and empowers them in decision-making and autonomy (Lynch, 2015; Thompson & Glasø, 2015). Using low directive and low supportive behaviors, the leader identifies the skill and commitment of the self-reliant achiever and recognizes that intervention to improve skill or commitment is unnecessary (Cote, 2017; Lynch, 2015; Thompson & Glasø). This style is characterized by a celebration of performance, continued encouragement to grow and challenge the status quo, while also allowing the individual to take on full responsibility for the task (Lynch, 2015; Stręk, 2018).

Applying Situational Leadership

The Ken Blanchard Companies (2013) describe the three major skills to applying the SLII® model: 1) Goal setting, 2) Diagnosing, and 3) Matching. These three skills progress sequentially and employ the above-described concepts to systematize the model. The Leadership Escape Game for this study will use this skill progression to organize the flow of the game.

Skill 1: Goal Setting

Goal setting is the first step in the model and is considered a necessary component to effectively applying the right leadership styles (Henkel & Bourdeau, 2018). The Ken Blanchard Companies (2013) promote the use of SMART goals, which are Specific, Motivating, Attainable, Relevant, and Trackable. Notice that SMART goals in SLII® are different than the SMART goals used in other developmental paradigms: Specific, Measurable, Attainable or Action-Oriented, Relevant or Realistic, Time-bound (Jakubik, 2019; Olt & Szasz, 2019). The primary reason for this change is based on the model's key assumption that motivation, or commitment, is a principal dimension to an individual's success with a task. In addition, changing Measurable and Time-bound to Trackable captures the need for accountability and creates room for the consideration of an individual's Motivation ("3 ways to help managers…", 2019).

Goals are most effective when there is alignment among the goals of the leader, the employee, and the organization (Hersey et al., 2001). SMART goals provide a framework for defining and understanding the employee's competence and commitment towards the identified task. Specific goals identify the exact behaviors and performance expectations for completing the task (Jakubik, 2019; The Ken Blanchard Companies, 2013). Motivating goals determine if the employee is interested or enthusiastic about accomplishing the task. Attainable goals question the practicality and possibility that the goal can be reasonably achieved (Doran, 1981). Relevant goals confirm the alignment between the employee, leader, and organization. Trackable goals create measures and accountability for achieving the goal (The Ken Blanchard Companies). A SMART goal includes each of these components.

Goal setting is a critical first step to define and create clarity of expectations around a task (Kuchynková, 2016). Once defined, the leader can progress to the second skill of diagnosing the development level.

Skill 2: Diagnosing

The second skill of a situational leader and the next step in the process is to determine the "level of a subordinate's preparedness to complete the required task," based on competence and commitment (Kuchynková, 2016, p. 1972). As a quick reflection, competence involves individual knowledge, skill, and experience related to the specific task, and commitment addresses the individual's motivation and confidence towards the task (Henkel & Bourdeau, 2018; Hersey et al., 2001; Thompson & Glasø, 2018).

To execute the diagnosing step, Northouse (2016) proposes a series of questions to collect information, such as "What goal are followers being asked to achieve? How complex is the goal? Are the followers sufficiently skilled to accomplish the goal? Do they have the desire to complete the job once they start it?" (p. 97). The answers help the leader identify where the individual's competence and commitment rate on a low to high scale. These ratings determine the development level of the individual in relation to the task. The development levels, as described above are (D1) Enthusiastic Beginner, (D2) Disillusioned Learner, (D3) Capable, but Cautious Contributor, and (D4) Self-Reliant Achiever (Lynch, 2015). Each of the development levels highlight the gaps and strengths of the individual's competence and commitment for the identified task and provide insight into what the individual may need to be successful. For example, an enthusiastic beginner (D1) is low in knowledge, skill, and/or experience, so they may need training, explicit instructions, and consistent, constructive feedback (The Ken Blanchard Companies, 2013).

The step of diagnosing helps the leader to identify how the individual relates to the task and what levels of direction or support the individual will need to be successful with that task. Thompson & Glasø (2018) studied the relationships between leader and follower diagnoses of development levels and the application of situational leadership behaviors. Results found that the strongest applications of the model occur when leader and follower diagnoses of development levels match. The diagnosing step helps the leader determine the individual's development level so that they can match and select the appropriate leadership style to apply (Stręk, 2018).

Skill 3: Matching

Each of the development levels identified with a D-code (D1, D2, D3, and D4) match directly to a leadership style identified with an S-code (S1, S2, S3, and S4). For example, a D1 development level compels the use of the S1 leadership style to effectively apply the SLII® model (Blanchard, 2010). The skill of matching seeks to "analyze the maturing/readiness of the employees or the team which includes being knowledgeable, willing, and eager to complete the task or project work…. then the manager can apply the leadership style that is appropriate for the situation" (Henkel & Bourdeau, 2018, p. 10).

Consider the directive and supportive behaviors described earlier and imagine they create an x and y axis. Directive behavior, on the x axis, describes the level of instruction and guidance on a scale of low to high (Cote, 2017). The level of leader directive behavior increases with the performing individual's needs for more guidance and instruction and decreases as the individual builds skill around the task. Supportive behavior, on the y axis, describes the relationship, communication, and encouragement provided by the leader (Hersey et al., 2001). Low levels of supportive behavior are required when the individual has high levels of commitment. Supportive behaviors increase in necessity as the individual experiences lower or moderating levels of

commitment (The Ken Blanchard Companies, 2013). These create a matrix of the leadership styles that help to explain how the development level needs and the leadership styles work together.

Salehzadeh (2016) conducted a study to determine the preferred leadership styles of individuals based on demographics of gender, education, and marital status in an academic setting. Results showed that, "Most undergraduate students prefer directing style, most postgraduate students prefer coaching style and most PhD students prefer supporting style" (p. 871). These conclusions align with situational leadership where the undergraduates, whom have less experience, would need more directive leadership, in contrast to post grad and PhD students with more experience who would prefer the other less directive leadership styles.

SLII® Application Example

Synthesizing the concepts described above, the connections between the development levels and leadership styles is an important paradigm in applying SLII®. The following example provides an illustration of how an individual may progress through development levels in relation to a task and how a leader must adapt their leadership style to adequately lead the individual.

Consider again the enthusiastic beginner (D1). For ease of explanation, the development level will be used as the individual's name throughout the example (e.g. D1 and D2 are the same person, just in different development levels).

D1 has just been promoted to a coordinator position and is enthusiastic and motivated to do well. One of the tasks is to create reports from a database. D1 has never used this database before and it is a complicated tool. The leader identifies a SMART goal (Skill 1) for this task and diagnoses (Skill 2) D1's competence and commitment for completing the database report task.

D1 has low competence because they have never used the tool before, but demonstrates high commitment through motivation and confidence in learning the task. The leader can diagnose D1 as an Enthusiastic Beginner and recognize needs, such as training, clear deadlines, expectations, and regular feedback. The leader will apply the Directing (S1) leadership style which leverages high directive and low supportive behaviors to help build D1's competence and acknowledge D1's commitment.

In about a month, the task is still proving to be challenging. The database tool is not intuitive and is presenting a number of challenges. The individual is becoming a Disillusioned Learner (D2) where they have some knowledge but is not performing the task proficiently and is feeling frustrated and demotivated. The leader recognizes the shift in D2's commitment and the lack of progress in competence. The leader confirms that D2 needs some encouragement, additional development with using the tool, and an opportunity to discuss the challenges. In doing so, the leader is applying the Coaching (S2) leadership style.

Following these efforts, there is observed skill development, but the individual is still feeling uncertain or could even be losing enthusiasm for completing the task. The individual has shifted into a D3 development level of being a Capable, but Cautious Contributor. D3 feels this moderating tug of war between liking the task and feeling defeated by it. D3 has the knowledge and skill to complete the database report task, but still is experiencing variable levels of commitment. The leader, acknowledging the improvement in competence and the wavering commitment applies the Supporting (S3) leadership style. Using this style, the leader asks D3 for input on the task, provides encouragement and positive reinforcement about what is being done well, and engages D3 in problem-solving for the challenges.

Six months into the new role, the individual has overcome the challenges related to the database task and is consistently demonstrating excellent performance, is motivated, and uses that enthusiasm and knowledge to help guide others with the database reports. This now D4 is a Self-Reliant Achiever. To lead a D4, the leader employs the Delegating (S4) leadership style. Due to D4's high levels of competence and commitment, the leader can focus on encouraging D4's autonomy, ownership, and creating opportunities of visibility for D4's successes with this task.

The leader recognizes that D4 may not always remain a self-reliant achiever. Over time, frustrations with the task or updates to the procedures can influence a shift to any of the other development levels, which will require an adaptation from the leader to support and direct appropriately. Also, as the D4 is able to take on new responsibilities, those new tasks may mean the individual is a D1 for that new task while still a D4 for the database task described above. This awareness establishes a need for leaders to develop skills to effectively match and to adapt by using all leadership styles.

Leadership Flexibility and Effectiveness

Northouse (2016) states, "Effective leadership occurs when the leader can accurately diagnose the development level of followers in a goal situation and then exhibit the prescribed leadership style that matches the situation" (p. 112). Henkel and Bourdeau (2018) note that leaders often have primary and secondary leadership styles. SLII® uses two measures to determine the skills of a leader in applying the model's principles: Leadership Style Flexibility and Leadership Style Effectiveness. A tool to assess these skills is the Leader Behavior Analysis II® (Blanchard et al., 2013).

The Leader Behavior Analysis II® (LBA II®) asks 20 scenario-based questions and provides multiple-choice options of leadership actions. The answers are scored and provide data points for Leadership Style Flexibility and Leadership Style Effectiveness (Blanchard et al, 2013).

Leadership Style Flexibility. Leadership Style Flexibility "is a measure of the degree to which the four styles are selected with equal frequency" (Zigarmi et al., 1991, para 4). This is calculated by identifying which leadership styles were selected for each scenario in the LBA II® and determining if all four leadership styles were used equally or if the leader relied more heavily on one or two styles. When a leader chooses one or two styles predominantly, they are considered less flexible in their leadership style (Dunnagan, 2014). This quality is known as rigidity and alleges that the leader applies the same leadership styles for all situations (Lynch, 2015).

Zigarmi and Roberts (2017) conducted a study about the use of situational leadership where they observed the use of all four leadership styles and concluded, based on participant feedback, that all styles were necessary to improve performance outcomes. Stiles (2008) references work by the Ken Blanchard Companies where individuals on average self-assess Leadership Style Flexibility in the range of 14-20 out of a 30-point scale. An LBA II® score between 14-20 is considered the normal range of flexibility (Blanchard et al., 2013). According to Blanchard (2010), "54 percent of leaders tend to use only one style, 35 percent tend to use two styles, 10 percent tend to use three styles, and only 1 percent use four styles" (p. 88). The goal and ideal quality of Leadership Style Flexibility is the equitable application of all four leadership styles. This demonstrates that the leader can adapt based on the needs of the individual.

Leadership Style Effectiveness. Leadership Style Effectiveness measures the participant's accuracy in choosing a leadership style that is most appropriate to the presented scenario (Blanchard et al, 1993). Zigarmi et al. (1991) propose this score is the most important of the two scores. As the leader answers the LBA II® questions, the scoring will determine if the answer is an excellent, good, fair or poor response, and in summation calculates an effectiveness score (Blanchard et al, 2013). A participant can score up to 80 points for this measurement, but normal ranges are often found in the 50 – 58-point range (Blanchard et al, 2013; Stiles, 2008). The goal of applying situational leadership is dependent on the leader's effectiveness to be able to accurately identify the most appropriate leadership style for the individual's specific situation. There is an inherent connection between the effectiveness and flexibility scores as the correct selection of leadership styles in the assessment, leading to a high effectiveness score, also means the leader is using multiple, and potentially, all four of the leadership styles, which equates to flexibility.

Criticisms of Situational Leadership

Researchers note that there have been criticisms of the various iterations of situational leadership over the years. Northouse (2016) states that there is a lack of empirical research on the validity of the model and that the development levels provide an unclear progression of growth, which challenges the prescriptive nature of the leadership styles. Thompson & Glasø (2018) echo the concern about the lack of empirical data for applying situational leadership. Even a decade earlier, Vecchio et al. (2006) presented this concern through studies of situational leadership that the model is not as effective or applicable as proposed by the authors. Graeff (1983) had the strongest criticisms of situational leadership citing internal inconsistencies and asserts that various components of the model "lack theoretical justification" (p. 290). Fourteen years later,

Graeff (1997) again assessed the many iterations of situational leadership and remained firm in criticizing the lack of theoretical foundation and validity of the prescriptive outcomes. Graeff also notes the confusion that the authors have created about situational leadership due to the division of Hersey's and Blanchard's visions for the models and the differences in terminology and training offered.

Meirovich and Gu (2015) challenge the lack of empirical support notion through a literature review of studies from the 1980's through the 2000's that provide data to support the model. Also, despite his criticisms, Graeff (1983) recognizes there are components of the situational leadership models that are helpful, such as the necessity for a leader to adapt to the needs of their employees.

Current Status of Situational Leadership Training

The Ken Blanchard Companies provides the version of SLII® that forms the basis for this study. The organization promotes outcomes related to development, performance metrics, and the ability to communicate and problem-solve from a common foundation. The training leverages various engagement techniques to deliver content, to create opportunities to practice, and to promote long term transfer (The SLII® Experience Learning Design, 2020).

Another organization called The Center for Leadership Studies (CLS): The Global Home of Situational Leadership also offers robust training based on Situational Leadership®. This organization is built upon the branch of the model grounded in the Hersey tradition, originally proposed in 1969 (About us, 2020). The CLS promotes similar outcomes and engagement practices as the Ken Blanchard Companies SLII® program.

A current gap in the literature is that there were no found published studies about the training programs or the instructional design of the programs. The primary source of information

about the situational leadership programs is found on the two organizations' websites for promotional purposes.

Summary of Situational Leadership

Situational leadership is a contingency theory-based model and was first presented in the 1960's. The model has evolved into two primary models, Situational Leadership® hosted by The Center for Leadership Studies and SLII® hosted by The Ken Blanchard Companies. This study applied the SLII® model.

The first step/skill of the model is to develop SMART goals around a specific task. The second step/skill uses an assessment based on two dimensions, commitment and competence, to diagnose the development level of the individual in relation to the task. The third step/skill is to match the appropriate leadership style based on levels of directive or supportive behavior that match the development level.

Northouse (2016) identifies five strengths of the Situational Leadership model. These include 1) positive professional application and popularity of the model within organizational training, 2) the simplicity of the model in application, 3) its prescriptive nature, which adds to the ease of application, 4) the focus on leader adaptation and flexibility based on the needs of the follower, and 5) the recognition that individuals and situations are all different and require leaders to approach each individual uniquely to their needs. Reza et al. (2018) concludes that "Situational Leadership has a significant influence on employee performance" (p. 93). SLII® also provides a strong basis for this study as each of the components, definitions, and visuals associated with the model can be adapted into game components, making it a viable model for the application of game-based learning.

Game-Based Learning

Game-based learning provides the theoretical framework for this study. The Leadership Escape Game developed for this study is an application of game-based learning. The following discussion will provide an overview of game-based learning (GBL), game design, and the application of GBL.

Overview of Game-Based Learning

Qian and Clark (2016) define game-based learning as, "an environment where game content and game play enhance knowledge and skills acquisition, and where game activities involve problem solving spaces and challenges that provide players/learners with a sense of achievement" (p. 51). Rules, objectives, challenges, rewards, and feedback within a defined window of time create the conditions for gaming in a learning environment (Braad, 2019; Farber, 2016). In game-based learning, students acquire knowledge that they can test in a low-risk environment, adapt decisions based on failures and success, collaborate with others to improve tactics, and reattempt strategies (Kim et al., 2009). This exploratory and experiential learning environment motivates learners to think critically and to solve problems that lead to skill acquisition (Garneli et al, 2017).

Game-Based Learning Terms

Multiple terms are used within the game-based learning domain that are important to distinguish from the overarching concept of game-based learning. The terms help define how the games are used to support learning and performance.

Gamification. Gamification uses game mechanics to promote behaviors in a non-game setting (Hanus & Fox, 2015). Examples of game mechanics include narrative, competition, rewards, levels, scores, and badges (Karagiorgas and Niemann, 2017; Mawhirter and Garofalo,

2016). For example, a leaderboard may be used to rank performance and motivate employees to strive for top results. Another example is the use of badges or levels to mark the completion of milestones. Meaningful gamification encourages a design that is not dependent on external rewards or mechanisms that, once the reward is removed, will dilute performance, but to instead find ways to create intrinsic and long-lasting motivation of performance long after the gamification is complete (Nicholson, 2015)

Serious Games. Serious Games describe learning activities that use game principles to convey content in an interactive and engaging manner (Karagiorgas & Niemann, 2017). Principles of game-based learning that align to serious game design include leveraging intrinsic motivation, learning through fun, simulating authentic context for learning and applying, encouraging independence along with teamwork, and basing design on experiential learning (Perrotta et al., 2013). Escape rooms games in a learning setting are an example of a serious game.

Digital Game-Based Learning. Digital game-based learning is described as "any marriage of educational content and computer games" (Prensky, 2001, p. 145). In many applications, the word 'digital' is assumed as most GBL is digital in nature, but there are non-digital applications that create the prudence for a separate definition (Abbott, 2019).

Game-Based Learning Design

Research shows that there are relationships between the quality of game design, the connection to learning objectives, and the perceived engagement and effectiveness of the game (Abbot, 2019). Arnab and Clarke (2017) describe the necessity of rigorous effort for serious game design to ensure the experience promotes a desired knowledge, skill, and attitude change.

Juul (2018) presents six features that create the foundation for a game. The features are rules, outcomes, the value of the outcomes, player effort, emotional investment, and consequences. Prensky (2001) also proposes structural factors of a game to include rules, objectives, outcomes and feedback, conflict or challenge, interaction, and story. Expanding these principles into game-based learning, de Lope & Medina-Medina (2017) proposed a Comprehensive Serious Game Taxonomy that describes 16 criteria of a Serious Game with six major categories. The six major categories include game development, game platform, game design, game use, game users, and business model. Within the game design category, elements that make games an effective tool for learning include narrative, interactivity, gameplay, assessment, consequences, and inherent player value (e Lope & Medina-Medina., 2017; Juul, 2018).

Baron et al. (2016) discuss educational game design elements, such as quick wins through manageable milestones and metacognition practices, using mechanics that inspire critical thinking, such as puzzles, and providing opportunities for clear feedback and reflection. The effective design of an educational game is a critical component for learning outcomes. Tobias et al. (2014) conclude that in order to see long term transfer beyond the game learning event, the game must be designed in a way that engages the same cognitive processes as what is experienced in the performance context. To ensure the quality of game design for this study, The Leadership Escape Games utilized the Spiral Educational Game Development Model and the RETAIN model.

Spiral Educational Game Development Model

Game development is time consuming, and studies show that effective design is a key influencer of learning outcomes (Strickland and Kaylor, 2016; Theodosiou &Karasavvidis, 2015)

For this study, the game development will be based on the Spiral Educational Game Development model proposed by Lui and Au (2018) in combination with traditional instructional practices within the ADDIE model (Budoya et al., 2019). The game development model is presented as a spiral due to its cyclical approach to design and evaluation iterations (See Appendix B).

The first step is to identify the learning objectives and purpose (Lui & Au, 2018). This step can be likened to the analysis phase of instructional design practices (Aldoobie, 2015). The goal is to specifically state the behavioral outcomes that become the foundation for the remaining steps in the game design model.

The second and third steps are to identify the game needs and goals and then to draft a conceptual design of the game (Lui & Au). The Comprehensive Serious Game (CSG) taxonomy provides examples of game needs to consider, such as narrative, interactivity, target audience, game play experience, assessment, and deployment (de Lope & Medina-Medina., 2017). Having those components defined provide guidance to begin a graphical representation of the objectives and potential game flow.

The fourth step builds on the previous two steps to design the game components. In this stage, game rules, elements, mechanics, and attributes are defined and matched to the learning objectives to start designing the game (Lui & Au). Fine tuning allows for the adjustment of the game mechanics to create a fun and fair game.

The previous three steps align to the design stage of instructional design practices and the next step transitions into development (Budoya et al., 2019). The fifth step in the Spiral Educational Game Development Model is to prototype the game with test players who work

through the game and find any loopholes or challenges that may prevent a successful completion of the game (Lui & Au).

The sixth step is to evaluate the game from the prototype test followed by a seventh step to identify solutions that will address problems found within the feedback (Lui & Au). These steps align to the formative feedback practices found in instructional design (Dick et al., 2010).

It is at this point that the spiral description of the model activates. If the problem is with learning objectives, purpose, or game needs, then the designer will navigate back to step one and progress through the model. If the objectives are confirmed, but the concept or game design needs to be refined, then the designer will return to step 3.

In this model there are four phases that the above steps align to. Steps 1, 2, and 7 are part of the Identification stage where the outcomes and issues are identified and defined. Steps 3 and 4 are in the design phase. Step 5 is the prototyping phase. Step 6 is in the evaluation phase. At the end of these phases and steps is the implementation of the game learning session (Lui & Au). These phases and steps within the Spiral Educational Game Development Model align to instructional design principles as well as consider the needs for game design (Aldoobie, 2015; de Lope & Medina-Medina, 2017; Lui & Au, 2018).

The RETAIN model

Another component of game design is to assess the quality of the game. Quality game design, as discussed earlier, is a predictor of successful learning outcomes (Lameras et al., 2017). The RETAIN model provides both a design and evaluation framework to assess the potential of the game as a vehicle for the learning content (Arnab & Clarke, 2017). RETAIN is an acronym for relevance, embedding, translation, adaptation, immersion, and naturalization (Gunter et al., 2008). The model, based on Keller's (1983) ARCS motivation model, Gagne's (1985) Events of

Instruction, Bloom's (1956) Taxonomy, and additional instructional models, leverages a rubric to assess the game design for educational success (Gunter et al., 2006). This rubric will be used to assess the quality of The Leadership Escape Game's design (See Appendix C).

Using a scale of zero to three, the rubric assesses the game's application of each construct in the RETAIN acronym. For example, if a game were assessed by relevance, Level 0 is scored if there is a lack of interest or connection to learning; Level 1 if there is some educational connection, but learners engage primarily in non-learning ways; Level 2 if learning outcomes are clear and learners are interested; and Level 3 if in addition to the requirements of levels one and two, the world and the necessary development challenges are present (Gunter et al., 2008). Each acronym within the RETAIN model is used to assess a game's design on this 0-3 scale.

Game-Based Learning in Practice

In learning environments, games can reduce stress while also creating an environment of engagement, building on what the learners already know, and providing an opportunity to practice and reflect (Mawhirter & Garofalo, 2016). Siegle (2015) concludes, "Typically, learning involves three separate processes: instruction, practice, and assessment. Games allow these three processes to occur simultaneously under more natural conditions" (p. 193). Games, puzzles, gamification practices, and group-work allow learners to engage in collaboration, planning, and problem-solving and act as antecedents to improved participation, engagement, understanding, and transfer (Ho, 2018; Nicholson, 2015; Wise et al., 2018).

Game-Based Learning Studies

Sung and Hwang (2012) summarized data showing that "educational computer games can enhance the learning motivation and learning performance of students" (p.44). Strickland and Kaylor (2016) studied undergraduate nurse students who noted a 15% increase in assessment

mastery in comparison to cohorts that did not complete the educational game and also noted the qualitative feedback stating that participants enjoyed the game.

Hamari et al. (2016) studied game-based learning environments and concluded that there are mostly positive outcomes using game-based learning, but that there are still limitations to be considered. Jabbar and Felicia (2016) add, "Game design must be accompanied with multiple learning tools and interesting tasks and materials that facilitate and help students to explore and complete gaming and learning activities in accordance with their needs and abilities" (p. 29). In a simulation game for nurses, Mawhirter and Garofalo (2016) found in a study that the assessment data from the participants was low, but the satisfaction and personal assessment of the value of the game ranked in the 90^{th} – 100^{th} percentile. The debate in the use of game-based learning highlights that while a popular approach and some data pointing to effective learning outcomes, there are still challenges with applying game-based learning.

Obstacles for Using Game-Based Learning

Cost is a major factor in the decision to use games for educational purposes. There is still debate on the cost-to-benefit or return on investment, which leads some to conclude that while games are about equal in terms of learning transfer, the primary aversion would be in development costs (Tobias et al., 2014, p. 494). A portion of the cost component is the resource of time. Strickland and Kaylor (2016) assert that educational game design is time-consuming. The authors recommend using resources that are available, instead of recreating what exists, and recommend ample facilitation support.

Skillset is another factor. Abbot (2019) states, "educational game design is complex, resource intensive, and requires multiple interdisciplinary skillsets. Games designed for digital platforms also need significant technical expertise and the resources to support them" (p. 1).

Theodosiou and Karasavvidis (2015) identify a significant challenge between educational endeavors and game design, meaning those who are developing games for educational purposes do not have experience in the principles and mechanics of game design. This challenge predicates the application of the Spiral Educational Game Development and RETAIN models described earlier for this study.

Another challenge is the willingness of adult learners to play. Whitton (2018) identifies the paradigm of play as an innate challenge that could impact the application of game-based learning. This paradigm challenges whether it is considered acceptable to play and can fuel dynamics that prevent an adult from engaging in or taking full advantage of playful learning.

Game-Based Learning and Leadership Training

The application of game-based learning for leadership development is another relevant consideration. Games have been shown to be an effective way to develop leadership characteristics, such as motivation, change management, and communication (Sousa and Rocha, 2019). Henriksen and Børgensen (2016) conducted a study about leadership training games. Using Kirkpatrick-inspired evaluation levels, the researchers concluded that games have a positive impact on leadership training outcomes and create opportunities for ongoing discussion.

One of the primary benefits of using a game to teach leadership skills is an environment that allows participants to practice responses and decision-making, potentially failing, getting feedback, and learning from safely failing in the game environment (de Freitas & Routledge, 2013; Ward et al., 2017). An example of this can be seen in massively multiplayer online role-playing games. A study observed that individuals were applying leadership skills in an online collaborative game and that the application of those leadership skills were linked to not only success within the game, but application of leadership behaviors outside of the game (Lee et al.,

2017). Considering the characteristics that various leadership models highlight, games provide an opportunity for developing leaders to build self-awareness, identify strengths and areas for development, receive feedback, and to do so in an environment that is less stressful than a production or performance context (Adams et al., 2018).

Summary of Game-Based Learning

Tobias et al. (2014) assert that, "Few instructional methods engage similar levels of interest among learners or induce them to persist on tasks for as long as games do" (p. 485). Studies show that educational games are engaging, support retention, and influence attitudes towards learning (Pitt et al., 2015). Game-based learning is connected to motivation, learner engagement, behavior change, and learning achievement (Tsai et al., 2016). Game-based learning is also associated with the psychology of memory connections imprinting on the brain (Pitt et al., 2015). Gallegos et al. (2017) conclude that game-based learning is engaging, enhances learning, and is generally well-received by participants.

Models help to support the design of educational games, as the quality of design is shown to link to learning outcomes (Strickland and Kaylor, 2016; Theodosiou &Karasavvidis, 2015). The Spiral Educational Game Development Model provides a systematic and iterative approach to designing a game-based learning experience and the RETAIN model will guide in assessing the game design (Gunter et al., 2008; Lui & Au, 2018).

Studies show that game-based learning does influence successful outcomes, such as assessment scores and motivation for learning (Strickland and Kaylor; 2016; Sung and Hwang, 2012). There are also potential limitations with applying GBL, such as cost, time, and design skill (Hamari et al., 2016; Mawhirter & Garofalo, 2016).

Escape Room Games

Escape Room Games, an emergent social activity, are inspiring a new approach to game-based learning. Studies show that participants respond positively and express enthusiasm for educational escape room games (Cain, 2019; Friedrich et al., 2018; Styling 2018). To frame the understanding of escape room games, the following section will provide an overview of escape room games, escape games in learning environments, and an overview of designing escape room games.

Escape Room Game Overview

Escape room games engage participants in puzzles and challenges to achieve an overarching objective (Nicholson, 2016b). The objective may simply be to escape the room. More often, games focus on the completion of a central challenge based on the theme of the game. For example, central challenges may be to break out of a prison cell, find the anti-dote for a virus, escape the cabin, or locate a hidden treasure. Over the last 8 years, an evolution in game design has shown that current games leverage more advanced puzzle types, themes with challenges beyond escaping the room, and stronger theatrical environments with set design than the first iteration of escape games (Clare, 2015). Games can be played by solo players or in groups. A survey of escape games showed the average number of players per game is around 4-6 people (Nicholson, 2016b). A primary consideration of group size is the balance of having a game that engages all players in collaboration without being too difficult (Cain, 2019).

History of Escape Room Games

Many articles attribute 2007 as the official year escape games started in Japan (Adams et al., 2018; Borrego et al., 2017; Clarke et al., 2017). One source credits Attila Gyurkovics in Budapest in 2011 as the driving force in escape game popularity when he created an escape room

game franchise (Lama, 2018). Escape rooms are claimed to have come to North America, specifically San Francisco, in 2012 (Gomati, 2017). Since 2012, escape room games have significantly grown in popularity (Nicholson, 2016b; Spira, 2019). Across the world in 2016, there were approximately 5,860 escape games in 98 countries (Lama, 2018). In the United States, the largest growth in escape room games occurred between 2016 and 2019 when the industry grew over 260% from approximately 900 rooms to 2,350 (Spira, 2019).

Escape Room Games in Learning

Escape room games have also emerged in educational environments as a new way to engage learners and to promote critical thinking, collaboration, and problem-solving (Coffman-Wolph, et al., 2017; Veldkamp et al., 2020). Libraries began using escape games to teach students how to use the available library resources, such as online catalogues and visual displays (Reade, 2017). Universities also use escape games in library services and undergraduate classes, such as physics, cryptography, and nursing (Gómez-Urquiza et al., 2019; Ho, 2018; Vörös & Sárközi, 2017). Breakout Edu (n.d.) is an example of a company that has successfully promoted escape game learning environments in schools and libraries. The company markets learner-centric escape rooms as offering an engaging solution that "requires players to use critical thinking, collaboration, creativity, and communication," also known as the 4C's (What is Breakout EDU?). The company also proposes that the construct of the escape room learning environment creates student-centered ownership, opportunities to learn from mistakes, and an instructional strategy that engages social emotional learning in addition to the 4C's described above (BreakoutEDU Supporting the 4C's and SEL).

Businesses primarily use escape room games for team building exercises, but there is a growing interest in expanding the use into training settings (Nicholson, 2016b). The healthcare

industry is beginning to use and publish studies on escape room games in training-related activities, such as in nurse education (Adams et al., 2018). For example, one study created an escape game for nursing students and concluded, through a post-session survey, that escape games were an engaging way to teach and assess competency (Brown et al., 2019). Another study created a patient safety escape game that reported high levels of engagement, team building, and participant request for similar future activities (Styling et al., 2018).

Wu et al. (2018) created an escape game with a focus on healthcare leadership development. Medical students participated in the game to demonstrate the application of the "school's five leadership competencies (leading self, communication and influence, problem-solving, teamwork, systems thinking)" (p. 561). The measurements included a student survey where 92% said it was an excellent experience and 58% of the students self-reported using the leadership competencies.

Sung & Hwang (2013) highlight that collaborative learning promotes engagement and competency development. Escape room games leverage collaboration, teamwork, critical thinking, and communication in order to achieve the outcomes of the room (Nicholson, 2016b; Wiemker et al., 2015). Gomati (2017) proposes that escape rooms foster "team building skills, empathy, and persistence, all of which are skills needed to productively approach challenges in today's world" (p. 12). Research shows that the collaborative nature of gaming influences social skills and the desire to learn (Brown et al., 2019).

Escape Learning Game Studies. Current studies of escape games as learning activities primarily focus on participant satisfaction or reaction to the event (Adams et al., 2018; Friedrich et al., 2018; Gómez-Urquiza, et al., 2019,). For example, Friedrich et al. (2018) analyzed 142 survey responses following an escape game learning activity that focused on communication

skills across healthcare professionals. Results reflected a positive experience and many participants stated that it was “their favorite part of the course” (p. 2). Gomez-Urquiza et al. (2019) conducted an escape room using game-based learning as a theoretical framework and measured participant satisfaction. Results showed that participants enjoyed the activity and predicted that the activity will help them apply what was learned. Eukel et al. (2017) present one of the few escape room studies to measure learning through assessment. Of the students that participated, 81% of the students demonstrated improved performance on the post-assessment. A similar study used a scavenger hunt, which are likened to escape games, and saw a 15% increase in assessment scores between pre-training and post-training tests (Strickland & Kaylor, 2016).

A primary challenge of escape game study is a lack of peer-reviewed literature on the design and evaluation of escape games in a learning environment (Cain, 2019). Most studies leveraging escapes rooms in a learning setting measure the learner satisfaction and very few provide learning acquisition or post-training transfer data (Cain, 2019; Eukel et al., 2017; Friedrich et al., 2018; Wu, et al., 2018).

Hermanns et al (2018) describes escape rooms as a “hands-on, team-based approach to learning” that “requires student engagement in a pre-arranged scenario, promotes communication and collaboration with each other, and utilizes critical thinking to solve a problem” (p. 90). As described earlier, the quality of game design has been linked to the outcomes of game-based learning (Abbott, 2018; Arnab & Clarke, 2017). The design of an educational escape game must then be considered to ensure the game creates an environment that promotes learning.

Escape Room Game Design

Designing an escape room includes various components that build a unique experience. Common themes between general game design and escape room design include the mechanics of

genre, narrative, purpose, and challenges (de Lope & Medina-Medina, 2017; Nicholson, 2016a). In addition to these design components, escape room games often follow a specific series of events to create a complete game experience (Clare, 2015).

Genre describes a combination of the characteristics, setting, and experience that help to classify the game into a specific category (de Lope & Medina-Medina, 2017; Jabbar & Felicia, 2016; Nicholson, 2016a). Genre is sometimes described as the theme of the room and is a key design component to ensure the mechanics of the game match the genre (Nicholson, 2016a).

Storytelling in a learning game provides the context of the game, presents a logical order of activities, establishes important characters, explains how the players fit into the overall story, and creates motivation to engage learners in the progression of the narrative (Bopp, 2007; Nicholson, 2016a). The storyline in a game creates an interactive and empathetic simulation of real life within which the learners can explore ideas, test out solutions, and receive feedback of success or failure, leading to learning and reattempts at solutions (Nicholson, 2018). The feedback can be provided within the narrative for continuity within the game experience (Baron et al., 2016).

de Lope and Medina-Medina (2017) describe a game's purpose in terms of the application area or domain for which the game is trying to provide education. The authors provide examples that application areas could be health, training, research, etc. and that those domains drive the defined purpose of the game. Educational escape games provide examples of game purpose such as teaching patient safety in a healthcare application area or building awareness of library services in an academic setting (Styling, et al., 2018; Wise et al., 2018).

At the heart of escape rooms are the puzzles and challenges that engage participants in an entertaining and immersive experience (Brown et al., 2019 Cain, 2019). Within an escape game,

participants undertake visual puzzles, physical tasks, brainteasers, logic, riddles, searching, and group or individual challenges (Wiemker, et al., 2015).

Puzzles

Wiemker et al (2015) present a framework for puzzles called the puzzle composition. The three stages of the framework are Challenge, Solution, Reward. The challenge is the puzzle or task that needs to be completed. The solution is the answer to that challenge. The reward is what the player receives for completing the challenge. The researcher of this study has adapted this framework to CAR: Challenge, Action, Reward because a challenge may require multiple actions that lead to completion, but only produce one reward. The combination of individual puzzles and puzzle path organization are often framed within a larger meta-puzzle. The meta-puzzle is the overarching challenge, purpose, or objective that is presented to the players over the course of the game (Wiemker et al, 2016).

To create the overall game structure, the CAR: Challenge Action Reward puzzle framework is multiplied to create a map of the entire game experience within the context of the narrative and the genre. The design of this experience can be described as puzzle paths, which are open, linear/sequential, or path-based/multi-linear paths (Nicholson, 2016; Pan et al., 2017, Wiemker et al., 2015).

Open Path. A game design based on an open path presents many puzzle options that can be completed in any sequence, which allows a high level of choice and a lower level of direction for the players (Nicholson, 2016; Wiemker et al., 2015). Having an open puzzle path allows multiple players in the room to work on different puzzles at the same time, which helps prevent players from having to wait for others to complete a puzzle before being able to participate (Pan et al., 2017).

Linear Path. Linear paths, also known as sequential paths, require players to follow a specific sequence, where one presented puzzle must be completed before progressing to the next only available puzzle. (Nicholson, 2016, Wiemker et al., 2015). Linear paths are easier to design and to play but can create downtime or bottlenecks in gameplay if only a few team members can work on the puzzle before being able to progress in the game (Wiemker et al., 2015). Multiple studies of escape games in learning environments recommend a linear or sequential path to minimize design concerns and to more closely monitor the progress and content exposure of learners (Cain, 2019; Connelly et al., 2018; Wise et al., 2018).

Multi-Linear Path. Multi-linear, also referred to as path-based, is the most commonly used puzzle path in social escape games. In this path, designers use a combination of open and linear paths to create the larger organization of the game (Wiemker et al, 2015). This design creates a series of challenges that eventually reach a common puzzle, known as a meta puzzle (Nicholson 2016b; Pan et al., 2017).

Considerations in Escape Room Game Design

As discussed above, an escape game consists of puzzles that follow a Challenge, Action, Reward framework, which are put together into a puzzle path. The collection of puzzle paths support the meta-puzzle and create the overarching structure and purpose of the game. Zooming out even further, there is a larger structure that guides the overall game experience and is a necessary component of escape game design consideration. The larger structure consists of the game flow, game roles, and player support.

Game Flow. The game flow includes a pre-game experience, the game activity, and a post-game debrief (Clare, 2015; Wiemker et al., 2015).

Pre-Game Experience. The pre-game experience begins the moment players enter the space where the game is being hosted, which could be the front door of a physical escape room company, the classroom, or the online gathering area (Nicholson, 2016b). During this time, the players are interacting with the hosts of the game and becoming accustomed to the environment (Clare, 2015). The primary goals of the pre-game experience are to prepare the players for the game, to explain the rules, and to answer player questions before they begin.

Escape Game Activity. As described in the above sections, the game consists of puzzles designed in a series of puzzle paths to lead the players towards the meta-puzzles or the overarching objective of the game (Nicholson, 2016b, Wiemker et al, 2015).

Debrief. In a 2015 survey of escape game facilities, 73% conducted a debriefing activity following the game (Nicholson, 2015). This is an exciting moment in the game experience where the players are exiting the game with a post competitive adrenaline rush and often there is a desire to discuss what went well and what did not (Clare, 2015). This practice is mirrored in escape game learning sessions. Studies demonstrate the value of debrief following learning simulations and conclude it is a critical activity to support learning transfer from an educational escape game (Fanning & Gaba, 2017; Nicholson, 2015; Wiemker et al., 2015).

Game Roles. To accomplish the above-described game experience, there are specific roles that each offer distinct contributions to the escape game industry and application in a learning setting. The roles include owners, designers, game masters, and players. Sometimes the first three roles overlap and can be carried out by the same individual within an escape game business.

Owners. Escape room owners are the business managers of escape game facilities and focus on logistics, scheduling, marketing, and general operations (Clare 2015; Nicholson, 2016b).

Designers. A designer is the creator of a game and aims to create a meaningful, fun experience while also achieving the desired game outcomes (Wiemker et al., 2015).

Game Masters. The game master (GM) leads the players through the escape game experience from beginning to end. During pre-game, the game master explains the rules and sets the stage for the theme and objectives of the game (Wiemker et al, 2015). During the game activity, the GM monitors the game, whether in the room or watching remotely to ensure the safety of players and to provide hints as needed (Nicholson, 2016b). The GM also hosts the debriefing discussion with players at the end of the game, win or lose.

Players. Players participate in the game by completing the challenges and attempting to achieve the overarching objective of the game. For educational games, players are also referred to as learners, as the intent of the game is to guide the learners towards new knowledge or skill acquisition (Brown et al., 2019; Clarke et al., 2017).

Player Support. Each of these roles play a part in helping the players successfully complete an escape game. Wiemker et al. (2015) highlight skills required from players to be successful in an escape game, such as observation, memorization, math, pattern recognition, correlation, and searching. However, in a challenging game with a sense of urgency due to time constraints and possible lack of experience with this type of game, players may need support to accomplish the overarching objective. Player support can be seen in escape games through the pre-game setup and an in-game hint system.

Pre-Game Setup. During the pre-game discussed earlier, game masters provide the rules and the objectives for completing the game (Clare, 2015). Escape games are a unique experience and bring in many first-time players as they grow in popularity. In a learning escape game study, the researchers discovered that only 20% of the participants had participated in an escape room game prior to the event (Adams et al., 2018). To prepare players for the experience and to ensure they understand the objectives of the game, the game master will provide the pre-game explanation and, if there are new players, will provide an example of how the challenges may work, such as demonstrating a sample lock puzzle (Clare, 2015).

Hints. Games often include a hint system that allows players to ask for help if they get stuck in the game (Nicholson, 2015). In escape game learning studies, the number of hints ranged from one to three hints, but in some instances additional hints would be made available if required (Brown et al., 2019; Cain, 2019; Hermanns et al., 2018). Hint delivery can occur through various methods, such as in-game monitors, intercoms, or notes, depending on the setting, theme, and capabilities of the game space (Wiemker et al., 2015).

The escapEd Framework

In addition to the instructional design and game design models, this study used the escapEd Framework proposed by Clarke et al. (2017) as a guide for designing an educational escape game (Dick et al., 2010; Gunter et al., 2008; Lui & Au, 2018). The framework is divided into 6 components: participants, objectives, theme, puzzles, equipment, and evaluation (See Figure 2.1).

Figure 2.1.

The escapEd Framework

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Participants and Objectives. The Participants component involves an audience analysis to understand the needs of learners, an appropriate length of game time, the difficulty level necessary to challenge and teach, the mode, competitive or collaborative, defining how the players will engage with the game, and the number of players in each game (Clarke et al., 2017). The Objectives component considers the desired outcomes, the scope of the content disciplines, and the development of soft skills or problem-solving skills (Clarke et al.). These two stages of the escapEd framework align with the analysis steps found in instructional design (Aldoobie, 2015).

Theme and Puzzles. The next two components of the escapEd framework align to the design of escape games (Nicholson, 2016; Wiemker et al., 2015). The Theme component uses the defined objectives to determine if the game is an escape or resolution of a mystery, to define a narrative to advance the game, and to determine if the game is played as a standalone game or if it is part of series of games (Clarke et al., 2017). The Puzzle design considers the challenge,

action, reward puzzle framework, the overall puzzle path, the alignment of the learning objectives to the theme and desired outcomes, the delivery of hints, and definition of clear game rules (Clare, 2015; Nicholson, 2016; Wiemker et al, 2015).

Equipment and Evaluation. The final two components of the escapEd framework cover logistics with designing a room. Equipment focuses on the design and space of the location, the props required for the game, both physical and technical, and the determination if actors as non-playing characters is necessary. Evaluation includes prototype testing prior to game implementation, post-game debrief design, and documentation of requirements to reset the game for each group of participants (Clarke et al., 2017). The evaluation component also aligns with instructional design practices to collect formative and summative data about learning outcomes and to adjust as needed (Aldoobie, 2015).

Escape Room Games Summary

Escape rooms games are currently being used in learning settings. Studies show that participants respond positively to this type of educational game (Friedrich et al., 2018). Using puzzles and challenges, escape games engage players in critical thinking, problem-solving, and collaboration (Coffman-Wolph et al., 2017; Nicholson, 2016). A gap in the current literature is a lack of peer-reviewed, empirical data related to educational escape games beyond participant satisfaction (Cain, 2019). As the quality of game design is a pre-requisite for effective learning outcomes, the design components of both game-based learning and educational escape games should be considered (Abbott, 208; Arnab & Clarke, 2017). This study used the escapEd framework to support the educational escape game design (Clarke et al., 2017).

Literature Review Summary

This chapter reflected on foundational constructs for this study. The literature established the effectiveness and design aspects of leadership training and leadership games (Henriksen and Børgesen, 2016; Lacarenza et al., 2017; Olatunji, et al., 2017). SLII® is a model widely trained to develop leaders with the skills to create goals, identify developmental needs, identify a leadership style, and then apply the style most appropriate to support team performance (Henkel & Bourdeau, 2018; Kuchynková, 2016). Leadership Style Effectiveness and Flexibility are two measurable constructs within the SLII® model that serve as variables for this study (Blanchard et al, 2013). To frame the SLII® model into a leadership training activity, the study used game-based learning for a theoretical framework. Games in learning environments have been shown to engage learners in adult learning practices, such as collaboration, planning, and problem-solving, and act as antecedents to improved participation, engagement, understanding, and transfer (Ho, 2018; Knowles, 1980; Nicholson, 2015; Wise et al., 2018). Connecting the above discussed topics into one application, this study used a digital escape room game to deliver leadership training on the SLII® model in a game-based learning framework. The next chapter will review the methodology used to organize the study and to design The Leadership Escape Game.

Chapter 3

Research Methodology

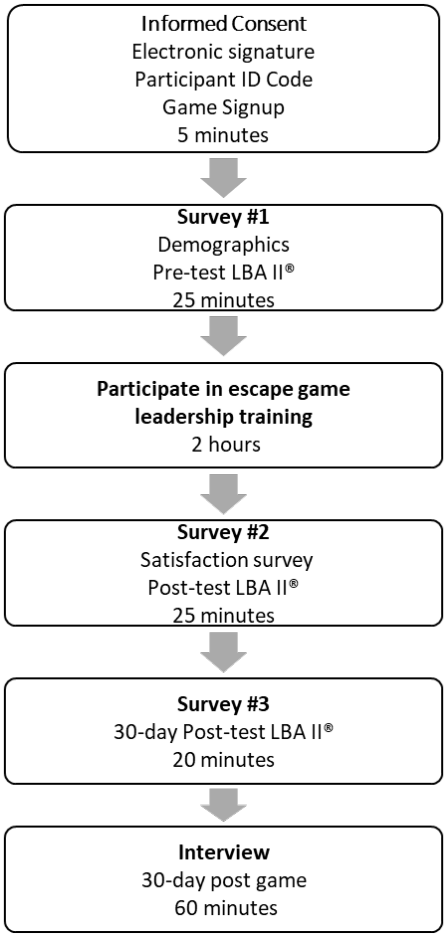
The Leadership Escape Game, developed for this study, delivered SLII® leadership training through a digital escape room game experience. The purpose of this study was to determine if digital escape room games are an effective method for delivering leadership training. Data from this study intended to explore two outcomes: 1) to build on existing literature that highlights participant satisfaction with educational escape games and 2) to contribute data that demonstrates learning acquisition and behavior change following The Leadership Escape Game. This chapter discusses the methodology guiding this study to determine the effectiveness of using a digital escape room game to deliver leadership training.

Research Method and Design Appropriateness

This study employed an explanatory sequential mixed methods research design, focusing first on quantitative data, followed by qualitative data (Creswell, 2014). Using a longitudinal cohort study design, participants were invited to complete multiple activities over a 30 to 60-day participation timeline (Pajo, 2018). After completing the informed consent, study activities included a pre-game assessment, The Leadership Escape Game, a post-game learner satisfaction survey, a post-game assessment, a 30-day post-game assessment, and an interview at least 30 days after the game (See Figure 3.1). Data was collected during each of these activities to address the study's primary and secondary research questions.

Figure 3.1

Longitudinal Cohort Study Activities



Rationale

Current studies on the use of educational escape games have focused primarily on learner satisfaction and conclude that participants enjoy this type of learning experience (Adams et al., 2018; Friedrich et al., 2018; Gómez-Urquiza, et al., 2019). There is minimal literature on the effectiveness of escape room games in terms of measuring learning acquisition and behavior change (Cain, 2019; Eukel et al., 2017; Friedrich et al., 2018; Wu et al., 2018). To contribute to the literature and to address this gap, this study collected post-game learner satisfaction data, learning acquisition data using a series of assessments, and determined the impact to behavior

change through interviews at least 30-days following the game (Kirkpatrick & Kirkpatrick, 2016). The mixed methods research design facilitated the quantitative and qualitative analysis of learner satisfaction, learning acquisition, and behavior change.

Operationalization of Variables

The Leadership Escape Game developed for this study was a digital learning activity that taught the SLII® leadership model. The effectiveness of this digital escape room game to deliver leadership training was measured using Kirkpatrick's New World Evaluation Model as the evaluation framework (Kirkpatrick & Kirkpatrick, 2016). A post-game survey collected learner satisfaction data from participants. To measure learning acquisition, participants completed pre-game and post-game assessments. The study also employed interviews to determine the impact of The Leadership Escape Game on the application of model.

Learner Satisfaction

Many studies using educational escapes room games measure learner satisfaction through post-game surveys. Results show that participants enjoy escape room games as a learning activity (Cain, 2019; Friedrich et al., 2018; Wu, et al., 2018). This study provided additional data by leveraging a Level 1 learner satisfaction survey to gauge the reaction and perceived value of an escape room game as a leadership training activity (Kirkpatrick & Kirkpatrick, 2016). The learner satisfaction survey questions were based on previous escape room game studies and adapted to align with the scope of this study. The first two statements within the survey asked for a yes or no response about previous experience with escape rooms or situational leadership. The remainder of the survey used a Likert scale of one to five (Strongly Disagree to Strongly Agree, respectively) to measure satisfaction with The Leadership Escape Game on specific aspects of the game experience (See Appendix D). The survey was piloted and evaluated for content

validity. Additional information about the pilot and validity can be found in the Pilot Study section. It was anticipated that participants would rate The Leadership Escape Game as a positive and valuable learning experience.

Learning Acquisition

Learning acquisition was measured using the Leadership Style Flexibility and Leadership Style Effectiveness scores calculated by the SLII® Leader Behavior Analysis II® (Blanchard et al., 2013; Kirkpatrick & Kirkpatrick, 2016). The Leadership Behavior Analysis II® (LBAII®) presented 20 scenario-based multiple-choice questions and asked participants to select the most appropriate leadership actions. The results translated into Leadership Style Flexibility and Leadership Style Effectiveness scores. These scores demonstrated understanding the model and were used to compare participant knowledge before and after playing The Leadership Escape Game.

Leadership Style Flexibility "is a measure of the degree to which the four styles are selected with equal frequency" (Zigarmi et al., 1991, para 4). This was measured by identifying which leadership styles were selected for each scenario and determining if all four leadership styles were used equally or if the participant relied on one or two styles more heavily. When a participant chooses one or two styles predominantly, they are considered less flexible in their leadership style than one who leverages all styles equally (Dunnagan, 2014).

Leadership Style Effectiveness measures the participant's accuracy in choosing a leadership style that is most appropriate to the presented scenario (Blanchard et al, 1993). Zigarmi et al. (1991) propose this score is the most important of the two. The Leadership Style Effectiveness score determined if the participant's answer was an excellent, good, fair or poor

response to the presented scenario and in summation calculated an effectiveness score (Blanchard et al, 2013).

Participants completed the LBA II® assessment prior to playing The Leadership Escape Game (Survey #1 pre-test), immediately following the game (Survey #2 post-test), and 30-days following the game (Survey #3 30-day post-test) as data points to measure learning acquisition (Kirkpatrick & Kirkpatrick, 2016). It was anticipated that participants would demonstrate a positive change in Leadership Style Flexibility and Leadership Style Effectiveness as a result of playing The Leadership Escape Game (Pomerantz, 1992).

Behavior Change

Participants were also invited to discuss their experience and the impact of The Leadership Escape Game in an interview at least 30 days following the game. The primary goals for the interview were to determine if the participants applied the leadership training within their professional contexts and to determine the long-term transfer of learning into practice. The interviews also provided qualitative phenomenological data to triangulate the quantitative data expressed in the satisfaction survey and learner assessments (Creswell, 2014; Kirkpatrick & Kirkpatrick, 2016). This practice of post-event interviewing has also been applied in other escape game studies, primarily to understand participant reactions to a game (Senturk, 2018).

Escape Room Game Design

The researcher employed multiple models for the overall instruction and game design, escape game specific design, and a rubric for evaluating the game as a quality learning activity. Following a review of these models, this section discusses the tools and escape game mechanics used to develop the game for this study.

Instructional and Game Design Models

The quality of game-based learning design has a strong relationship to producing expected learning outcomes (Abbott, 2018; Arnab & Clarke, 2017). This study took extensive measures to create a learning activity that aligns to instructional design, educational game, and escape room design standards using four models found in the literature.

Dick and Carey Systems Approach Model: Instructional Design. The Systems Approach Model proposed by Dick and Carey is one of the most influential models within the instructional design field (Kusrini, 2018). The model provides a procedural approach, based on constructivist methods, to create learning events (Dick et al., 2010). The model begins with considering instructional goals as an analysis of the learners' and instructional needs. Then it moves into design and development phases by defining objectives, developing assessments, defining the strategies, and eventually developing the materials. Evaluation is also a key component to the model with both formative and summative evaluation activities.

For this study, the researcher used the Dick and Carey Systems Approach Model to create a foundational analysis and design for the escape room game learning outcomes. The analysis and design resulted in defined learning objectives, a work breakdown structure to map out the procedures within the SLII® model, a description of the target audience, an outline for the instructional strategy, and confirmation that the evaluation methods for the research study aligned to instructional design practices.

Spiral Educational Game Development Model. The Spiral Educational Game Development Model proposed by Lui and Au (2018) was used to bridge from instructional design practices to educational game development (See Appendix B). First, using the learning objectives from the instructional design model described above, the Spiral Educational Game

Model guided the design process to identify the game needs, which in combination with the Comprehensive Serious Game Taxonomy, helped to identify genre, narrative, interactivity, context, assessment, game play, interaction, and license components (de Lope & Medina-Medina et al., 2017). The next steps included conceptual design and game design. The model also prescribed prototyping the game and collecting feedback to make formative adjustments before implementing the game to the target audience, which also aligns to the Systems Approach procedures (Dick et al., 2010; Lui & Au, 2018). To prototype the game, a small group of people leaders and subject matter experts were invited to play the game and provide feedback. These practices allowed for the prototype testing of the game in order to make adjustments and ensure alignment to learning outcomes.

escapED Framework. The escapED Framework provides guidelines for designing an educational escape room game (Clarke et al., 2017). The framework consists of six components that address analysis, design, and evaluation practices. For this dissertation, the escapED framework was used to compare the instructional design and the game design details from the previous models against a model specifically for educational escape games. The framework considered design factors unique to escape games, such as puzzle design, hint systems, theme, and participant considerations related to the game.

The RETAIN Model. The fourth model used for this study was the RETAIN model (See Appendix C). As described earlier, quality design is an antecedent to learning outcomes, thus requiring a method for evaluating a game's design. RETAIN is an acronym for relevance, embedding, translation, adaptation, immersion, and naturalization (Gunter et al., 2008). The Leadership Escape Game for this study was measured against this rubric by the researcher, an escape game designer, an SLII® subject matter expert, a people leader, and the dissertation

committee to ensure that game design rated well against the RETAIN model and did not pose a negative impact the study's implementation. Further details and results of the game's pilot study against the RETAIN model are available in the below Pilot Study section.

Escape Game Development

The following section documents the considerations and overall escape game development steps. To do so, the following will review tools, the game flow, and the game blueprint.

Development Tools. The researcher used Articulate Storyline 360 to build the escape game for this study. Videos for the game were also developed in 360 with audio recorded and edited in Audacity. The surveys were developed in Qualtrics and provided to the participants through hyperlinks.

Game Flow. A general game flow of an escape game includes a pre-game experience, the game activity, and a post-game debrief (Clare, 2015; Wiemker et al., 2015). The following description of these game flow components also includes evaluation components, as they collectively made up the participant experience.

Pre-game Experience. Following the invitation and informed consent, the pre-game assessment was sent to participants. It was communicated that the assessment was a pre-requisite to playing the game. Participants who showed up to the game without having completed the pre-game assessment were rescheduled for another game session. Participants were asked to sign up for a game time on SignUpGenius.com to limit capacity to six participants per game.

At the scheduled game time, participants were greeted by the Game Master and checked in for attendance and confirmation of pre-game assessment completion as they entered the online Zoom game. The Game Master followed a scripted orientation to the game to ensure that all

participants were aware of the tools available to them. The Game Master allowed participants to have their cameras on for the purposes of collaboration and communication, though it was not required.

The Game Master provided an orientation to the game, which included information about the game's focus on the SLII® model, the narrative to set the game's context, the hint system, tips on how engage as a team within the game, and a reminder that the game would be recorded, but will only be viewable by the researcher. The game's narrative context established that the participants were attending an SLII® workshop, but the facilitator had not yet arrived. It also established that the Game Master was present as a training coordinator, but could not teach the content. This opening was followed by an introduction video that explained the game mechanics and the importance of the team collaborating and progressing through the game together. Following the Game Master's orientation to the experience, the participants were given an opportunity to ask questions. Before beginning the actual SLII® training game, the participants played through a tutorial to understand the navigation and game mechanics, such as clicking on objects to find clues or how to submit answers.

Game Activity. Participants were then provided access to The Leadership Escape Game. The Game Master observed the progress of the participants and took notes on the length of time it took to complete each section. Structured hints were provided by the Game Master when requested by the participants. Further explanation of the entire game is described below in the Game Blueprint section.

Post-game Debrief. Following the game, the Game Master asked participants to complete the Survey #2, which included the learner satisfaction survey and post-game assessment. The participants remained in the online Zoom environment, but were instructed to take Survey #2

individually with no collaboration. To show completion, participants notified the Game Master and were free to exit the room. Before exiting the game, the Game Master communicated that the study will reach out again in 30 days for Survey#3. The Survey #3 30-day post-test is not specifically related to game flow and is therefore described in further detail in later sections of this chapter.

Game Blueprint. The following section provides a walkthrough of the game experience.

The game was divided into three parts to align to the three skills of a situational leader (The Ken Blanchard Companies, 2013). At the beginning of part one, participants were looking at a conference room as though standing inside the door. From left to right they could see a whiteboard, a navigation marker (GPS pin), a table with file folders, and three flip charts on the wall, each labeled with a number from one to three. If the participants clicked on the navigation marker, they would see another perspective of the room as if standing at that marker and looking back where they originally stood. From this view participants can still see the flip charts, table with files, and white board, but are also shown a computer, cabinet, and picture with an SLII® graphic.

Part one focused on the first skill of situational leadership, which is goal setting. After exploring the room, participants found a set of files on the table that spelled out SMART goals and what each letter of the acronym means: Specific, Motivating, Attainable, Relevant, Trackable (The Ken Blanchard Companies, 2013). During exploration of the room, they would have found a flip chart labeled with a number one. With the file folders in their inventory, they are asked to rearrange letters in an anagram puzzle to spell out SMART. Next, participants completed an acrostic puzzle. The SMART acronym was spelled down the left side of the screen with dashes to represent each letter of the corresponding words. Under the dashes, numbers one

through nine were scattered across the words to correspond to letters. Participants were challenged to locate the corresponding letter. For example, the number five was underneath the first dash of S (Specific), therefore number five is the letter 'S'. After finding all the letters, they aligned to numbers across the top of the page that, after finishing the puzzle, spelled out 'Goal Setting' as the first skill of situational leadership.

After completing these puzzles, participants received an item that matched the portfolio images on the whiteboard. The whiteboard served as the metapuzzle across the entire game. There were four portfolios on the board and as participants completed each part, they would come back to this puzzle for learning application. For part one, participants were introduced to the four portfolio characters, Eleanor, Casey, Shirley, and Tom. Participants then had to apply the first skill of situational leadership by creating goals for each participant based on provided scenarios. After creating SMART goals for each character, a cut scene showed that the picture on the wall opened up. They were then able to collect a key and answer a ringing cell phone. This ended part one of the game. Participants notified the Game Master, which prompted a video debriefing of what they learned about creating SMART goals. The Game Master then sent a link for part two of the game.

Part two focused on the second skill of situational leadership, which was diagnosing the development level (The Ken Blanchard Companies, 2013). Participants picked up in the conference room where they left off. They were positioned in the opposite corner of the room than most of part one and were looking at the picture, cabinet, and computer. In the Discoverable Items (inventory) menu, the participants had the key from part one. This was used to open a cabinet where they received information relevant to diagnosing a development level and also collected puzzle pieces. The image of the puzzles matched the image on flip chart two, which led

them to click on the flip chart. This challenge involved a jigsaw puzzle that, when completed, explained each of the four development levels and additional information about how to identify an individual's development level related to a task. When completed, the computer in the room turned on. Participants clicked onto the computer and were transported into a computer mini game called Diagnose This! In the mini game, there were four characters: Wes, Jen, Elijah, and Karen. Using a map with different work settings, participants clicked on each location and worked through a series of questions. Participants were reminded of what they learned in part one by selecting a SMART goal. Next, they began learning the second skill of diagnosing by identifying the levels of competence and commitment for that individual in relation to the task. The third question focused on the needs of the individual and the fourth question ended with the development level code, D1, D2, D3, or D4 (Blanchard, 2010). These questions were completed for each of the four characters on the map. To ensure this still followed an escape game and puzzle mechanic, for each correct answer they received portions of what eventually were four triangles, each facing a different direction and were a different color. These rewards were used in the next puzzle to unlock the printer. After successfully unlocking the printer by selecting the correct triangle combination, it printed out portfolio pages to hint towards the whiteboard metapuzzle. On the whiteboard metapuzzle, the part one puzzles reflected that they were solved. Participants clicked on the second level of puzzles and had to apply the second skill of situational leadership. Using the same scenarios and the created goals from part one, participants selected the correct development level as well as the descriptor. For example, Eleanor was a D3 which meant she was a Capable, but Cautious Contributor. After selecting the development levels for all four characters in the metapuzzle, a cut scene focused in on the projector, which prompted a debrief video and concluded part two.

Part three focused on the final skill of situational leadership of matching the leadership style to the development level (The Ken Blanchard Companies, 2013). The section started out with a zoomed in view of the projector, as though the debrief video just ended, with four colored lines popping out of the projector screen. The view zoomed out and the lines continued to squiggle across the room until eventually pointing to a trap door that appeared in the floor. When participants clicked on the door, they saw a ladder and then were transported to an outside meadow. In this new environment, the whiteboard and three flip charts were still present in the foreground, posted on stands instead of walls. In the background, the participants were able to click on a mountain, an archery target, and a tree with a kite. The mountain provided a clue that showed "D = S" linking the development levels to what would soon be revealed as leadership styles. The archery target allowed participants to shoot two arrows that eventually revealed the supportive and directive leadership behavior language that supported the third skill (Blanchard, 2010). They also received a clue with a green check mark and the number 3. The tree and kite showed the four quadrants of the SLII® model with only the numeric labels of one through four. This also produced a clue with a green check mark and the number 8. After exploring these new elements, participants navigated to the third flip chart. On the flip chart, they could see the two arrows they collected in the archery target and the four quadrants from the tree kite with the found clue numbers of three and eight. They then had to complete a challenge that had them match development level descriptors to the corresponding leadership style. Throughout the game, as participants completed puzzles, they were also building a Participant Guide. The Participant Guide ensured that players did not need to use outside knowledge to correctly answer challenges, like the corresponding leadership style. After this challenge, the flip chart provided a third clue number 5. Upon exiting the flip chart, a treasure chest appeared from the ground with a

combination lock. Using the 3-8-5 combination, they were able to unlock the treasure chest and a cut scene showed them zooming to look into the chest. In addition to treasure, the participants were presented with two challenges. The first challenge had them use what they learned in part two. There were four characters listed with a brief description of the competence and commitment towards a task. The participant had to match the development level to that scenario. The second challenge then required matching the leadership style to the development level to reinforce what was previously learned. Upon completing these treasure chest challenges, the participants closed the chest and were back at the meadow scene. They can see that they have collected some treasure and also the portfolio images they collected in parts one and two, indicating the next step is the whiteboard metapuzzle. In this final challenge, participants needed to revisit the four portfolios and match the appropriate leadership style. In addition, the participants had to select the most appropriate leadership actions that they would take to apply the leadership style. This final application question was used to close out the logical progression of goal setting, diagnosing the development level, matching the leadership style, and then selecting the best leadership behaviors, which was used when answering the LBAII ® scenario questions. After completing this final metapuzzle, the participants were greeted with the message that they have completed The Leadership Escape Game. A final video briefly summed up the overall workshop highlights.

Research Questions and Hypotheses

The primary research question for this study asked: How effective are escape room games as a leadership training activity? This research question was supported by three secondary research questions (See Figure 3.2). The intention of this study was to determine the

effectiveness of delivering leadership training in a digital escape room game through learner satisfaction, learning acquisition, and behavior application data.

Figure 3.2

Primary and Secondary Research Questions

Primary Research Question

How effective are escape room games as a leadership training activity?

Secondary Research Questions

Q1. How satisfied are learners with the escape room game leadership training activity?
Q2. How does the use of escape room games improve Leadership Style Flexibility?
Q3. How does the use of escape room games improve Leadership Style Effectiveness?

The research questions were investigated using the following hypotheses:

Secondary Research Question 1: How satisfied are learners with the escape room game leadership training activity?

- **H_1:** The use of an escape game for leadership training does not result in statistically significant positive learner satisfaction survey scores.
- **H_2:** There is no statistically significant difference in the average learner satisfaction survey scores from participants with and without prior escape room experience.
- **H_3:** There is no statistically significant difference in the average learner satisfaction survey scores from participants with and without prior training in situational leadership.

Secondary Research Question 2: How does the use of escape room games improve Leadership Style Flexibility?

- **H_1:** There is no statistically significant difference in participant Leadership Style Flexibility between pre-game, post-game and 30-day post-game assessments following an escape room leadership training.

Secondary Research Question 3: How does the use of escape room games improve Leadership Style Effectiveness?

- **H_1:** There is no statistically significant difference in participant Leadership Style Effectiveness between pre-game, post-game and 30-day post-game assessments following an escape room leadership training.

From these hypotheses, the study seeks to draw conclusions about the efficacy of a digital escape room game as a way to facilitate a leadership training activity.

Population and Sample

The target population for this study focused on people leaders. People leaders, for the purposes of this study, were defined as individuals who coordinate, direct, influence, and build professional relationships with employees who directly report to the leader to achieve organizational and mutual goals (Fielder, 1967; Raffo & Clark, 2018; Stogdill, 1950).

The sample of this population for this study targeted people leaders, with no exclusions related to industry or years of experience. It was assumed that most of the participants had heard of situational leadership as a general leadership concept but have not had formal training in the model. The sample size for this study was determined using the G*Power statistical tool. To calculate the total sample size using an ANOVA statistical test, G*Power requires effect size, power, and number of groups. Studies that have leveraged the Leader Behavior Analysis II often leverage a medium effect size and a power of .8 (Burch, 2011; Dunnagan, 2014; Vartanian, 2006). Medium effect size presents in literature either at a .3 or .5 (Cohen, 1992; Cunningham& McCrum-Gardner, 2007; Rice & Harris, 2005). In alignment with the above considerations, with a medium effect size of .25, and a power of .8. The sample size calculation equated to 64 participants. A minimum requirement of at least 30 participants completing The Leadership

Escape Game and the Survey #2 post-test was determined as the base threshold for quantitative analysis in the event that 64 participants were not recruited (Sekaran, 2003). An additional component of the study included the qualitative interviews at the 30-day interval following the training session. The target sample size for the interviews consisted of 10 participants who completed at least Survey #1, Survey #2, and completed the Leadership Escape Game. (Mason, 2010).

Informed Consent and Confidentiality

In accordance with the Franklin University Institutional Review Board, this study followed consent and confidentiality practices to ensure the safety and privacy of participants. At the time of invitation, participants received an Informed Consent document that stated the purpose, participation components, potential risks, rights, and confidentiality practices. When the participants accessed the pre-assessment, the first action was to review and electronically sign the consent form. Also, during this initial interaction with the study, participants created a Participant Identification Code. Further details of this code can be found below in the recruitment section of this chapter. The participants used the identification code at each data collection point and during the game to promote privacy and confidentiality during the study.

Instrumentation

Instrumentation for this study was identified based on the level of evaluation (Kirkpatrick & Kirkpatrick, 2016). The tools are described below, organized by the evaluation level.

Level one learner satisfaction data was collected immediately following The Leadership Escape Game to determine the participants' level of satisfaction with the experience (Kirkpatrick & Kirkpatrick, 2016). The survey was created based on previous escape game learning survey studies (Adams et al., 2018; Caldas et al., 2019; Clauson et al., 2019; Eukel et al., 2017; Gómez-

Urquiza et al., 2019). The survey consisted of two questions to determine if participants had previous experience with escape games or situational leadership content prior to playing The Leadership Escape Game. The remainder of the survey included 12 statements that the participants rated using a five-point Likert scale. The scale ranged from Strongly Disagree (1) to Strongly Agree (5) ratings for each of the statements. The survey questions can be viewed in Appendix D. The satisfaction survey was distributed to the learners as part of the game experience using a Qualtrics survey link.

Level two learning acquisition data was collected using the Leader Behavior Analysis II® at three milestones to measure a change in knowledge over time. The assessments were provided to participants prior to The Leadership Escape Game session, immediately following the game, and 30-days after the game. Assessment questions within in the LBA II® provided a scenario with multiple-choice answer options. The answers from the survey calculated the Leadership Style Effectiveness and Leadership Style Flexibility scores based on the LBA II® scoring rubric. Permissions to use the LBA II® Self-Questionnaire and Self-Scoring rubric were provided by the Ken Blanchard organization (See Appendix A). The assessment data was collected using a Qualtrics survey.

Level three behavior data employed qualitative measures to interview the participants. The primary goals for the interview were to determine the extent to which participants applied the content from the leadership training and to triangulate the data of satisfaction, learning, and behavior change to draw stronger conclusions about the impact of an escape game as a leadership training activity. To ensure reliability of the interview, the study utilized an interview protocol (See Appendix E). The interviews were recorded in Zoom and transcribed. The initial transcriptions were provided by the Zoom's transcription tool and then audited and edited for

accuracy through multiple screenings and corrections. The transcripts were coded and analyzed using Atlast.ti 8. The interview protocol questions were developed based on previous escape game and leadership training interviews and aligned to the operational variables for this study (Creswell, 2014; Pereira, 2017; Senturk, 2018; Zhang et al., 2018)

Pilot Study

Pilot testing was conducted to validate the post-game learner satisfaction survey and the quality of game design. Pilot participants included an SLII® subject matter expert, an escape room game designer, people leaders, and academic leaders within instructional design and methodology fields. For the pilot, participants played all or portions of The Leadership Escape Game, completed feedback on the learner satisfaction survey validity, and evaluated the design of the game. The validity of the survey was determined using Lawshe's (1975) Content Validity Ratio. Further description of this evaluation is included in the Validity and Reliability section.

The design of the educational escape game was evaluated using the RETAIN game design rubric. Using a scale of zero to three, the rubric assessed the game's application of each construct in the RETAIN acronym (Relevance, Embedding, Transfer, Adaptation, Immersion, Naturalization). For example, when assessing relevance, Level 0 is scored if there is a lack of interest or connection to learning; Level 1 if there is some educational connection, but learners engage primarily in non-learning ways; Level 2 if learning outcomes are clear and learners are interested; and Level 3 if in addition to the requirements of levels one and two, the world and the necessary development challenges are present (Gunter et al., 2008). Each acronym within the RETAIN model was used to assess the game's design on this 0-3 scale. The individual ratings and averages can be found in Table 3.1. Based on this assessment, the game was determined to be an effective educational game.

Table 3.1

RETAIN Rubric Results (Scale: 0 to 3)

RETAIN	SME 1	SME 2	SME 3	SME 4	SME 5	Average
Relevance	2	3	3	2	3	2.6
Embedding	2	2.5	2	2	3	2.3
Transfer	2.2	3	2	2	3	2.44
Adaptation	2.8	2	3	1	3	2.36
Immersion	1.7	3	3	1	3	2.34
Naturalization	2	2.9	2	2	3	2.38

Validity and Reliability

Both quantitative and qualitative factors were considered to ensure reliability, validity, and credibility for this study. The three components of the study that were reviewed for appropriate levels of reliability and validity include the level one quantitative learner satisfaction survey, the level two quantitative LBA II® assessment, and the level three qualitative interviews.

Learner Satisfaction Survey

Post-session learner satisfaction was measured with a survey immediately following The Leadership Escape Game. The internal reliability of the survey was determined through a Cronbach alpha conducted on the data retrieved during the study's data collection ($\alpha = .767$). The validity of the survey was determined using Lawshe's (1975) Content Validity Ratio. A panel of reviewers judged the content of the survey against the expected outcomes from the training session to determine if the question were essential to be included in the survey. On a CVR scale of -1 (not essential) to 1 (essential), the survey was judged by 5 reviewers, requiring a CVR score of at least .99 (Ayre & Scally, 2014; Lawshe, 1975). The content validity of the

survey returned a CVR of 1. All reviewers determined the questions within the learner satisfaction survey were essential components of the study.

Learner Assessment with the LBA II®

The Leadership Behavior Analysis II (LBA II) ® tool was used to measure learning acquisition through the Survey #1 pre-test, Survey #2 post-test, and Survey #3 30-day post-test. Dunnagan (2014) references earlier studies using the LBA II ® with a reliability Cronbach alpha averaging .74. In a review of six studies using the LBA II®, each of the four leadership styles were tested for reliability, creating 24 data points. This study demonstrated that 23 of the data points resulted in a .7 or higher reliability with one data point in one study calculating a .54 alpha (Abouel-Enin, 1994).

Regarding validity, Burch (2011) discussed the efforts taken by Zigarmi et al (1997) to validate the LBA II® assessments in parallel with a pre-validated tool called the Multilevel Management Survey (MLMS). The results of validity analysis considering construct, predictive, and content validity in relationship to the MLMS resulted in a statistically significant relationship ($p < .0004$) between the LBA II® and the previously validated MLMS (Burch, 2011). Leslie (2013) discussed the regression and stepwise regression analysis that compared the alignment between the MLMS and Situational Leadership styles resulting in alignment for leadership style effectiveness with three of the leadership styles, partial alignment for the fourth style, and a lack of alignment with flexibility. The lack of flexibility alignment is explained by the fluctuations that should occur in a leader over time (Leslie, 2013; Zigarmi et al, 1997). Another part of Zigarmi et al.'s analysis considered a criterion-related, predictive validity analysis that concluded that the "similar constructs on the two instruments are not only theoretically related but are also empirically related" (Leslie, 2013, Validity).

Post-session Interview

Creswell (2014) states that trustworthiness is a qualitative research strength because it is "based on determining whether the findings are accurate from the standpoint of the researcher, the participant, or the readers of an account" (p. 201). Six strategies were used to ensure validity of the qualitative components for this study including: triangulation, member checking, peer debriefing, bias clarification, and presenting all data.

Triangulation

Triangulation compares multiple data sources to harmonize or highlight discrepancies across different inputs (Creswell, 2014). This study used data from the post-game learner satisfaction survey, the learning acquisition assessment scores, and the 30-day interviews as multiple data sources. The goal was to determine if the rated experience in the learner satisfaction survey and the acquisition of knowledge measured in the assessments matched the experiences of the participants described in the interviews. Maxwell (1998) highlights that self-reporting mechanisms can contain implicit biases that will affect results and recommends leveraging additional non-self-reporting methods for true triangulation. This is an understood limitation of the study and the veracity of participant information was an underlying assumption in the qualitative data. Therefore, the triangulation of interview data with the satisfaction survey and assessments results was used to draw relationships and present conclusions.

Member Checking

Member checking is an additional method to validate if qualitative findings are accurate by sharing major themes with the participants and soliciting feedback to ensure they represent the original intent (Creswell, 2014). Maxwell (1998) states that "This is the single most important way of ruling out the possibility of your misinterpreting the meaning of what the

participants say and the perspective they have on what is going on" (p. 94). To fulfill this validity check, the interviewer recapped responses during the interview to ensure understanding and accuracy of the interviewee's answers.

Researcher Bias

Bias has the greatest potential for appearing in the proposed study. The researcher for this study is an escape room enthusiast, having played many rooms and having designed a few games of various sizes. Creswell (2014) states that "self-reflection creates an open and honest narrative that will resonate well with readers" and adds that "Good qualitative research contains comments by the researchers about how their interpretation of the findings is shaped by their background" (p. 202).

To address the potential of researcher bias, a brief description of the researcher's experience follows. The researcher has participated in over 30 physical escape rooms, a variety of at-home boxed games, and online escape games. In the past three years, the researcher has attended escape room conferences and has been selected to present about escape rooms as learning events at learning and development conferences. The researcher has also assisted in the design of one physical escape game, a few at-home games, and led a podcast escape game.

Presenting All Data

The researcher also understands that the data may conclude escape room games are not effective as leadership learning activities and will be transparent in that data. This last point highlights the final strategy, which is presenting all information, even if negative or in contrast to general themes found in other research (Creswell, 2014).

Data Collection

Using an explanatory sequential mixed methods design, this study first collected quantitative data followed by the collection of qualitative data (Creswell, 2014). The quantitative data provided insight into learner satisfaction and learning acquisition. These data were triangulated with the qualitative interview data to assess behavior change following The Leadership Escape Game (Kirkpatrick & Kirkpatrick, 2016). This section will review the recruitment and data collection tools leveraged for this study.

Recruitment

As discussed earlier, participants for this study were recruited through various leadership organizations and leadership networks. An invitation email was sent to potential participants. The email included the purpose and description of the study as well as an outline of the participation components. Selection criterion for participation was that the leaders had employees that directly reported to the participant, such that application of The Leadership Escape Game could be measured in the 30-day post-game interview. Exceptions were allowed for individual contributors with direct coaching influence of people leaders. The email also stated that participation is voluntary and a participant could withdraw from the study at any point. The components of this study include:

- Informed consent signature (approximately 2-5 minutes)
- Survey #1: a pre-session assessment (approximately 20 minutes)
- The Leadership Escape Game: the escape game learning event (approximately 1.5 hours)
- Survey #2a: a post-session learner satisfaction survey (10 minutes)
- Survey #2b: a post-session assessment (approximately 20 minutes)
- Survey #3: a 30-day follow-up assessment (approximately 20 minutes)

- Interview: a 30-day follow-up interview (approximately 60 minutes)

To protect participant confidentiality, each participant created a Participant Identification Code (PIC). The PIC was derived from a series of questions and used throughout each of the study components to ensure accurate analysis of data. The questions used to determine the PIC, shown in Figure 3.3, were based on the research of Schnell et al. (2010) regarding self-generated identification codes.

Figure 3.3

Self-Generated Participant Identification Codes

First two letters of first name (e.g. John = Jo)	Jo
First two letters of last name (e.g. Doe = Do)	Do
First letter of birth month (e.g. September = S)	S
Last two digits of birth year (e.g. 1983 = 83)	83
Number of older siblings	2
Self-Generated Participant ID Code	**JoDoS832**

Data Analysis

The study followed a data analysis and interpretation procedure (Creswell (2014). The first step was to identify the response and non-response rates from the study sample, followed by an analysis of response bias to determine if the gap in responses had an impact on the results or if the results collected were skewed based on the characteristics of the responses (Cull et al-., 2005). To address this possibility, demographic data, such as gender, age, length of time in leadership roles, and current leadership role, was collected to identify potential skews based on these data points. The third step was to provide descriptive analysis of the data. The study leveraged central tendency descriptive statistics to demonstrate mean, median, range, and standard deviation data related to the learner satisfaction, Leadership Style Flexibility, and

Leadership Style Effectiveness scores (Marusteri & Bacarea, 2010). Descriptive data can be found in Chapter 4 results.

Quantitative Analysis

The next step was to define the methods used to analyze the data and test the hypotheses (Creswell, 2014). The primary research question was divided into three secondary research questions with corresponding hypotheses. The analysis included the statistical significance of the data based on a significance level of 95% as well as a discussion of the implications of this study and potential for future research.

Secondary Research Question 1

Secondary Research Question 1 asked, "How satisfied are learners with the escape room game leadership training activity?" Preliminary analysis to check assumptions accounted for approximate normality. Three hypotheses were tested based on the learner satisfaction survey data. Q_1H_1 used a one-sample, one-tailed t-test to compare the average scores of each statement within the survey to a predetermined satisfactory rating. Q_1H_2 and Q_1H_3 used a two-sample two-tailed t-test to compare the average scores for each statement of the learner satisfaction survey based on whether the participants had previous experience with escape rooms and then separately experience with SLII® prior to playing the Leadership Escape Game.

Secondary Research Questions 2 and 3

The second and third research questions sought to understand the impact of The Leadership Escape Game on learning acquisition as measured by Leadership Style Flexibility and Leadership Style Effectiveness scores. Flexibility and Effectiveness scores were calculated using the LBA II®, the assessment used for the pre-test, post-test, and 30-day post-test. The three LBA II® scores were analyzed using multiple analyses. First, a one-way ANOVA compared the

average scores across the three different assessments. The ANOVA tested for statistically significant score differences in terms of Leadership Style Flexibility and Leadership Style Effectiveness. A follow-up analysis used a series of paired t-tests to compare Survey #1 to Survey #2 and then separately to Survey #3, testing the null hypothesis that there would be no statistically significant difference between scores from before and after The Leadership Escape Game. A paired t-test also compared Survey #2 to Survey #3 to test the null hypothesis that there would be no statistically significant difference between the immediate post-test and the 30-day post-test. A final round of analysis used paired t-tests to determine the influence of previous escape room or situational leadership experience on learning acquisition data.

Qualitative Analysis

Interviews were conducted at least 30 days after participants played The Leadership Escape Game. Analysis of these interviews followed the Interpretative Phenomenological Analysis (IPA) approach to discover emerging themes and draw inferences from the participants' answers. Interpretative Phenomenological Analysis (IPA) applies five steps: (1) read, re-read, and take notes, (2) define emerging themes from the notes, (3) identify relationships between the emerging themes, (4) create a table of themes and quotes, (5) repeat for all interviews and compile a final table of themes (Noon, 2018). Each interview was transcribed through multiple reviews and confirmation of the recorded content. The transcribed interviews were uploaded to Atlas.ti for coding and theme organization.

A final review of the quantitative and qualitative data reflected on the learner satisfaction, learning acquisition, and behavior data to determine: 1) whether or not escape room games are effective for leadership training and 2) what makes them effective or ineffective based on the data.

Summary

The methodology of this study leveraged an explanatory sequential mixed methods research design to address the research question, "How effective are escape room games as a leadership training activity?" Using The New World Kirkpatrick Model for the evaluation framework, data collection and analysis considered learner satisfaction, learning acquisition, and behavior change as variables to assess The Leadership Escape Game (Kirkpatrick & Kirkpatrick 2016). Level one learner satisfaction data was collected from a post-game survey. Level two learning acquisition was measured through pre-game, post-game, and 30-day follow-up assessments. These assessments used the LBA II® Leadership Style Flexibility and Effectiveness scores as indicators of learning acquisition. Level three behavior change was determined through interviews to solicit the participant's perspective of applying the SLII® model in their performance context after playing the game. Data analysis included descriptive statistics of all quantitative data collected. Learner satisfaction was tested using a one-sample one-tailed t-test to compare participant satisfaction ratings to a pre-determined average and a two sample two-tailed t-test to determine the impact of previous escape room or situational leadership experience on satisfaction. Learning acquisition was tested using a one-way ANOVA to compare the three flexibility and effectiveness scores. Additional paired t-tests were conducted to compare the variance between pre-test and post-test scores and to determine if previous experience with escape rooms or situational leadership impacted learning acquisition. Qualitative data were analyzed using the Interpretative Phenomenological Analysis procedure. An overall reflection on quantitative and qualitative data provided insight to address the study's primary research question.

This chapter presented the methodology, research design, data collection and data analysis for this study. Chapter 4 presents the research finds from the above-described study methodology.

Chapter 4

Research Findings

Learner satisfaction, learning acquisition, and behavior change data address this study's research questions. The purpose of this study was to determine the efficacy of a digital escape room game to deliver leadership training. Many escape room game studies have focused primarily on learner satisfaction. This study sought to contribute data demonstrating learning acquisition and application to the study and use of digital escape room games to deliver leadership training.

The organization of this chapter begins with revisiting the research questions and hypotheses for this study. Next, there are descriptions of the pilot studies used to confirm the validity of the learner satisfaction survey and the design of the game. To address the mixed-methods approach to data analysis, the quantitative and qualitative data are separated into two sections. The quantitative section reviews the methods used to analyze data and presents the findings for each secondary research question and hypotheses testing. The qualitative section is also organized by the secondary research questions and provides participant insight into the application of SLII® behaviors, as well as learner satisfaction and learning acquisition, following The Leadership Escape Game.

Research Questions and Hypotheses

The primary research question for this study asked: How effective are escape room games as a leadership training activity? The primary research question was supported by three secondary research questions (See Figure 4.1). The intention of the research questions was to explore learner satisfaction, learning acquisition, and behavior change following The Leadership Escape Game.

Figure 4.1

Research Questions

Primary Research Question

How effective are escape room games as a leadership training activity?

Secondary Research Questions

Q1. How satisfied are learners with the escape room game leadership training activity?
Q2. How does the use of an escape room game improve Leadership Style Flexibility?
Q3. How does the use of an escape room game improve Leadership Style Effectiveness?

This mixed methods study explored the primary research question through the following secondary research questions and hypotheses:

Secondary Research Question 1: How satisfied are learners with the escape room game leadership training activity?

- **H_1:** The use of an escape room game for leadership training does not result in statistically significant positive learner satisfaction survey scores.
- **H_2:** There is no statistically significant difference in average learner satisfaction survey scores from participants with and without prior escape room experience.
- **H_3:** There is no statistically significant difference in average learner satisfaction survey scores from participants with and without prior training in situational leadership.

Secondary Research Question 2: How does the use of an escape room game improve Leadership Style Flexibility?

1. **H_1:** There is no statistically significant difference in participant Leadership Style Flexibility between pre-game, post-game and 30-day post-game assessments following an escape room leadership training.

Secondary Research Question 3: How does the use of an escape room game improve Leadership Style Effectiveness?

2. **H_1:** There is no statistically significant difference in participant Leadership Style Effectiveness between pre-game, post-game and 30-day post-game assessments following an escape room leadership training.

From these hypotheses, the study seeks to draw conclusions about the efficacy of an escape room game in facilitating a leadership training activity.

Data Collection

Participants for this study were recruited through leaders in various organizations. The only preferred criterion for participation was that the participant was a people leader (i.e. a leader with employees that directly report to them). Emails were sent to prospective participants inviting them to join a free, online leadership training delivered via an online escape room game. Emails included the informed consent document and links for registration. The components of this study include the following data collection events:

- Informed consent signature (approximately 2-5 minutes)
- Survey #1: a pre-session assessment (approximately 20 minutes)
- The Leadership Escape Game: the escape game learning event (approximately 1.5 hours)
- Survey #2a: a post-session learner satisfaction survey (10 minutes)
- Survey #2b: a post-session assessment (approximately 20 minutes)
- Survey #3: a 30-day follow-up assessment (approximately 20 minutes)
- Interview: a 30-day follow-up interview (approximately 60 minutes)

The Informed Consent and survey data were collected using Qualtrics software. Survey #1 collected demographic data and presented the pre-test assessment using the LBA II®. The results from this assessment provided the benchmark for measuring learning acquisition through Leadership Style Flexibility and Effectiveness scores. The Leadership Escape Game was hosted in an online Zoom room and the recording was saved to the Zoom cloud. Participants completed Survey #2 immediately following the game. This survey asked participants for their learner satisfaction ratings and presented the post-test assessment. 30 days following the game, participants were sent Survey #3 for the final assessment of the study. The interview invitations were also sent after 30 days. Interviews were recorded and stored using the Zoom Cloud. The interview recordings were transcribed and coded for qualitative analysis in Atlas.ti.

Pilot Study

Two elements of this study were piloted prior to the full study. The first element reviewed the learner satisfaction survey. The second element tested the design of the digital escape room game developed by the researcher.

Learner Satisfaction Survey Pilot

The first piloted element was the learner satisfaction survey within Survey #2 that measured reactions of the players to The Leadership Escape Game. The validity of the survey was determined using Lawshe's (1975) Content Validity Ratio. A panel of reviewers judged the content of the survey against the expected outcomes from the training session to determine if each question was essential to be included in the survey. On a CVR scale of -1 (not essential) to 1 (essential), the survey was judged by five reviewers, requiring a CVR score of at least 0.99 (Ayre & Scally, 2014; Lawshe, 1975). All reviewers scored each of the survey questions with a

one rating. The content validity of the survey returned a CVR of 1 indicating that all questions on the survey were essential components of the study.

The Leadership Escape Game Pilot

The second piloted element focused on the design quality of The Leadership Escape Game based on the RETAIN game design rubric (Gunter et al., 2008). Using a scale of zero to three, the rubric assessed the game's application of each construct in the RETAIN acronym (Relevance, Embedding, Transfer, Adaptation, Immersion, Naturalization). For example, when assessing the Relevance of a game, Level 0 is scored if there is a lack of interest or connection to learning, Level 1 if there is some educational connection, but learners engage primarily in non-learning ways, Level 2 if learning outcomes are clear and learners are interested, and Level 3 if in addition to the requirements of levels one and two, the world and the necessary development challenges are present (Gunter et al., 2008). Each acronym within the RETAIN model was used to assess the game's design on this 0-3 scale. The RETAIN model can be viewed in Appendix C, reprinted with permission from the authors.

The panel of game reviewers included subject matter experts from multiple perspectives. One subject matter expert was a certified trainer of the SLII® leadership training content. A second subject matter expert was an escape room owner and designer. Two subject matter experts were practitioners and academic leaders in learning & development and instructional design focused areas. The final subject matter expert provided a methodological perspective in scope of the larger dissertation study.

Each reviewer played either a large portion of the game or the full game and provided a rating of 0-3 based on the RETAIN rubric described above (Gunter et al., 2008). The individual

ratings and averages can be found in Table 3.1 in the previous chapter. Based on this assessment, the game was determined to be an effective educational game.

Demographics

Demographic data for this study focused on gender, age, leadership role, and years of leadership experience. The data was collected during Survey #1. For analysis, duplicate responses and individuals who did not complete study components through at least Survey #2 were removed. The study included 46 participants who completed Survey #1, played The Leadership Escape Game, and completed Survey #2. It is noteworthy that while 46 participants were included in the demographic data, that number represented the highest number of responses among the collected data. There were some survey responses left blank by participants, such as identifying previous experience with escape room and situational leadership, creating a lower response rate on individual survey questions.

The distribution of participants based on gender can be found in Figure 4.2. The number and percentage of participants that identified gender included 34 female (74%), 12 male (26%), with no participants selecting the Other or Prefer not to answer options.

Participants were asked to identify their age based on decade ranges. Ranges began from 20-29 and spanned every ten years through 70 – 79. Figure 4.3 presents the age ranges of the participants in frequency and percentage.

Participants were asked to define their leadership role at work based on a provided multiple-choice selection. The selections included:

- Individual Contributor: I have no employees that directly report to me.
- People Leader: Individual Contributors directly report to me.
- People Leader Manager: My direct reports have Individual Contributors and/or People Leaders that directly report to them.
- Senior Leader: My direct reports are People Leader Managers.
- Other: None of the above describe my role within the organization (please describe)

Figure 4.4 presents the selected roles of participants. No participants selected the Other option. The sample's preferred criterion was to include only people leaders. There were six participants who identified as Individual Contributors. In follow-up discussions, it was noted that these participants were coaches in their organizations and, while they did not have direct reports, they were coaching leaders to become more effective in their roles, therefore the analysis included their data.

The final demographic question asked for years of leadership experience. Participants were provided options that included:

- 0 – 1 years
- 2 – 5 years
- 6 – 10 years
- 11 – 15 years
- 16 – 20 years
- 21 or more years

Figure 4.5 displays the ranges of participant leadership experience in years.

Figure 4.2

Participation by Gender (Frequency and Percentage)

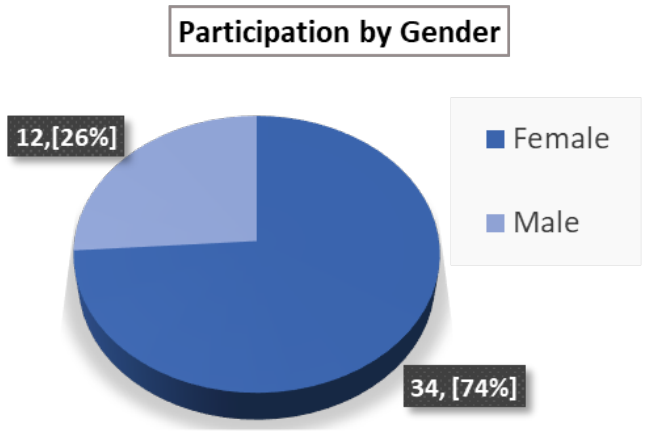


Figure 4.3

Participation by Age (Frequency and Percentage)

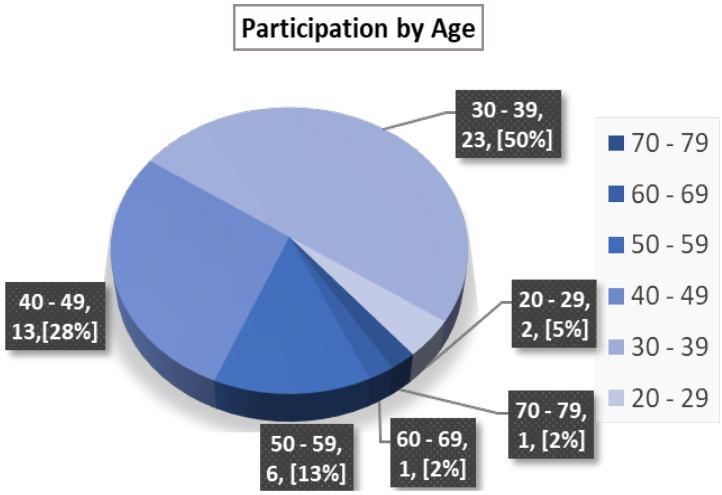


Figure 4.4

Participation by Role (Frequency and Percentage)

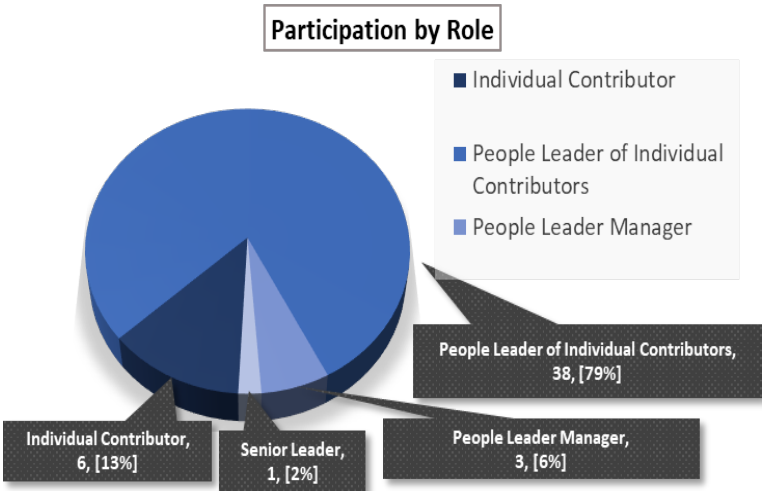
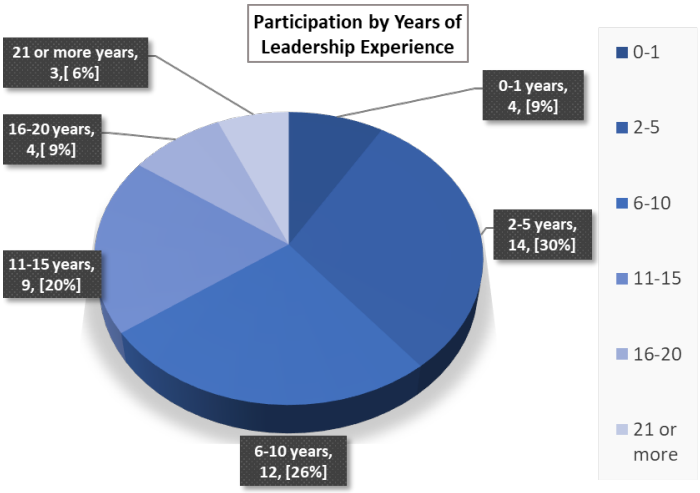


Figure 4.5

Participation by Years of Leadership Experience (Frequency and Percentage)



Quantitative Analysis and Results

Quantitative analysis results for this study support the use of a digital escape room game as a leadership training activity. Secondary Research Question 1 focused on learner satisfaction survey scores. Results confirmed positive learner satisfaction survey ratings. Secondary Research Questions 2 and 3 focused on learning acquisition. Participants demonstrated learning acquisition through the LBA II® assessments as measured in Leadership Style Flexibility and Leadership Style Effectiveness scores. The quantitative results are separated by each research question and hypothesis. Descriptive statistics are also provided for each of the research questions.

Secondary Research Question 1 – Learner Satisfaction

Q1: How satisfied are learners with the escape room leadership training activity?

Using the learner satisfaction survey data, three hypotheses were tested:

H_1: The use of an escape room game for leadership training does not result in statistically significant positive learner satisfaction survey scores.

H_2: There is no statistically significant difference in average learner satisfaction survey scores from participants with and without prior escape room experience.

H_3: There is no statistically significant difference in average learner satisfaction survey scores from participants with and without prior training in situational leadership.

Learner satisfaction results from the Secondary Research Question 1 Hypothesis 1 one-sample one-tailed t-test rejected the null hypothesis. Results demonstrated that participants had a positive experience and were satisfied with the leadership training conducted through the digital escape game. The Hypothesis 2 two-sample two-tailed t-test failed to reject the null hypothesis for all statements on the satisfaction survey except one, implying that previous escape room experience only had an impact on one aspect of learner satisfaction. The remaining statements

did not result in a statistically significant difference of satisfaction based on escape room experience. The Hypothesis 3 two-sample two-tailed t-test also failed to reject the null hypothesis for all statements on the satisfaction survey except one, implying that previous situational leadership training only had an impact on one aspect of learner satisfaction. The remaining statements did not result in a statistically significant difference of satisfaction based on previous situational leadership experience. Table 4.1 provides an overview of the hypotheses and results. The data analysis and results for the Secondary Research Question 1 hypotheses, including descriptive statistics, are discussed in further detail.

Table 4.1

Secondary Research Question 1 Hypotheses and Results

SRQ 1 Hypotheses	Hypotheses Formulae	Result
H_1: The use of an escape room game for leadership training does not result in statistically significant positive learner satisfaction survey scores.	**Statements 3,4, 6-14** $H_o = \mu < 4$ $H_a = \mu > 4$ **Statements 5** $H_o = \mu > 2$ $H_a = \mu < 2$	Reject null hypotheses for all statements
H_2: There is no statistically significant difference in average learner satisfaction survey scores from participants with and without prior escape room experience.	$H_o: \mu_a = \mu_b$ $H_a: \mu_a \neq \mu_b$	Reject null hypothesis except #11[a]
H_3: There is no statistically significant difference in average learner satisfaction survey scores from participants with and without prior training in situational leadership	$H_o: \mu_a = \mu_b$ $H_a: \mu_a \neq \mu_b$	Reject null hypothesis except #3[b]

Note. Overview of the three hypotheses within Secondary Research Question 1.

[a] Statement 11 states, "I believe that the escape room game enhanced my leadership skills."

[b] Statement 3 states, "I enjoyed playing this game."

Learner Satisfaction Survey Descriptive Statistics

To prepare for hypothesis testing, descriptive data were calculated for each of the statements within the learner satisfaction survey. The first two statements within the survey asked for a yes or no response about previous experience with escape rooms or situational leadership (See Table 4.2). Throughout the survey results, some responses were left blank, as can be seen in Tables 4.2 and 4.3 where there is a variety of response rates across the survey statements (n = 41 to 46). The blank responses were attributed to challenges with the online survey navigation.

Table 4.2

Learner Satisfaction Survey Statements 1 and 2 (Percentages)

Survey Statements	n	Yes	No
1. I have participated in an escape room game before playing this Leadership Escape Game.	45	60%	40%
2. I have participated in a Situational Leadership training prior to playing this Leadership Escape Game.	44	50%	50%

The rest of the survey used a Likert scale of one to five (Strongly Disagree to Strongly Agree, respectively) to measure the satisfaction of participants with The Leadership Escape Game. Calculations included the mean, median, range, and standard deviation. The descriptive data for the remaining satisfaction survey statements can be found in Table 4.3. Preliminary analysis to check assumptions accounted for approximate normality. Frequency data representing the total number of responses and percentage of ratings for each statement in the survey can be found in Table 4.4. The five-point scale ranged from Strongly Disagree (1) to Strongly Agree (5).

Table 4.3

Descriptive Statistics for Learner Satisfaction Survey

Statement	n	Mean	Median	Range	Std. Dev
3. I enjoyed playing this game.	46	4.67	5	4	0.76
4. I am satisfied with the quality of the escape room game experience.	45	4.76	5	1	0.43
5. It was difficult for me to focus on learning because I was feeling stressed or overwhelmed from playing the game.	46	1.61	1	4	1.08
6. The escape room game was an effective way to learn new information related to Situational Leadership.	46	4.59	5	4	0.8
7. I enjoyed the online format for this escape room game leadership training.	46	4.72	5	4	0.72
8. I feel I was able to engage with my teammates to complete the escape room game.	46	4.3	5	4	1.07
9. I feel confident applying the leadership skills taught in this escape room game.	46	4.43	5	2	0.58
10. The escape room encouraged me to think about how to choose leadership styles in a new way.	46	4.65	5	2	0.57
11. I believe that the escape room game enhanced my leadership skills.	45	4.33	4	3	0.77
12. The Game Master facilitated a good experience in the escape room game leadership training.	46	4.93	5	1	0.25
13. Overall, I think the escape room game was a valuable learning experience.	41	4.8	5	3	0.56
14. I would recommend this activity to other leaders.	41	4.78	5	3	0.61

Table 4.4

Frequency Data for Learner Satisfaction Survey Statements (Percentages)

Statement	n	1	2	3	4	5
3. I enjoyed playing this game.	46	2%	-	4%	15%	78%
4. I am satisfied with the quality of the escape room game experience.	45	-	-	-	11%	34%
5. It was difficult for me to focus on learning because I was feeling stressed or overwhelmed from playing the game.	46	70%	13%	7%	9%	2%
6. The escape room game was an effective way to learn new information related to Situational Leadership.	46	2%	2%	-	26%	70%
7. I enjoyed the online format for this escape room game leadership training.	46	2%	-	2%	15%	80%
8. I feel I was able to engage with my teammates to complete the escape room game.	46	4%	-	20%	13%	63%
9. I feel confident applying the leadership skills taught in this escape room game.	46	-	-	4%	48%	48%
10. The escape room encouraged me to think about how to choose leadership styles in a new way.	46	-	-	4%	26%	70%
11. I believe that the escape room game enhanced my leadership skills.	45	-	2%	11%	38%	49%
12. The Game Master facilitated a good experience in the escape room game leadership training.	46	-	-	-	7%	93%
13. Overall, I think the escape room game was a valuable learning experience.	41	-	2%	-	12%	85%
14. I would recommend this activity to other leaders.	41	-	2%	2%	10%	85%

Note. Rating scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Disagree nor Agree

4 = Agree, 5 = Strongly Agree.

Q_1H_1 Testing Learner Satisfaction

Question 1 Hypothesis 1(Q_1H_1) tested the null hypothesis that the use of a digital escape room game for leadership training would not result in statistically significant positive learner satisfaction survey scores. All satisfaction survey statements rejected the null hypothesis ($p < .05$), implying that participants were satisfied with playing The Leadership Escape Game.

The null hypothesis was tested using a one-sample, one-tailed t-test to compare the average rating of each learner satisfaction survey statement to a pre-determined satisfactory average. Statement 5 on the survey was tested using an upper one-tailed t-test where the null hypothesis stated that the average score was greater than 2. The remainder of the survey statements, which included Statements 3, 4, and 6 through 14, were tested using a lower one-tailed t-test where the null hypothesis stated that the average score was less than 4. Table 4.5 provides the t-value, degrees of freedom, and the result of one-sample, one-tailed t-test. For all statements within the survey, $p < .05$ therefore rejecting the null hypothesis. This analysis of the satisfaction survey results demonstrated that participants were satisfied with the experience of playing The Leadership Escape Game.

For statements 3, 4, and 6 through 14, the average statistically significant ratings were greater than four, the pre-determined satisfaction rating. For those statements, participants selected Agreed or Strongly Agreed, identifying satisfaction with the game. Statement 5, which asked participants to rate if it was difficult to focus on learning because of feeling stressed or overwhelmed, produced an average statistically significant rating that was less than the pre-determined satisfaction of a two rating, meaning that the participants did not find the experience to be stressful or overwhelming. Overall, participants' ratings demonstrated that they were satisfied with The Leadership Escape Game experience.

Table 4.5

Satisfaction Survey t-test and Hypothesis Results

Statement	t value	df	p	Result
3. I enjoyed playing this game.	6	45	1.56E-07	Reject
4. I am satisfied with the quality of the escape room game experience.	11.7	44	2.37E-15	Reject
5. It was difficult for me to focus on learning because I was feeling stressed or overwhelmed from playing the game.	2.45	45	2.27E-19	Reject
6. The escape room game was an effective way to learn new information related to Situational Leadership.	4.95	45	5.50E-06	Reject
7. I enjoyed the online format for this escape room game leadership training.	6.76	45	1.17E-08	Reject
8. I feel I was able to engage with my teammates to complete the escape room game.	1.93	45	3.03E-02	Reject
9. I feel confident applying the leadership skills taught in this escape room game.	5.06	45	3.81E-06	Reject
10. The escape room encouraged me to think about how to choose leadership styles in a new way.	7.81	45	3.26E-10	Reject
11. I believe that the escape room game enhanced my leadership skills.	2.91	44	2.83E-03	Reject
12. The Game Master facilitated a good experience in the escape room game leadership training.	25.4	45	1.29E-28	Reject
13. Overall, I think the escape room game was a valuable learning experience.	9.35	41	5.02E-12	Reject
14. I would recommend this activity to other leaders.	8.25	41	1.49E-10	Reject

Note. All tests rejected the null hypothesis. There is sufficient evidence to support the claim that learners were satisfied with The Leadership Escape Game.

$^{*}p < .05$

Q_1H_2 Testing Previous Escape Room Experience and Learner Satisfaction

Question 1 Hypothesis 2 (Q_1H_2) tested the null hypothesis that there would be no statistically significant difference in average learner satisfaction scores from participants with and without prior escape room experience. The null hypothesis was tested using a two sample, two-tailed t-test to compare the average scores between the two groups. Table 4.6 provides the data from the hypothesis testing. Statements 3 through 10 and 12 through 14 failed to reject the null hypothesis ($p > .05$), implying that there was no statistically significant difference of satisfaction between those with and without previous escape room experience. Statement 11, which stated, "I believe that the escape room game enhanced my leadership skills," rejected the null hypothesis ($p < .05$). Those with previous escape room experience rated this statement at a statistically significant higher rating than those without previous experience. Participants with previous escape room experience rated that the game enhanced their leadership skills at an average score of 4.58. Those without experience rated this statement at a 4. While there was a statistically significant difference and those with previous experience had a stronger agreement with the statement that the game enhanced their leadership skills than those without previous experience, both scores were still in the positive satisfaction range.

The above analysis determined that there was no statistically significant difference between average ratings for survey Statements 3 through 10 and 12 through 14. This implies that previous escape room experience did not influence participant satisfaction in relation to those survey statements. The one exception with Statement 11 was a statistically significant difference and higher rating of the game enhancing leadership skills from those with previous escape room experience. Overall, the results imply that previous escape room experience is not a pre-requisite for learner satisfaction in a digital leadership escape game.

Table 4.6

Q_1H_2 Two-Sample Two-Tailed t-test for Previous Escape Room Experience

		Prior Escape Room			No Prior Escape Room							
	Hypothesis	Mean	SD	n	Mean	SD	n	95%CI	t	df	p	Result
Q3	$Q1\ H2_a$	4.67	0.83205	27	4.67	0.69	18	(-0.459, 0.459)	0	43	1	Fail to reject
Q4	$Q1\ H2_b$	4.88	1.02982	26	4.56	0.51	18	(-0.146, 0.804)	1.4	42	0.16912	Fail to reject
Q5	$Q1\ H2_c$	1.33	1.44115	27	2.06	1.61	18	(-1.668, 0.224)	1.54	43	0.13106	Fail to reject
Q6	$Q1\ H2_d$	4.59	0.84019	27	4.67	0.69	18	(-0.535, 0.387)	0.32	43	0.7476	Fail to reject
Q7	$Q1\ H2_e$	4.81	0.78628	27	4.5	0.62	18	(-0.109, 0.739)	1.5	43	0.14132	Fail to reject
Q8	$Q1\ H2_f$	4.44	1.05003	27	4.06	1.11	18	(-0.278, 1.056)	0.25	43	0.25565	Fail to reject
Q9	$Q1\ H2_g$	4.52	0.50918	27	4.33	0.69	18	(-0.196, 0.566)	0.98	43	0.33283	Fail to reject
Q10	$Q1\ H2_h$	4.74	0.52569	27	4.5	0.62	18	(-0.117, 0.599)	1.36	43	0.18189	Fail to reject
Q11	$Q1\ H2_i$	4.58	0.64331	26	4	0.84	18	(0.103, 1.051)	2.46	42	0.01822	Reject null
Q12	$Q1\ H2_j$	4.96	0.19245	27	4.89	0.32	18	(-0.097, 0.245)	0.87	43	0.38692	Fail to reject
Q13	$Q1\ H2_k$	4.92	0.28233	24	4.65	0.79	17	(-0.133, 0.672)	1.35	39	0.18356	Fail to reject
Q14	$Q1\ H2_l$	4.92	0.28233	24	4.59	0.87	17	(-0.114, 0.771)	1.5	39	0.14139	Fail to reject

Note. SD = Standard Deviation; N = number of responses; CI = confidence interval

Q_1H_3 Testing Previous Situational Leadership Experience and Learner Satisfaction

Question 1 Hypothesis 3 (Q_1H_3) tested the null hypothesis that there would be no statistically significant difference in average learner satisfaction scores from participants with and without prior situational leadership training experience. The null hypothesis was tested using a two sample, two-tailed t-test to compare the average scores between the two groups. Table 4.7 provides the data from the hypothesis testing.

Statement 3 that stated, “I enjoyed the game” rejected the null hypothesis ($p < .05$). Participants with prior situational leadership experience rated their enjoyment of the game at an average of 4.95 and those without prior training rated enjoyment at an average of 4.4. Those with

situational leadership experience rated a statistically significant higher level of game enjoyment. This implies that while both ratings were above the pre-determined level of satisfaction, the analysis, those with previous situational leadership experience were more likely to enjoy the game, or at higher levels, than those without previous experience.

The remaining statements failed to reject the hypothesis ($p > .05$), implying that there was no statistically significant difference in satisfaction results between those with and without previous situational leadership experience. Overall, results show that previous situational leadership experience is not a pre-requisite for learner satisfaction in a digital leadership escape game.

Table 4.7

Q_1H_3 Two-Sample Two-Tailed T-test for Previous Situational Leadership

		Prior SLII® Training			No Prior SLII® Training							
	Hypothesis	Mean	SD	n	Mean	SD	n	95%CI	t	df	p	Result
Q3	Q1 $H3_a$	4.955	0.213	22	4.409	1.008	22	(0.102, 0.989)	2.4842	42	0.0171	reject null
Q4	Q1 $H3_b$	4.818	0.395	22	4.714	0.463	21	(-0.162, 0.369)	0.7902	41	0.4340	fail to reject
Q5	Q1 $H3_c$	1.364	0.790	22	1.818	1.296	22	(-1.107, 0.198)	1.4049	42	0.1674	fail to reject
Q6	Q1 $H3_d$	4.500	0.913	22	4.682	0.716	22	(-0.681, 0.317)	0.7350	42	0.4664	fail to reject
Q7	Q1 $H3_e$	4.682	0.894	22	4.773	0.528	22	(-0.538, 0.356)	0.4107	42	0.6834	fail to reject
Q8	Q1 $H3_f$	4.136	1.167	22	4.455	1.011	22	(-0.982, 0.346)	0.9667	42	0.3392	fail to reject
Q9	Q1 $H3_g$	4.409	0.590	22	4.500	0.598	22	(-0.452, 0.271)	0.5076	42	0.6144	fail to reject
Q10	Q1 $H3_h$	4.636	0.581	22	4.682	0.568	22	(-0.395, 0.304)	0.2624	42	0.7943	fail to reject
Q11	Q1 $H3_i$	4.190	0.750	21	4.500	0.802	22	(-0.787, 0.168)	1.3082	41	0.1981	fail to reject
Q12	Q1 $H3_j$	4.955	0.213	22	4.909	0.294	22	(-0.111, 0.202)	0.5867	42	0.5605	fail to reject
Q13	Q1 $H3_k$	4.895	0.307	20	4.762	0.700	21	(-0.206, 0.472)	0.7929	39	0.4326	fail to reject
Q14	Q1 $H3_l$	4.895	0.307	20	4.714	0.784	21	(-0.192, 0.553)	0.9791	39	0.1414	fail to reject

Note. SD = Standard Deviation; N = number of responses; CI = confidence interval

Secondary Research Question 2

Q2: How does the use of escape room games improve Leadership Style Flexibility?

The null hypothesis for this research question stated:

> **H_1:** There is no statistically significant difference in participant Leadership Style Flexibility between pre-game, post-game and 30-day post-game assessments following an escape room leadership training.

Using the Leadership Style Flexibility scores from the LBAII®, multiple rounds of hypothesis testing rejected the null hypothesis and concluded that there was a statistically significant difference and improvement in flexibility scores across the three assessments (Survey #1 pre-test, Survey #2 post-test, and Survey #3 30-day post-test). A larger sample size of participant flexibility scores compared the Survey #1 pre-test and Survey #2 post-test, which also demonstrated a statistically significant difference and improvement across the two scores. For both sets of analysis, results demonstrated improvement in Leadership Style Flexibility scores. Additional analysis considered the influence of previous escape room and situational leadership experience on flexibility scores. The analysis resulted in no statistically significant difference between those with and without previous experience. Further details for these conclusions are explained in this section.

Leadership Style Flexibility Descriptive Statistics

To prepare for hypothesis testing, descriptive data were calculated for the Leadership Style Flexibility scores between the three surveys. The descriptive data can be found in Table 4.8. The Leader Behavior Analysis II® calculates within a range of low flexibility (0) to high flexibility (30) and identifies the normal range for Leadership Style Flexibility scores to fall within 14 to 20 (Blanchard et al., 2013).

Table 4.8

Descriptive Statistics for Leadership Style Flexibility Scores

	N	Mean	Median	Range	Std Dev
Pre-Test	42	16.7	16	22	5.19
Post-test	42	21.8	22	20	5.02
30-day Post-test	24	22.8	22	10	3.0

Q_2H_1 Testing Leadership Style Flexibility Scores

Question 2 Hypothesis 1(Q_2H_1) tested the null hypothesis that the use of an escape room game for leadership training would not result in a statistically significant difference of Leadership Style Flexibility scores, as calculated by the LBAII® Survey #1 pre-test, Survey #2 post-test, and Survey #3 30-day post-test (See Figure 4.6). Only 24 participants completed all three assessments. Due to the low response rate of Survey #3, Leadership Style Flexibility scores were also compared only using the Survey #1 pre-test and Survey #2 post-test. As stated earlier, analysis rejected the null hypothesis ($p < .05$) and found that there was a statistically significant difference and improvement in Leadership Style Flexibility scores.

Figure 4.6

Question 2 Hypothesis 1 Null Hypotheses

Comparing Three Assessment Scores	**Comparing Two Assessment Scores**
$H_o: \mu_a = \mu_b = \mu_c$	$H_o: \mu_a = \mu_b$
$H_a: \mu_a \neq \mu_b \neq \mu_c$	$H_a: \mu_a \neq \mu_b$

Comparing Leadership Style Flexibility Scores across Three Assessments.

Leadership Style Flexibility scores were compared across the three assessments to draw conclusions about learning acquisition. A one-way ANOVA was used to compare the variance in

the three sets of flexibility scores. Instead of a traditional post-hoc test as a follow-up to the one-way ANOVA, a series of paired t-tests were applied to compare the variance between each assessment. Survey #1 was compared to Survey #2 and then separately to Survey #3 to test the variance of flexibility scores from before The Leadership Escape Game (Survey #1 pretest) to the two tests that would demonstrate learning acquisition following the game. Additionally, Survey #2 scores were compared to Survey #3 to compare the variance of scores following The Leadership Game as a measure of knowledge retention.

One-Way ANOVA - Comparing Three Leadership Style Flexibility Scores. Using a one-way ANOVA, the Leadership Style Flexibility scores of 24 participants were compared across the three assessments. A preliminary analysis to check assumptions accounted for normality. Scores from the three assessments were: Survey #1 pre-test = 16.5 (normal range), Survey #2 post-test = 22.16 (above normal), Survey #3 30-day post-test = 22.83(above normal). Table 4.9 provides the data from the one-way ANOVA. The test resulted in a p-value less than .05 and an F-Statistic greater than the F-critical, therefore the null hypothesis was rejected.

Rejecting the null hypothesis determined that there was a statistically significant difference in assessment scores across the pre-test, post-test, and 30-day post-test. The average Leadership Style Flexibility scores increased, and the variance decreased across the three surveys. Flexibility scores also improved from the normal range in Survey #1 to above normal in Surveys #2 and 3. These results imply a statistically significant improvement in Leadership Style Flexibility scores and demonstrate learning acquisition across the three assessments.

Table 4.9

One-Way ANOVA Test of Leadership Style Flexibility Scores

SUMMARY

Groups	Count	Sum	Average	Variance
Survey #1 Pre-Test	24	396	16.5	17.47826
Survey #2 Post-test	24	532	22.17	16.31884
Survey #3 30-day Post-Test	24	548	22.83	9.014493

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	581.333	2	290.666	20.3683	1.12E-07	3.12964
Within Groups	984.666	69	14.2705			
Total	1566	71				

Paired t-test Follow-up Analysis to One-Way ANOVA. As a follow-up analysis to the one-way ANOVA, a series of paired t-tests were conducted to determine the variance between each of the three assessments. The null hypotheses for these tests claim that there is no statistically significant difference in Leadership Style Flexibility scores between each of the three assessments. Table 4.10 provides the data from the series of paired t tests. The scores from the three assessments include: Survey #1 pre-test = 16.5, Survey #2 post-test = 22.16, Survey #3 30-day post-test = 22.83. In the tests comparing Survey #1 to Survey #2 ($p = 0.0000087$) and Survey #1 to Survey #3 ($p = 0.0000029$), both tests rejected the null hypotheses ($p < .05$). Therefore, there was a statistically significant difference between the Survey #1 pre-test and both of the tests following The Leadership Escape Game. The paired t-test comparing Survey #2 to Survey #3 ($p = 0.41$), failed to reject the null hypothesis ($p > .05$) therefore, there was no statistically significant difference in scores. The non-statistically significant result between Survey #2 and Survey #3 present evidence for the retention of knowledge through at least 30-days following

The Leadership Escape Game. In summary, learners acquired Leadership Style Flexibility knowledge from the game and retained that knowledge for at least 30 days.

Table 4.10

Leadership Style Flexibility Paired t-test of Three Assessments

	Survey #1	Survey #2	Survey #1	Survey #3	Survey #2	Survey #3
Mean	16.5	22.166	16.5	22.8333	22.1666	22.833
Variance	17.478	16.318	17.478	9.0144	16.3188	9.0144
Observations	24	24	24	24	24	24
Pearson Correlation	0.29348		0.03463		0.41821	
df	23		23		23	
t Stat	-5.6804		-6.12945		-0.83803	
P(T<=t) two-tail	8.77E-06		2.98E-06		0.41064	
t Critical two-tail	2.06865		2.068658		2.068658	

Paired T-test – Comparing Pre-Test and Post Test Leadership Style Flexibility. Due to the low response rate of Survey #3, an additional paired t-test was conducted with a larger sample size of participants who completed the Survey #1 pre-test and Survey #2 post-test. The pre-test and post-test Leadership Style Flexibility scores of 42 participants were compared using a paired two-sample t-test. A preliminary analysis to check assumptions accounted for normality. Scores from the two assessments were: Survey #1 pre-test = 16.7 (normal), Survey #2 post-test = 21.76 (above normal). Table 4.11 provides the data from the paired t-test. The test rejected the null hypothesis ($p < .05$).

Rejecting the null hypothesis determined that there was a statistically significant difference between the pre-game and post-game assessments. The average Leadership Style Flexibility scores increased from the pre-game to the post-game assessment, implying that there was a statistically significant increase in flexibility scores. An additional consideration is that the Pearson Correlation calculated to .19, confirming that while there was a positive correlation, it

was a weak correlation. A larger sample size could provide a stronger statistical test for comparing the average flexibility scores. These results demonstrate learning acquisition across the two assessments, with an additional recommendation to continue researching for stronger relationships.

Table 4.11

Q_2H_1 Paired T-test of Leadership Style Flexibility Scores

	Survey #1	Survey #2
Mean	16.71429	21.7619
Variance	26.89199	25.21022
Observations	42	42
Pearson Correlation	0.186544	
df	41	
t Stat	-5.02447	
P(T<=t) two-tail	1.04E-05	
t Critical two-tail	2.019541	

Prior Escape Room Experience Impact on Leadership Style Flexibility. An additional level of analysis sought to determine if escape room experience prior to playing The Leadership Escape Game had an impact on Leadership Style Flexibility. The null hypothesis for the series of paired t-tests stated that there would not be a statistically significant difference of Leadership Style Flexibility scores factoring in previous experience. Results failed to reject the null hypothesis ($p > .05$) and concluded that there was no statistically significant difference of Leadership Style Flexibility scores. Previous escape room experience did not have an influence on Leadership Style Flexibility learning acquisition.

The analysis was first run using all three assessment scores (Survey #1 pre-test, Survey #2 post-test, and Survey #3 30-day post-test). However, due to the low response rate of Survey #3, a follow-up analysis was conducted that only compared Survey #1 pre-test and Survey #2

post-test scores. The data were separated into two groups, those with and without previous escape room experience. Table 4.12 provides a summary of the results for both sets of null hypothesis testing.

Table 4.12

Previous Escape Room Experience and Leadership Style Flexibility Summary

Variable		n	p	Result
3 Assessments				
	Pre-test	24	0.26	Fail to reject null hypothesis
	Post-test	24	0.54	
	30-day post-test	24	0.41	
2 Assessments				
	Pre-test	42	0.47	Fail to reject null hypothesis
	Post-test	42	0.90	
	Score change	42	0.53	

Note. 3 Assessments includes Survey #1, Survey #2, and Survey #3.

2 Assessments includes Survey #1 and Survey #2

The first analysis used a series of paired t-tests assuming unequal variance to compare the Leadership Style Flexibility scores from the Survey #1 pre-test, Survey #2 post-test, and Survey #3 30-day post-test factoring in previous escape room experience. 24 participants completed all three surveys. The data for each survey's flexibility scores are below in Tables 4.13 through 4.15. All three tests failed to reject the null hypotheses ($p > .05$). This test showed that there was no statistically significant difference between the Leadership Style Flexibility scores of those with and without prior escape room experience.

Table 4.13

Survey #1 Leadership Style Flexibility Pre-Test t-test and Escape Room Experience

	Prior Escape Room Experience	No Prior Escape Room Experience
Mean	17.28571429	15.4
Variance	21.2967033	11.6
Observations	14	10
df	22	
t Stat	1.151627018	
P(T<=t) two-tail	0.26183654	
t Critical two-tail	2.073873068	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Table 4.14

Survey #2 Leadership Style Flexibility Post-test t-test and Escape Room Experience

	Prior Escape Room Experience	No Prior Escape Room Experience
Mean	21.71429	22.8
Variance	14.06593	20.62222
Observations	14	10
df	17	
t Stat	-0.61996	
P(T<=t) two-tail	0.543506	
t Critical two-tail	2.109816	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Table 4.15

Survey #3 Leadership Style Flexibility 30-day Post-test t-test and Escape Room Experience

	Prior Escape Room Experience	No Prior Escape Room Experience
Mean	23.28571429	22.2
Variance	7.142857143	11.95555556
Observations	14	10
df	16	
t Stat	0.831297808	
P(T<=t) two-tail	0.418039169	
t Critical two-tail	2.119905299	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Due to a low response rate on Survey #3, an additional test compared only Survey #1 pre-test and Survey #2 post-test scores when considering prior escape room experience. Using a series of paired t-tests, this analysis conducted the t-test on each set of assessment scores and then conducted a paired t-test on the change in scores from the pre-test to the post-test. The data for each survey's flexibility scores are below in Tables 4.16 through 4.18. In all three tests, $p > .05$, therefore failing to reject the null hypothesis. From the above analysis, we can assert that prior escape room experience did not have a statistically significant influence on participants' Leadership Style Flexibility scores. This implies that previous escape room experience is not a pre-requisite to success with acquiring knowledge of Leadership Style Flexibility in a digital escape game.

Table 4.16

Survey #1 Leadership Style Flexibility Pre-Test t-test and Escape Room Experience

	Prior Escape Room Experience	No Prior Escape Room Experience
Mean	17.15385	16
Variance	30.77538	21.33333
Observations	26	16
df	36	
t Stat	0.727288	
P(T<=t) two-tail	0.471753	
t Critical two-tail	2.028094	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Table 4.17

Survey #2 Leadership Style Flexibility Post-test t-test and Escape Room Experience

	Prior Escape Room Experience	No Prior Escape Room Experience
Mean	21.69231	21.875
Variance	26.78154	24.25
Observations	26	16
df	33	
t Stat	-0.1145	
P(T<=t) two-tail	0.909533	
t Critical two-tail	2.034515	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Table 4.18

Difference in Flexibility Pre and Post-test t-test and Escape Room Experience

	Prior Escape Room Experience	No Prior Escape Room Experience
Mean	4.538462	5.875
Variance	40.81846	46.65
Observations	26	16
df	30	
t Stat	-0.63106	
P(T<=t) two-tail	0.532778	
t Critical two-tail	2.042272	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Prior Situational Leadership Training Impact on Leadership Style Flexibility. An additional level of analysis sought to determine if prior situational leadership training had an impact on Leadership Style Flexibility. The null hypothesis for the series of paired t-tests stated that there would be no statistically significant difference in Leadership Style Flexibility scores as a factor of previous experience. Results failed to reject the null hypothesis ($p > .05$) and concluded that there was no statistically significant difference of Leadership Style Flexibility scores based on previous situational leadership experience. This implies that previous situational leadership experience did not have an influence on learning acquisition related to Leadership Style Flexibility learning acquisition.

The analysis was first run using all three test scores. However, due to the low response rate of Survey #3, a follow-up analysis was conducted that only compared Survey #1 pre-test and Survey #2 post-test scores. The scores were separated into two groups, those with and without previous situational leadership experience. Table 4.19 provides a summary of the results described in further detail below.

Table 4.19

Previous Situational Leadership Experience and Leadership Style Flexibility Summary

Variable		n	p	Result
3 Assessments				
	Pre-test	24	.29	Fail to reject null hypothesis
	Post-test	24	.47	
	30-day post-test	24	.93	
2 Assessments				
	Pre-test	42	.07	Fail to reject null hypothesis
	Post-test	42	.46	
	Score change	42	.03	Reject null hypothesis

The first analysis used a series of paired t-tests assuming unequal variance to compare the Leadership Style Flexibility scores from the Survey #1 pre-test, Survey #2 post-test, and Survey #3 30-day post-test, factoring in previous situational leadership training experience. 24 participants completed all three surveys. The data for each flexibility score t-test are below in Tables 4.20 through 4.22. All three tests failed to reject the null hypotheses ($p < .05$), therefore there was no statistically significant difference between the Leadership Style Flexibility scores. Previous situational leadership experience did not have an influence on flexibility scores when comparing across the three assessments.

Table 4.20

Survey #1 Leadership Style Flexibility Pre-Test t-test and Situational Leadership Experience

	Prior Situational Leadership Experience	No Prior Situational Leadership Experience
Mean	17.77778	15.73333
Variance	23.44444	13.6381
Observations	9	15
df	14	
t Stat	1.0906	
P(T<=t) two-tail	0.293864	
t Critical two-tail	2.144787	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Table 4.21

Survey #2 Leadership Style Flexibility Post-test T-test and Situational Leadership Experience

	Prior Situational Leadership Experience	No Prior Situational Leadership Experience
Mean	21.33333	22.66667
Variance	21	14.09524
Observations	9	15
df	14	
t Stat	-0.737	
P(T<=t) two-tail	0.473296	
t Critical two-tail	2.144787	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Table 4.22

Survey #3 Flexibility 30-day Post-test t-test and Situational Leadership Experience

	Prior Situational Leadership Experience	No Prior Situational Leadership Experience
Mean	22.44444	23.06667
Variance	8.777778	9.638095
Observations	9	15
df	18	
t Stat	-0.48919	
P(T<=t) two-tail	0.630616	
t Critical two-tail	2.100922	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Due to a low response rate on Survey #3, an additional test compared only Survey #1 pre-test and Survey #2 post-test scores to determine if there was a statistically significant difference in Leadership Style Flexibility when considering prior situational leadership training experience. Using a series of paired t-tests, this analysis was conducted on each set of assessment scores and then on the change in scores from the pre-test to the post-test. The data for each survey's flexibility scores are below in Tables 4.23 through 4.25.

Table 4.23

Survey #1 Leadership Style Flexibility Pre-Test t-test and Situational Leadership Experience

	Prior Situational Leadership Experience	No Prior Situational Leadership Experience
Mean	18.21053	15.30435
Variance	30.17544	22.40316
Observations	19	23
df	36	
t Stat	1.81557	
P(T<=t) two-tail	0.077773	
t Critical two-tail	2.028094	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Table 4.24

Survey #2 Leadership Style Flexibility Post-test t-test and Situational Leadership Experience

	Prior Situational Leadership Experience	No Prior Situational Leadership Experience
Mean	21.36842	22.52174
Variance	36.02339	12.44269
Observations	19	23
df	28	
t Stat	-0.7388	
P(T<=t) two-tail	0.466178	
t Critical two-tail	2.048407	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Table 4.25

Difference in Flexibility Pre and Post Test t-test and Situational Leadership Experience

	Prior Situational Leadership Experience	No Prior Situational Leadership Experience
Mean	3.157895	7.217391
Variance	37.47368	37.72332
Observations	19	23
Hypothesized Mean Difference	0	
df	39	
t Stat	-2.13585	
P(T<=t) two-tail	0.039025	
t Critical two-tail	2.022691	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

The first paired t-test above (Table 4.23) tested the Survey #1 pre-test scores. The test failed to reject the null hypothesis ($p > .05$), implying that there was no statistically significant difference in Leadership Style Flexibility between participants with and without previous situational leadership experience ($p = 0.07$). While this study used a 95% significance level, if changed to 90%, this paired t-test would reject the null hypothesis ($p < .10$) implying that there would be a statistically significant difference between those with and without prior situational leadership training, which would be in alignment with assumptions. The data is inconclusive whether previous situational leadership training would influence pre-test scores. The results based on this study's parameters imply there is no difference. However, the results are close enough that further research would be beneficial for stronger results.

The second paired t-test above (Table 4.24) comparing the scores from the Survey #2 post-test also failed to reject the null hypothesis ($p > .05$), implying that there was not a statistically significant difference in post-game Leadership Style Flexibility scores between those with and without prior situational leadership training experience ($p = 0.46$). These results provide

a stronger confidence that previous experience did not have an influence on post-game Leadership Style Flexibility scores.

The third paired t-test above (Table 4.25) compared the difference between the pre-test and post-test Leadership Style Flexibility scores as a means to calculate learning acquisition. The test rejected the null hypothesis ($p < .05$), therefore the Leadership Style Flexibility scores from the Survey #2 post-test had a statistically significant difference. This demonstrated that participants without prior situational leadership training resulted in a greater increase in Leadership Style Flexibility scores.

Secondary Research Question 2 Quantitative Summary

Question 2 Hypothesis 1(Q_2H_1) states that there is no statistically significant difference in participant Leadership Style Flexibility scores between pre-game, post-game, and 30-day post-game assessments following an escape room leadership training. A series of paired t-test analyses demonstrated statistically significant improvements in Leadership Style Flexibility scores when comparing across the assessments. Further analysis considered the impact of previous experience with escape rooms and situational leadership on Leadership Style Flexibility scores. A series of paired t-test analyses demonstrated no statistically significant difference in flexibility scores as a result of previous experience. Therefore, the study concludes that The Leadership Escape Game improved learning acquisition, as measured by Leadership Style Flexibility scores. Additionally, previous experience with escape room games or situational leadership is not a pre-requisite for successful Leadership Style Flexibility learning acquisition.

Secondary Research Question 3

Q3: How does the use of escape room games improve Leadership Style Effectiveness? The null hypothesis for this research question stated:

H_1: There is no statistically significant difference in participant Leadership Style Effectiveness between pre-game, post-game and 30-day post-game assessments following an escape room leadership training.

Using the Leadership Style Effectiveness scores from the LBA II®, analysis provided multi-faceted results about learning acquisition. A comparison of three assessment scores using a one-way ANOVA failed to reject the null hypothesis ($p = .053$), implying that there was no statistically significant difference across the three assessment scores. However, a follow-up analysis involving a series of paired t-tests rejected the null hypothesis when comparing the Survey #1 pre-test scores to the Survey #2 post-test and then separately to the Survey #3 30-day post-test scores. Rejecting the null hypothesis implies there was a statistically significant difference between scores from before and after The Leadership Escape Game. While further details of these analyses are discussed in the following section, the study does conclude that there is sufficient evidence to support the claim that The Leadership Escape Game influenced an improvement in learning acquisition through Leadership Style Effectiveness scores.

Leadership Style Effectiveness Descriptive Statistics

To prepare for hypothesis testing, descriptive data were calculated for the Leadership Style Effectiveness scores. Descriptive data can be found in Table 4.26.

Table 4.26

Descriptive Statistics for Leadership Style Effectiveness Scores

	N	Mean	Median	Range	Std Dev
Pre-Test	42	61.67	51.5	48	9.879
Post-test	42	57.07	56	38	8.279
30-day Post-test	24	57.67	59.5	38	9.328

The Leader Behavior Analysis II® calculates Leadership Style Effectiveness within a range of low effectiveness (20) to high effectiveness (80) and identifies the normal range for leadership style effectiveness to fall within 50 to 58 (Blanchard et al., 2013).

Q_3H_1 - Leadership Effectiveness Scores

Question 3 Hypothesis 1(Q_3H_1) tested the null hypothesis that the use of an escape room game for leadership training would not result in a statistically significant difference of Leadership Style Effectiveness scores as calculated by the LBAII® (see Figure 4.7). Similarly to the above-described Leadership Style Flexibility analysis, only 24 participants completed all three assessments. Due to the low response rate of Survey #3, Leadership Style Effectiveness scores were also compared between the Survey #1 pre-test and Survey #2 post-test.

Figure 4.7

Question 3 Hypothesis 1 Null Hypotheses

Comparing Three Assessment Scores	**Comparing Two Assessment Scores**
$H_o: \mu_a = \mu_b = \mu_c$	$H_o: \mu_a = \mu_b$
$H_a: \mu_a \neq \mu_b \neq \mu_c$	$H_a: \mu_a \neq \mu_b$

Comparing Leadership Style Effectiveness across Three Assessments. Leadership Style Effectiveness scores were compared across the three assessments to draw additional conclusions about learning acquisition. A one-way ANOVA was used to compare the variance in the three sets of effectiveness scores and followed-up with a series of paired t-tests to compare the variance between each assessment. The tests determined the variance of effectiveness scores from before The Leadership Escape Game (Survey #1 pre-test) to the two post-game tests. Additionally, Survey #2 scores were compared to Survey #3 to compare the variance of scores following The Leadership Escape Game.

One-Way ANOVA - Comparing Three Leadership Style Effectiveness Scores. Using a one-way ANOVA, the Leadership Style Effectiveness scores of 24 participants were compared across the three assessments. A preliminary analysis to check assumptions accounted for normality. Scores from the three assessments all fell within the normal range: Survey #1 pre-test = 51.83, Survey #2 post-test = 56.70, Survey #3 30-day post-test = 57.67. Table 4.27 provides the data from the one-way ANOVA. The test resulted in a p-value equal to .053 and an F-statistic less than the F-critical. The test failed to reject the null hypothesis ($p > .05$), implying that there was not a statistically significant difference in Leadership Style Effectiveness. This study used a significance level of 95%, however with a significance level of 90%, this one-way ANOVA would have rejected the null hypothesis ($p < .10$) implying that there would be a statistically significant difference between the three Leadership Style Effectiveness scores. To summarize, the Leadership Style Effectiveness scores did increase across the three assessments, however the one-way ANOVA did not determine that there was a statistically significant difference.

Table 4.27

One-Way ANOVA Test of Leadership Style Effectiveness Scores

SUMMARY

Groups	Count	Sum	Average	Variance
Survey #1 Pre-Test	24	1244	51.8333	68.9275
Survey #2 Post-Test	24	1361	56.7083	75.3460
Survey #3 30-day Post-Test	24	1384	57.6666	87.0144

ANOVA

Source of Variation	SS	df	MS	F	p-value	F crit
Between Groups	469.69	2	234.847	3.04616	0.05398	3.12964
Within Groups	5319.6	69	77.0960			
Total	5789.3	71				

Paired t-test Follow-up Analysis to One-Way ANOVA. As a follow-up analysis to the one-way ANOVA, a series of paired t-tests were conducted to determine the variance between each of the three assessments. The null hypotheses for these tests claim that there is no statistically significant difference in Leadership Style Effectiveness scores between each of the three assessments. Table 4.28 provides the data from the series of paired t tests. The scores from the three assessments include: Survey #1 pre-test = 51.83, Survey #2 post-test = 56.70, Survey #3 30-day post-test = 57.67. In the tests comparing Survey #1 to Survey #2 ($p = 0.01$) and Survey #1 to Survey #3 ($p = 0.003$), both tests rejected the null hypotheses ($p < .05$). Therefore, there was a statistically significant difference between the Survey #1 pre-test and both of the tests following The Leadership Escape Game. The paired t-test comparing Survey #2 to Survey #3 ($p = 0.57$), failed to reject the null hypothesis ($p > .05$) therefore, there was no statistically significant difference in scores. The non-statistically significant result between Survey #2 and Survey #3 present evidence for the retention of knowledge from immediately following the game to at least 30-days later. In summary, learners acquired Leadership Style Effectiveness knowledge from the game and retained that knowledge for at least 30 days.

Table 4.28

Leadership Style Effectiveness Paired t-test of Three Assessments

	Survey #1	Survey #2	Survey #1	Survey #3	Survey #2	Survey #3
Mean	51.833	56.708	51.833	57.667	56.708	57.667
Variance	68.928	75.346	68.928	87.014	75.346	87.014
Observations	24.000	24.000	24.000	24.000	24.000	24.000
Pearson Correlation	0.457		0.500		0.589	
df	23.000		23.000		23.000	
t Stat	-2.696		-3.226		-0.574	
P(T<=t) two-tail	0.013		0.004		0.572	
t Critical two-tail	2.069		2.069		2.069	

Paired t-test – Comparing Pre-Test and Post Test Effectiveness Scores. Due to the low response rate of Survey #3, an additional paired t-test was conducted with a larger sample size of participants who completed the Survey #1 pre-test and Survey #2 post-test. The pre-test and post-test Leadership Style Effectiveness scores of 42 participants were compared using a paired two-sample t-test. Table 4.29 provides the data from the paired t-test. A preliminary analysis to check assumptions accounted for normality, sample independence, and a continuous variable. The test rejected the null hypothesis ($p < .05$).

Rejecting the null hypothesis determined that there was a statistically significant difference between the Survey #1 pre-test and Survey #2 post-test assessments. The average Leadership Style Effectiveness scores increased from the Survey #1 pre-test to the Survey #2 post-test assessment, implying that there was a statistically significant increase in average scores. An additional consideration is that the Pearson Correlation calculated to .48 suggesting a medium strength positive correlation. This analysis implies that Leadership Style Effectiveness learner acquisition did occur between the Survey #1 pre-test and Survey #2 post-test.

Table 4.29

Q_3H_1 Paired t-test of Leadership Style Effectiveness Scores

	Pre-Test	Post-test
Mean	51.66667	57.07143
Variance	97.5935	68.84843
Observations	42	42
Pearson Correlation	0.482922	
df	41	
t Stat	-3.74943	
P(T<=t) two-tail	0.000548	
t Critical two-tail	2.019541	

Prior Escape Room Experience Impact on Leadership Style Effectiveness. An additional level of analysis sought to determine if escape room experience prior to playing The

Leadership Escape Game had an impact on Leadership Style Effectiveness scores. The null hypothesis for the series of paired t-tests stated that there would be no statistically significant difference in Leadership Style Effectiveness scores factoring in previous experience. Results failed to reject the null hypothesis ($p > .05$) and concluded that there was no statistically significant difference of Leadership Style Effectiveness scores. Previous escape room experience did not have an influence on Leadership Style Effectiveness learning acquisition.

The analysis was first run using all three assessment scores. However, due to the low response rate of Survey #3, a follow-up analysis was conducted that only compared Survey #1 pre-test and Survey #2 post-test scores. The scores were separated into two groups, those with and without prior escape room experience. Table 4.30 provides a summary of effectiveness results based on previous escape room experience.

Table 4.30

Previous Escape Room Experience and Leadership Style Effectiveness Summary

Variable		n	p	Result
3 Assessments				
	Pre-test	24	0.31	Fail to reject null hypothesis
	Post-test	24	0.52	
	30-day post-test	24	1.72	
2 Assessments				
	Pre-test	42	0.09	Fail to reject null hypothesis
	Post-test	42	0.90	
	Score change	42	0.08	

The first analysis used a series of paired t-tests assuming unequal variance to compare the Leadership Style Effectiveness scores from the Survey #1 pre-test, Survey #2 post-test, and Survey #3 30-day post-test factoring in prior escape room experience. 24 participants completed all three surveys. The data for each survey's effectiveness scores are below in Tables 4.31 through 4.33. All three tests failed to reject the null hypotheses ($p > .05$). This implies there was

no statistically significant difference between the Leadership Style Effectiveness scores of those with and without prior escape room experience.

Table 4.31

Survey #1 Leadership Style Effectiveness Pre-Test t-test and Escape Room Experience

	Prior Escape Room Experience	No Prior Escape Room Experience
Mean	50.5	53.7
Variance	102.5769	21.34444
Observations	14	10
df	19	
t Stat	-1.04033	
P(T<=t) two-tail	0.311243	
t Critical two-tail	2.093024054	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Table 4.32

Survey #2 Leadership Style Effectiveness Post-test t-test and Escape Room Experience

	Prior Escape Room Experience	No Prior Escape Room Experience
Mean	55.78571	58
Variance	99.1044	46.22222
Observations	14	10
df	22	
t Stat	-0.64732	
P(T<=t) two-tail	0.524122	
t Critical two-tail	2.073873	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Table 4.33

Survey #3 Leadership Style Effectiveness 30-day Post-test t-test and Escape Room Experience

	Prior Escape Room Experience	No Prior Escape Room Experience
Mean	58	57.2
Variance	88.76923	93.73333
Observations	14	10
df	19	
t Stat	0.201812	
P(T<=t) two-tail	0.842209	
t Critical two-tail	2.093024	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Due to a low response rate on Survey #3, an additional test compared only Survey #1 pre-test and Survey #2 post-test scores to determine if there was a difference in Leadership Style Effectiveness when considering prior escape room experience. Using a series of paired t-tests, this analysis conducted a paired t-test on each set of assessment scores and then also on the change in scores from the pre-test to the post-test. The data for each survey's effectiveness scores are below in Tables 4.34 through 4.36. All three tests failed to reject the null hypothesis ($p > .05$); there was no statistically significant difference in effectiveness scores. This implies that previous escape room experience did not have an influence on Leadership Style Effectiveness scores.

Table 4.34

Survey #1 Leadership Style Effectiveness Pre-Test t-test and Escape Room Experience

	Prior Escape Room Experience	No Prior Escape Room Experience
Mean	49.84615	54.625
Variance	121.5754	49.05
Observations	26	16
df	40	
t Stat	-1.71754	
P(T<=t) two-tail	0.093614	
t Critical two-tail	2.021075	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Table 4.35

Survey #2 Leadership Style Effectiveness Post-test t-test and Escape Room Experience

	Prior Escape Room Experience	No Prior Escape Room Experience
Mean	57.19231	56.875
Variance	74.16154	64.51667
Observations	26	16
df	34	
t Stat	0.120931	
P(T<=t) two-tail	0.904457	
t Critical two-tail	2.032245	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Table 4.36

Difference in Effectiveness Pre and Post-test t-test and Escape Room Experience

	Prior Escape Room Experience	No Prior Escape Room Experience
Mean	7.346154	2.25
Variance	87.91538	74.86667
Observations	26	16
df	34	
t Stat	1.794985	
P(T<=t) two-tail	0.081551	
t Critical two-tail	2.032245	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Prior Situational Leadership Training Impact on Leadership Style Effectiveness. An additional level of analysis sought to determine if prior situational leadership training had an impact on Leadership Style Effectiveness scores. The null hypothesis for the series of paired t-tests stated that there would be no statistically significant difference of Leadership Style Effectiveness scores as a factor of previous experience. Results failed to reject the null hypothesis ($p > .05$) and concluded that there was no statistically significant difference of Leadership Style Effectiveness scores when considering previous situational leadership experience.

The analysis first compared all three test scores. However, due to the low response rate of Survey #3, a follow-up analysis was conducted that only compared Survey #1 pre-test and Survey #2 post-test scores. The scores were separated into two groups, those with prior situational leadership training experience and those without. Table 4.37 provides a summary of the results for Leadership Style Effectiveness considering previous situational leadership experience.

Table 4.37

Previous Situational Leadership Experience and Leadership Style Effectiveness Summary

Variable		n	p	Result
3 Assessments				
	Pre-test	24	.32	Fail to reject null hypothesis
	Post-test	24	.72	
	30-day post-test	24	.64	
2 Assessments				
	Pre-test	42	.09	Fail to reject null hypothesis
	Post-test	42	.18	
	Score change	42	.51	

The first analysis used a series of paired t-tests assuming unequal variance to compare the Leadership Style Effectiveness scores from the Survey #1 pre-test, Survey #2 post-test, and Survey #3 30-day post-test factoring in previous situational leadership training experience. 24 participants completed all three surveys. The data for each survey's effectiveness scores are below in Tables 4.38 through 4.40. All three tests, failed to reject the null hypotheses ($p > .05$), therefore, there was no statistically significant difference between the Leadership Style Effectiveness scores. Previous situational leadership experience did not have an influence on effectiveness scores across the three assessments.

Table 4.38

Survey #1 Leadership Style Effectiveness Pre-Test t-test and Situational Leadership

	Prior Situational Leadership Experience	No Prior Situational Leadership Experience
Mean	54.22222	50.4
Variance	91.44444	55.11429
Observations	9	15
df	14	
t Stat	1.027614	
P(T<=t) two-tail	0.32156	
t Critical two-tail	2.144787	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Table 4.39

Survey #2 Leadership Style Effectiveness Post-test t-test and Situational Leadership

	Prior Situational Leadership Experience	No Prior Situational Leadership Experience
Mean	57.55556	56.2
Variance	83.52778	75.31429
Observations	9	15
df	16	
t Stat	0.358444	
P(T<=t) two-tail	0.724696	
t Critical two-tail	2.119905	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Table 4.40

Survey #3 Leadership Style Effectiveness 30-Day Post-test t-test and Situational Leadership

	Prior Situational Leadership Experience	No Prior Situational Leadership Experience
Mean	56.33333	58.46667
Variance	157.5	51.12381
Observations	9	15
df	11	
t Stat	-0.46655	
P(T<=t) two-tail	0.649924	
t Critical two-tail	2.200985	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Due to a low response rate on Survey #3, an additional test compared only Survey #1 pre-test and Survey #2 post-test scores to determine if there was a statistically significant difference in Leadership Style Effectiveness when considering previous situational leadership training. Using a series of paired t-tests, this analysis was conducted on each set of assessment scores and then on the change in scores from the pre-test to the post-test. The data for each survey's effectiveness scores are below in Tables 4.41 through 4.43. All three tests failed to reject the null hypothesis ($p > .05$). From this, we can assert that prior situational leadership experience did not have an influence on Leadership Style Effectiveness scores. One consideration is Survey #1 pre-

test (p = .09). With a significance level of 90% this paired t-test would have rejected the null hypothesis (p < .10), implying that there would be a statistically significant difference between those with and without prior situational leadership training within the Survey #1 pre-test scores. This consideration is important because assumptions identify that those without previous situational leadership experience would score lower on a pre-test. Further research is recommended.

Previous situational leadership experience did not appear to have an influence on learner acquisition related to Leadership Style Effectiveness. The final analysis did identify that with a lower significance level (90%) Survey #1 pre-test scores were lower for those without previous situational leadership experience than those who had gone through training before, which is in alignment with assumptions. However, with the parameters of this study, there was not a statistically significant difference. A larger sample size would improve the data analysis for previous situational leadership influence on Leadership Style Effectiveness.

Table 4.41

Survey #1 Leadership Style Effectiveness Pre-Test t-test and Situational Leadership

	Prior Situational Leadership Experience	No Prior Situational Leadership Experience
Mean	54.57895	49.13636
Variance	129.0351	65.55195
Observations	19	22
df	32	
t Stat	1.741152	
P(T<=t) two-tail	0.091265	
t Critical two-tail	2.036933	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Table 4.42

Survey #2 Leadership Style Effectiveness Post-test t-test and Situational Leadership

	Prior Situational Leadership Experience	No Prior Situational Leadership Experience
Mean	59.05263	55.54545
Variance	60.16374	76.06926
Observations	19	22
df	39	
t Stat	1.36267	
P(T<=t) two-tail	0.180804	
t Critical two-tail	2.022691	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Table 4.43

Difference in Effectiveness Pre and Post-test t-test and Situational Leadership

	Prior Situational Leadership Experience	No Prior Situational Leadership Experience
Mean	4.473684	6.409091
Variance	79.7076	99.30087
Observations	19	22
df	39	
t Stat	-0.65583	
P(T<=t) two-tail	0.515783	
t Critical two-tail	2.022691	

Note. Fail to reject the null hypothesis. No statistically significant difference with experience.

Addressing Small Sample Size with Additional Analysis

24 participants completed Survey #3. To measure the influence of previous escape room experience or situational leadership training on learning acquisition, this sample was further divided into sub-sections of experience. Within these smaller groups, the analysis of previous escape room experience included 14 participants with previous experience and 10 without. Situational leadership analysis included 9 participants with previous situational leadership

training and 15 without. To exercise due diligence in analysis, the study used the Mann Whitney U test, also known as the Wilcoxon rank sum test, which is used for lower sample sizes.

In all instances of this additional analysis, the results failed to reject the null hypotheses ($p > .05$), meaning that there was no statistically significant difference between Leadership Style Flexibility or Leadership Style Effectiveness scores based on previous experience (See Tables 4.44 and 4.45). This implies that neither previous escape room nor situational leadership experience are prerequisites for success in learning acquisition with The Leadership Escape Game. This additional analysis supports the previous findings that there is no difference in learning acquisition scores when factoring in previous experience.

Table 4.44

Leadership Style Flexibility: Previous Escape Room and Situational Leadership Experience

Variable	Previous Escape Room Experience			Previous Situational Leadership Experience		
	Sum of Ranks	Count	U Stat	Sum of Ranks	Count	U Stat
Survey #1						
Yes	194	14	89[a]	129.5	9	84.5[b]
No	106	10	51[a]	158.5	15	38.5[b]
Survey #2						
Yes	164	14	59[a]	103	9	58[b]
No	128	10	73[a]	194.5	15	74.5[b]
Survey #3						
Yes	188	14	83[a]	106.5	9	61.5[b]
No	109.5	10	54.5[a]	191	15	71[b]

Note: N = 24. Yes = previous experience; No = No previous experience; All U-Stat values are greater than the U Critical Values, therefore failing to reject the null hypothesis

[a] Previous Escape Room Experience Critical Value = 36

[b] Previous Situational Leadership Experience Critical Value = 34

Table 4.45

Leadership Style Effectiveness: Previous Escape Room and Situational Leadership Experience

Variable	Previous Escape Room Experience			Previous Situational Leadership Experience		
	Sum of Ranks	Count	U Stat	Sum of Ranks	Count	U Stat
Survey #1						
Yes	161.5	14	56.5	131	9	86
No	138.5	10	83.5	169	15	49
Survey #2						
Yes	163.5	14	58.5	115.5	9	70.5
No	136.5	10	81.5	184.5	15	64.5
Survey #3						
Yes	179	14	74	111	9	66
No	121	10	66	189	15	69

Note: N = 24. Yes = previous experience; No = No previous experience; All U-Stat values are greater than the U Critical Values, therefore failing to reject the null hypothesis

[a] Previous Escape Room Experience Critical Value = 36

[b] Previous Situational Leadership Experience Critical Value = 34

Quantitative Analysis Summary

Learner satisfaction and learning acquisition data were collected using the study's three surveys. The primary research question asked about the effectiveness of escape room games to deliver leadership training. This study showed positive learner satisfaction and learning acquisition results.

Secondary Research Question 1 focused on learner satisfaction data collected immediately following The Leadership Escape Game. Hypothesis 1 stated that the use of an escape room game for leadership training does not result in statistically significant positive learner satisfaction survey results. The evidence is sufficient to reject this claim. Participant

ratings demonstrated that they enjoyed the game, believed the game was engaging, and found it to be an overall valuable learning experience that they would recommend to other leaders.

Secondary Research Question 1 Hypothesis 2 stated that there is no statistically significant difference in average learner satisfaction survey results from participants with and without prior escape room experience. Results show there is no statistically significant difference on all survey statements except one statement. Previous escape room experience did not influence learner satisfaction. One exception is the survey statement asserting that the game enhanced leadership skills. While those with previous escape room experience did rate this at a statistically significant difference and higher rating than those without experience, both ratings were at a positive satisfactory level.

Secondary Research Question 1 Hypothesis 3 stated that there is no statistically significant difference in average learner satisfaction survey results from participants with and without prior training in situational leadership. Results show there is no statistically significant difference on all survey statements except the statement "I enjoyed playing this game." Previous situational leadership experience did not influence learner satisfaction. One exception is that participants with previous situational leadership experience had a statistically significant and higher rating of game enjoyment than those without previous experience. Despite the difference, both those with and without previous experience rated high game enjoyment and it is implied that previous situational leadership experience is not a pre-requisite for learner satisfaction.

Secondary Research Questions 2 and 3 presented the null hypotheses that there would not be a statistically significant difference in Leadership Style Flexibility and Leadership Style Effectiveness across the study's learning acquisition assessments. The evidence is sufficient to reject the claim. Results showed a statistically significant difference and increase in flexibility

and effectiveness scores across the assessments. Overall, participants demonstrated positive learning satisfaction and positive learning acquisition.

Qualitative Results

Approximately 30 days following The Leadership Escape Game, participants were invited to discuss their experience with the game and how it has since influenced their leadership practices. The interviews provided additional insight into the research questions with participant comments on learner satisfaction, learning acquisition, and behavior change. 13 participants volunteered for the interview. Using a structured interview protocol, the researcher asked about reactions to The Leadership Escape Game and self-assessment of skill related to the SLII® model. The interview protocol included the following 14 questions.

1. You have been identified as a people leader. What is your current role/title and how many employees directly report to you?
2. What kinds of leadership training activities or workshops have you previously participated in, outside of the Leadership Escape Room Game activity?
3. How would you rate how well you applied the other leadership trainings into your work, on a scale of 1, being not at all to 5 your leadership approach completely changed because of the training? Please explain your answer.
4. Have you ever participated in an escape room game before this study?
5. What are your thoughts about playing an escape room game as a way to learn leadership concepts and skills?
6. How would you compare your experience of previous leadership training to the escape room game?
7. Consider the last month since the escape game leadership training, what have you put into practice that you learned in training activity?
8. An objective of the training was to match leadership styles based on an individual's development level. Of the four leadership styles in Situational Leadership, what styles do you use most often?

9. If you were to assess your own skill, how well do you match the appropriate leadership style to an employee's developmental level?

10. If you were to assess your own skill, how well do you use all four of the leadership styles in different scenarios?

11. When you think about the last month, how would you describe how the escape game leadership training activity influenced your leadership practices?

12. When you consider the escape room game leadership training, is there anything that you think the designer of the game would like to know to improve the game for future leadership training?

13. Any other final things you would like to share?

14. Do you have any questions for me?

Analysis of these interviews followed the Interpretative Phenomenological Analysis (IPA) approach to discover emerging themes and draw inferences from the participants' answers. Interpretative Phenomenological Analysis (IPA) applies five steps: (1) read, re-read, and take notes, (2) define emerging themes from the notes, (3) identify relationships between the emerging themes, (4) create a table of themes and quotes, (5) repeat for all interviews and compile a final table of themes (Noon, 2018). Each interview was transcribed through multiple reviews and confirmation of the recorded content. The transcribed interviews were uploaded to Atlas.ti for coding and theme organization.

The following qualitative results are organized based on the study's research questions. The first section provides additional demographic insight into the interviewed participants to help provide a comparison of the interviewed sample to the larger study's sample. The remaining sections present interview content in alignment with the study's research questions.

Interviewed Participant Demographics

In the above quantitative analysis, demographics were analyzed for all participants who played The Leadership Escape Game. This section will focus on the 13 participants who

completed all three surveys, The Leadership Escape Game, and volunteered for the interview. The number and percentage of participants that identified gender included 10 female (77 %) and 3 male (23%), which was similar to the overall study's gender ratio. The age of interviewed participants spanned 30 to 59 with the following percentages: 30-39 (62%), 40-49 (23%), 50-59 (14%). While these were relatively close to the original study percentages, there were no interviews that represented the 20 to 29, 60 to 69, or 70 to 79 age ranges.

Related to role at work, the two role categories represented within the interviews included the People Leader: Individual Contributors directly report to me (85%). and the People Leader Manager: My direct reports have Individual Contributors and/or People Leaders that directly report to them (15%). No participants in the Individual Contributor or Senior Leader categories volunteered for an interview. During the interviews, participants were asked to provide additional information about their roles, including title and number of reporting employees. Roles included directors, managers, senior managers, specialists, and supervisors. The interviewees represented three different areas of industry: administrative and recruiting (31%), training and education (38%), and healthcare (31%). The average number of direct reports for interviewed participants was about seven employees with a median of five reports. Nine of the interviewed participants had five or fewer direct reports. There were two outliers, one with 33 direct reports and another with 10 that increased the average number of reporting employees. It is also noted that two additional participants mentioned having indirect reports, whether a project team or a larger volunteer population, but did not provide a specific number for their scope of responsibility. Regarding years of experience, the only category that was not represented by the interviewed participants was the range of 16 to 20 years. Those interviewed had the following years of leadership experience: 0 to 1 years (8%), 2 to 5 years (38%), 6 to 10 years (23%), 11 to

15 years (25%), 21 or more years (8%). These percentages were representative of the larger sample for the study.

An additional demographic consideration involved prior experience with escape room games and situational leadership training. Of the 13 interviewed participants, 46% had prior experience with escape rooms and 54% had none. Related to prior situational leadership training, 38% had prior experience and 62% had none.

One final demographic consideration was the number of participants in each game. Five interviewed participants (38%) played solo games, five participants (38%) played games of two players, and three interviewed participants played in three, four, and five player games, respectively.

The demographics of the interviewed participants are reflective of the larger study's sample demographics. The age ranges were the only gap in representation among the interviewed sample. This alignment supports an assumption that the interview analysis will reflect the experience of the study's broader sample of participants.

Secondary Research Question 1 – Learner Satisfaction

Secondary Research Question 1 studied the level of participant satisfaction with The Leadership Escape Game as one way to determine the value of this learning experience. Results from the post-game satisfaction survey were analyzed in the above quantitative section. Themes also emerged within the interviews to support the findings on learner satisfaction, such as positive reactions, challenges with the game, and comparisons of The Leadership Escape Game to other leadership training experiences. Each of these is discussed in the following sections.

Positive Reactions to The Leadership Escape Game

Throughout the interviews, participants provided their reactions and opinions about the efficacy of the use of escape room games for leadership training. Table 4.46 shows the two overarching themes and recurring sub-themes regarding positive reactions to the game.

Table 4.46

Positive Reactions to The Leadership Escape Game (Themes)

Themes	
Overall Experience	Design/Learning
Fun/Enjoy/Like/Interesting	Design/Effective
Unique/New/Novelty	Relevant
Memorable	Ownership

Overall Experience and Learner Satisfaction. The first theme focused on overall experience. As was expected based on the literature review and the learner satisfaction survey results, participants had an overall positive experience with The Leadership Escape Game. The most common sub-theme was that participants found it to be an enjoyable experience. Participants said, "I thought it was a really fun way of approaching skill building..." and "I really enjoyed it." One participant even expressed:

> I think that it's a perfect way and it's a fun way of learning these concepts and being able to apply it, but … doing it in a way, where… you're having so much fun that you don't … realize all the learning that's going on until later.

Reactions also signaled a common feeling that this was a unique experience. In general, one participant commented, "…an escape room is a new concept, at least it was new for me. That method made it intriguing and made me want to do it." Other participants expressed that it was interesting or something unique. Specifically related to game-based learning, one participant

said, “You’re trying to find new ways to get people to remember what it is that I’m trying to teach you so that you can apply it in multiple ways. So I thought it was a fantastic tool to add to that.” Another said, “I think it’s a really fresh take on training.” The novelty of participating in a leadership training delivered through an escape room game was memorable and left a long-term impression on the participants.

Game Design and Learner Satisfaction. A second learner satisfaction theme was related to the design of the game. Participants’ responses focused on the interactivity, the ways they were able to practice and apply the learning to real scenarios within the game, and the necessity to be actively engaged and take ownership of their learning experience. One participant stated, “I liked the repetitiveness of it. We’ve learned the concepts and then got to apply it multiple times in different ways, which I think really helped and, again, make it sink in.” Another noted, “…the escape room was extremely interactive.” Regarding ownership, a participant expressed that, “I liked that it made me take a little more ownership and control over what content I engaged with and how quickly I engaged with it.” Similarly, another participant stated:

> I couldn’t sit back and let somebody else steer the class or I couldn’t sit back and let somebody else do all the participating and just kind of coast. I really had to take ownership of figuring it out as we went, because there was no one else there to escape the room, so that part I think made it a lot of fun as well.

Finally, one participant confessed, “I was forced into like kind of paying attention.” They recognized that they had to stay engaged to finish the game despite having distractions of other work that would pop in. These responses illuminated learner engagement because they could see

the immediate application, they felt that they had some control, and were motivated to get through the game.

Challenges with The Leadership Escape Game Satisfaction

Participants did note challenges that could have influenced their experience and levels of satisfaction with the game. The two themes that stood out as detractors from learner satisfaction included the game's narrative and navigation.

A good storyline is considered a key component to good game design. In The Leadership Escape Game narrative, the facilitator was running late, so participants needed to get started without her. Participants explored the room, found clues and challenges, and solved puzzles to achieve each objective. The game was separated into three parts, each focusing on an objective of the training. At the end of each objective, participants had to solve a meta-puzzle that would require an application of what they learned in that objective to four portfolios of employees. These portfolios were gradually filled out as players ended each section of the game. Participants mentioned that sometimes there was a disconnect between the meta-puzzle portfolios and the other scenarios they were using for practice throughout the game. One participant said:

> I liked that there was… kind of that bulletin board that like you keep going back to to apply the next piece of the model. But because…we keep going back to it, and there were so many different scenarios, I had to keep kind of recalibrating, like okay, which person are we talking about, which task are they doing versus kind of learning the model and then say, 'Hey let's apply this to this situation and work our way all the way through.' So that part felt a little disjointed like I was…kind of jumping around between different kinds of activities, even though they repeated a little bit, there was a little bit of … linear-ness that was missing.

The consensus was that it was challenging to keep track of the scenarios within the meta-puzzle portfolio. Each time they got back to the meta-puzzle, they spent significant effort getting reacquainted with the scenario. There was a lot of content and many scenarios used within the game. There was also a change in scenery where the game shifted from being inside a conference room to an outside setting. Most participants expressed that they enjoyed the change and some even wished that the outside part was longer. There was one participant that said they were confused why they were outside. This reflects the detail that in designing an educational escape game, the storyline needs to support the objectives and the mechanics to make a cohesive experience.

The second challenge that influenced learner satisfaction was related to navigation. One participant said:

> The opening questions to the escape room about how to navigate was a little bit of a challenge. If you recall I had to keep asking you like, 'How can I hit? I don't see this arrow. This is not clicking in.' Um if you could just make the pathway a little bit easier… you didn't know really where to click is that, like those a flashing arrow saying, 'Please click here!'…Just on a computer … you know people get frustrated if they can't get to what they need to right away.

While many participants quickly navigated through the tutorial in the two to three minutes, this participant took almost ten minutes. They had an outlier experience as they struggled to locate the interactable objects within the game. It was a noteworthy observation that participants can have varying experiences in relation to navigation. Another participant also noted that they sometimes found themselves caught up in the game navigation:

> I was trying to learn the content, but at the same time I was also trying to orient myself with the environment. So I felt a little bit split between, like, what do I click on and how do I get to the next thing. And oh, is this a dragging thing or is this a whatever. So I felt like I was kind of using a lot of my processing power to figure out what to do next. So that when I actually go like, 'Oh I know what to do with this activity', some of my brain power had already been used up to then not be as able to focus as well on the content itself.

These comments highlight an important consideration of mechanics when designing educational escape games. Navigation challenges can take away from learner satisfaction.

Comparison of Satisfaction with The Leadership Escape Game to Prior Leadership Training

Interviewed participants were asked to share about other leadership training experiences as a benchmark of comparison to their experience with The Leadership Escape Game. Responses ranged from, "I probably had more fun [in the escape game]" to "if I had to rate it on a scale like the last one, I would have probably given it a four or five versus like the twos or threes that I gave the other leadership stuff." One participant offered insight into why the escape room was a more engaging experience. They said:

> So the one with [Program A], there's no comparison. It was boring. It was lackluster, one dimensional… [The escape game wasn't] the norm of the day. And I think that's really important because if you do the norm, which was [Program A], I wanted to poke my eyes out. Whereas, if you do something different, especially when it's brand new for me, it was brand new to do an escape room, so you know I'm over there like do I click on everything? Should I click on everything? I want to click on everything because it was something I'd never done before.

The theme of engagement emerged from multiple sources. One participant stated:

> I thought it was a fun way to learn [concepts and skills], which is always more engaging than somebody just standing there and talking to you. I feel like getting to…figure out how to apply them in those different scenarios, it was a fun way to do that. So it was more engaging, I think, than just a presentation would be.

Another participant said:

> So having been an instructor for many many years, anytime you can get someone to play to learn something, that's what you need to do. You need to…do something interesting so that they are engaged. So I found that [escape room] to be engaging as compared to like [another training program]. I think…in education, you have to be able to reach as many different people as you can and doing something different, really makes it so much better for the participants.

In comparison to other online training experiences, a participant said:

> I thought this was a much more engaging way of doing it than a traditional e-Learning course where a 'facilitator,' big quotes there, talks at you in an e-Learning course or recording…I liked that it made me take a little more ownership and control over what content I engaged with and how quickly I engaged with it.

Another comparison to specific media delivery highlighted that the participant would rather play The Leadership Escape Room game over other online experiences, such as LinkedIn Learning videos or required compliance training. However, this participant would pick in-person classroom training over The Leadership Escape Room game.

In the current pandemic world where in-person classroom training is not occurring as often and virtual webinars have been a primary delivery mechanism, participants expressed that

they would choose the digital escape game over a standard webinar because it is a unique and engaging experience. One participant said:

> An escape room is a new concept, at least it was new for me, that the method made it intriguing and made me want to do it. If you would have said, do you want to sit through an hour-long webinar on situational leadership, I probably would have passed. So strictly the method is enticing…. It differentiates itself from another one. If there was another situational leadership workshop being offered at the same time, and it was a two-hour webinar, I would have picked the escape room version.

When offered an opportunity at the end of the interview to provide general comments, participants often ended with a positive affirmation of their experience. One participant, specifically relating to the comparison of the escape game with other trainings stated, "I thought the game, overall was fun. I thought it was effective to learn something new, more effective than some of the other leadership activities I've participated in, so that was good."

The qualitative data from participant interviews presented an overwhelming positive reaction to The Leadership Escape Game. The overarching reflection of this analysis seemed to be well summed up by one participant. They said, "…the escape room was a lot of fun, too, because it was just something a little out of the box, even though it did weigh on the cognitive load a little bit; it still caught my attention." Participants identified the game as an enjoyable, engaging, and unique experience that supported their learning through ownership, relevant scenarios, and repetitive practice. The challenges that impacted learner satisfaction included narrative disconnects and the amount of content covered within the game. In comparison to other experiences, participants consistently rated the escape room game as a more engaging and interesting approach to leadership training than they had experienced before. Overall, the

qualitative data presents evidence that learners were satisfied with their experience in The Leadership Escape Game.

Secondary Research Question 2 – Leadership Style Flexibility

Secondary Research Question 2 focused on Leadership Style Flexibility as one component of determining learning acquisition and behavior change. The SLII® model presents four leadership styles that are matched to an employee based on their level of competence and commitment to a task (Blanchard et al, 1993). Matching the correct leadership style was one of the objectives of The Leadership Escape Game. While selecting the most appropriate leadership style at surface level is related to Leadership Style Effectiveness, a secondary outcome is that leaders would be able to apply all four of the leadership styles based on the needs of the employee, which demonstrates Leadership Style Flexibility. Flexibility requires that a leader step outside of their default style or personal preference to meet the need of the employee. The interviews provide additional insight into how participants understood the value of all four of the model's leadership styles and applied the skills of adapting their leadership style based on the needs of their employee. Two themes emerged specifically related to Leadership Style Flexibility: leadership style preference and applying new styles.

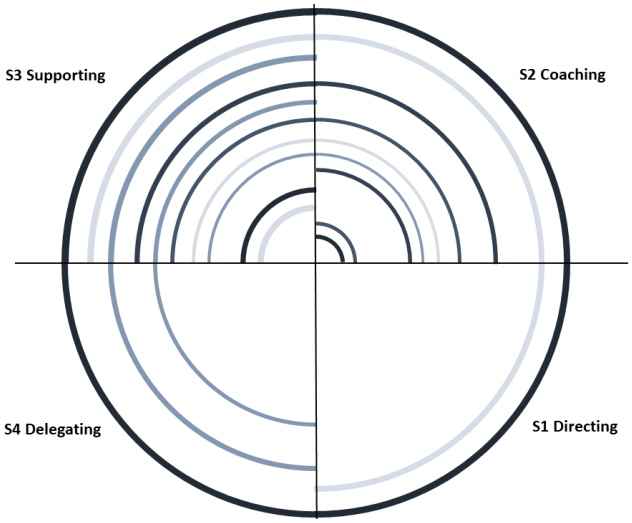
Leadership Style Preference

A theme that emerged as an influencing factor for learning application was leader personal preference of leadership styles. Especially related to primary leadership styles, preference implies that participants identified some SLII® model leadership style(s) as skills they already possessed prior to The Leadership Escape Game. When asked to identify their primary leadership style, most participants assessed that they applied the S2 coaching and S3 supporting styles (See Figure 4.8). One participant assessed that they are, "probably doing some

of these things subconsciously without knowing." Another participant noted, "I'm a people person," when reflecting on their default leadership approach. Another participant stated, "some of this is innate for me is how to deal with people. I think that's one of my talents and so I think I naturally have a lot of these skills." Finally, a participant said, "I think I'm a pretty good judge of character and I place a lot of trust in my staff and that is reassuring to them." The above four quotes highlight participants' beliefs that being a people person, having innate talent, good judge of character, and subconscious behavior were indicators of modeling the SLII® behaviors, even if not influenced by the game.

Figure 4.8

Primary Leadership Style(s) per Interviewed Participant



Two additional participants specifically spoke to their primary leadership style in terms of their default or gut style. One participant said, "I'm definitely an S2 kind of person. Like, that's my gut style if I don't think about how to weave through it." Similarly, another participant said, "S2 is probably the one I do the most…. I have a hard time relinquishing control. Um so I'm definitely up in people's business" [later in the interview this participant reiterated] "gut

reaction, apply S2 to everything." The first group of participants stated that they naturally apply the appropriate leadership styles because their preferred leadership approach lends to understand what people need. The second group of participants recognized that subject to their own natural tendencies, they would default into applying a high directive and high supportive leadership style.

Personal preference also appeared to play a role in which leadership styles were applied by participants on the job. Six of the participants noted that as a result of the way they liked to be led or have been developed from other leaders, they choose their leadership styles from a place of personal preference. One participant shared an example where they have had micromanaging leaders in the past, which leads them to avoid behaviors that could be seen as micromanaging. This same participant had associated directive leadership styles to micromanaging and was surprised to see the benefits of directive leadership styles after playing The Leadership Escape Game and applying it with a new employee. Another participant reflected on preferring either a high directive or hands completely off approach, but struggled with leadership styles that fall between those two extremes. After playing The Leadership Escape, while their preference and default style still remained, they found the benefits of applying other styles as needed.

Personal preference, default leadership style, and recognizing the value of other leadership styles was seen by participants as an influencing factor for successfully applying the SLII® model. Playing The Leadership Escape Game provided insight into leadership styles that expanded participant Leadership Style Flexibility skills.

Applying New Leadership Styles

Within the interviews, participants presented application of Leadership Style Flexibility by applying leadership styles they would not have used, or used significantly less often, prior to

playing The Leadership Escape Game. Within the interviews, participants shared stories where they were learning to apply new leadership styles after playing the game. In two of the examples, participants stated they had previously believed that a directive leadership style was not an effective approach. They had viewed the directive style as micromanaging or negative. Following the game, they recognized that there was value in applying a directive leadership approach when it would benefit the employee. They also provided examples of applying it in their workplace since playing the game. One participant noted that they needed to apply a directive leadership style when bringing on new interns. They said, "Prior to the escape room, I had never thought about that I need to be more directing…. I get a new intern every year and then…I'll be hiring another new employee, so in doing that I'm gonna have to be more directing at the beginning…instead of starting at coaching and supporting." The other participant noted that the training "gave them some level of permission to … be in that style."

Some participants were recognizing that they needed to move away from directive styles and to be more flexible. One participant stated:

> So I started off with directing, which did not work very well. It was kind of painful, to be honest….it was very much a cut and dry go I gave you the information, you know, I'll direct you to go do that. And then delegate. Those two things were really bad where they did not work for me in the beginning. I've now tried to do more of the coaching and supporting side of it.

Another participant noted that they needed to, "move away from my happy S2 square where I'm telling everybody what to do all the time." Multiple participants noted a reflection of recognizing that they needed to be more flexible in their approach and apply styles that were not necessarily in their comfort zones. Another participant even mentioned that through the scenarios in the

game and in the survey assessments, they recognized a situation on their own team where they could be applying a delegating leadership style where they had been previously more directive.

These examples demonstrate application of one of the learning/performance outcomes of The Leadership Escape Game: recognizing and applying leadership styles participants would not have instinctively used previously. Participants found themselves applying new leadership styles beyond their personal preference and default leadership styles. They found themselves considering their employees and even applying new styles that were outside of their default leadership approach. This aligns to the application of Leadership Style Flexibility.

Secondary Research Question 3 – Leadership Style Effectiveness

Secondary Research Question 3 focused on Leadership Style Effectiveness as another component of determining learning acquisition and behavior change. Leadership Style Effectiveness focuses on the selection, or matching, of the most appropriate leadership style based on an employee's competence and commitment around a specific task (Blanchard, 2013). Within the interviews, two themes demonstrated participants application of Leadership Style Effectiveness in reaction to their expectations of employees and different types of employees.

Leader Expectations and Adaptation of Leadership Style

Another application theme focused on the leaders' recognition of expectations that could have affected their chosen leadership style. One participant shared an example about an employee on their team that matched directly with an example in The Leadership Escape Game. In both the game scenario and in real life, an employee was not adopting new technology practices that were more efficient and were expected to be used. The interviewed leader reflected on how the game influenced the leadership style they selected in a similar real-life scenario. The scenario helped them realize that one of their own employees wasn't intentionally refusing to do

work, they didn't understand the task. When asked for more clarification on their response, the participant stated, "Being able to see that my expectation… was way up here [held up hand], but her ability was down here, that gap isn't something I should be ticked off about. That gap is an opportunity for me to help her grow to the next level."

Another participant shared a similar example where they had an expectation of their employee, but then realized they needed to adapt their leadership style to meet a need. They described that this employee was someone they had worked with in a prior role as a peer and had equitable professional experience.

> I made the assumption that I wouldn't have to do some of that [handholding], but the work that she is doing in our office is vastly different than what she was doing before and I think that in some ways, on certain projects that I may have given her, she may have second guessed herself a little bit or not felt as confident in doing something, even though I am fully confident in her abilities to apply what she's learned in other roles to our work….I think reflecting on those things I kind of realized … maybe those expectations of mine needed to change and I need to reframe and instead of just throwing the task out … I need to provide some more of that …coaching and that encouragement and let her know why I was giving her the task.

When asked for more specifics on the influence of the game, they replied, "I've spent more time since then asking more follow-up questions…and active listening a little bit more and trying to pick up on some of those other cues and just kind of resetting expectations…and adjusting based on what I'm hearing…."

In these examples, the interviewed leaders recognized that their expectations of employees were driving their leadership style. Following the game, they learned that they

needed to consider the employees' skill and motivation around a task and then adapt their leadership style appropriately.

Leaders Matching Leadership Style Based on Type of Employees

Another theme for Leadership Style Effectiveness application related to different types of employees. Sub-themes within this section identified new employees and consideration of full-time employees versus student, indirect, or intern employees.

New Employees. Participants shared stories about successfully applying the SLII® model in relation to new employees. Having had prior experience with situational leadership, one participant stated that The Leadership Escape Game "came at a very opportune time" to remind them of the model and being able to apply it to different scenarios. This participant described being "in the middle of a hiring spree" that would add additional employees to their current team of 33 direct reports. Related to applying the SLII® model from the escape game, they stated:

> It's definitely helped me remember that when we're bringing on these new hires when I have very little time, to take the time to talk to them, find out where they are, and give them real solid direction. I think I've saved a handful of people that we brought on at around the time we did this seminar because I was, remember, just because they seem like they've got it … because they're brand new you can't just assume that they know what they're doing. They might be building real bad habits and we actually found a couple that were building bad habits already because we hadn't taken that extra zhuzh for them.

Though this participant had taken a form of situational leadership training before, they noted the timing of this game helped them remember to apply a directive and coaching leadership style to

their new employees and believed that taking action helped to retain some employees that might have otherwise quit.

Other participants described scenarios where they had recently doubled the size of their team or were bringing on new employees. When asked how the escape game influenced their leadership practices, one participant stated, “Well, it has definitely influenced in the fact that I am proactively trying to use it to identify where my new team members are so that I can work with them appropriately.” Others noted they recognized they needed to adapt the style they would normally use to meet the needs of the new employees.

This highlights that one outcome of The Leadership Escape Game, in terms of behavior change, was an intentional shift in leadership style for newer employees that required more direction and guidance than the leader would have normally applied. In at least one example, this also helped retain employees that might have otherwise left the organization.

Types of Employees. Another sub-theme within team dynamics related to leadership styles for different types of employees. For example, one participant noted:

> I have my immediate team who I feel pretty confident with, but then I have a team of informal indirect reports that have to take direction from me, but that at the end of the day, I’m not the one doing their performance evaluations, right. So it’s a balance of like informal influence, how do you get people to follow you that don’t have to follow you. And that’s where I think I’m still learning to figure out, okay, use these styles there too, but also don’t cross the boundary, right. You don’t want to delegate too much or coach too much because you’re not their manager.

For this leader, there is a comfort level with direct employees but less comfort with those on the project team that indirectly report to them.

A similar mindset emerged around student employees. A participant noted that student employees are working in new roles with limited experience, an expected short timeline for employment, and a primary focus on education over career. The participant reflected on the use of different leadership styles stating, “I immediately think of like S2 with student employees, like highly directive, highly supportive, giving…specific instructions, but also being able to answer questions and spending a little bit extra time coaching those folks.” This was followed up with a contrast to how they would apply a different leadership style to full-time staff.

An important consideration is that the SLII® model is not meant to be applied to general employee types. The model is intended to reflect on the competence and commitment of an employee around a specific task. For example, as the participant noted that student employees would have an entry level skill set and may be more committed to other responsibilities, such as their education, than to the described work function, this would suggest that they use a more directive leadership style. The above themes provide insight that leaders were matching leadership styles to what they perceived were needs of the employees based on competence and commitment, but used language that was generalized to a broader employee type or expectation. In the above examples, the leaders recognized that they had a perspective of their employees that was driving their leadership approach. After completing the game and being exposed to the concepts around commitment and motivation, they realized that shifting their leadership approach to match the supportive needs of the employee would be more effective. This matching of leadership style aligns to the game’s learning outcomes and application of Leadership Style Effectiveness.

Primary Research Question

The Primary Research Question for this study asked about the effectiveness of using an escape room game to deliver leadership training. From a qualitative perspective, the previous sections covered the learning satisfaction, learning acquisition, and behavior change components. Additional themes that address the primary research question emerged as influencing factors related to the effectiveness of escape room games for leadership training purposes. These themes include design components, team building, and challenges related to application.

The Leadership Escape Game Design Strategies

Within the interviews, participants reflected on experiences within the game that were both beneficial and challenging. Reviewing these experiences highlights themes that have emerged as positive reflections of the game design, challenges within the game, and recommendations for improved game experience. Table 4.47 presents the themes in these three categories.

Table 4.47

The Leadership Escape Game Design (Themes)

Themes		
Relevant and Reinforcement	Challenge	Recommendations
• Scenarios • Reinforcement strategies	• Content • Navigation	• Multiple learning experiences • Results

Relevance and Reinforcement. Two sub-themes emerged that described participants' positive reactions to the game that were connected to the game's design.

The first theme focused on scenarios used within the game. As was noted in the previous sections, participants described examples where they reflected on scenarios within the game and

the learning surveys, and then translated that to application with their employees. Participants appreciated the relevance and applicability of the scenarios within the game. When comparing their experience in The Leadership Escape Game to a previous situational leadership training, a participant stated that the scenarios in the game were, "a little more realistic to what a real person is than I think the [other] seminar presented." One participant stated, "I can remember parts of the game. I can remember during this, I had to click this, and I had to read this person's bio and that then triggers the actual learning piece of it." Other examples from the interviews described participants thinking about how to apply the model with their team. One participant said, "There was an example in one of the escape things. I was like, 'Oh!' That is her! I know this person!" This participant went on to describe how seeing this example in the game helped them to see the situation from their employee's perspective and take a different leadership approach. Another participant commented about the assessments saying, "I even remember that the question on the test…I answered wrong the first time and right the next two times." Another example related to the assessments described, "I do feel like the third time I was…using the framework much more obviously than the first time. And I think better than the second time. So I feel like it did stick in my brain." They continued to explain that they had a similar situation on their team, which supported a decision to apply a different leadership style.

The second theme that participants highlighted was that the game design reinforced what was previously learned and built onto it with new content. Complementing what was said earlier, one participant added:

> I liked the repetitiveness of it, we've learned the concepts and then got to apply it multiple times in different ways, which I think really helped, and again, make it sink in, because the typical classroom scenario is learn something, use it once, move on, learn

> something. Talk about it maybe not even use it, talk about it once, move on. So I liked that it was pieced out, but it really kept building on itself. So it was more like cumulative at the end, instead of just little tiny pieces that you just keep moving on from.

Another participant noted that the game had built in gatekeeping mechanisms to ensure application of the objective before moving on. They stated:

> I think that the component of you're not able to move forward to the next thing until you've grasped this concept fully was helpful because I actually felt at the end that I had learned some things and I wasn't…able to just move forward. I think of online classes or online learning where you can skip and jump around from module to module, like you couldn't do that in this, which was helpful because… every step builds off of the one before it. So I thought it was effective, at least for me and the way I learn. I thought it was … an effective way of teaching me this concept and getting me to apply it, because I couldn't have gotten out unless I figured it out.

These comments support that participants took note of design mechanics intentionally employed in the game, which were to present realistic, relevant scenarios and build each practice on what had previously been taught.

Challenges Related to Design. Two challenges related to the design of the educational escape game included the navigation and organization of the content.

Navigation, as a factor of learner satisfaction, was reviewed in the above section for Secondary Research Question 1. This challenge also connects to the broader question about the effectiveness of escape room games for leadership training delivery. As quoted earlier, one of the participants stated, "Just on a computer ... you know, people get frustrated if they can't get to what they need to right away." Another participant stated:

> I felt like there was definitely sort of a learning curve to understand exactly what it was wanting us to do. Once we got the hang of it, it was fine. But, um, it took us as a team like are we supposed to do this? Are we supposed to do that? So there was there was you know, we had to spend some brain power on just figuring out how to operate the game before we could get to understanding what the game was trying to teach us.

The theme of navigation getting in the way of the content appeared in multiple interviews. Sometimes it was related to not being sure what to click on and other times it was related to the amount of content and participants balancing both the navigation and learning. A conclusion stated earlier is that navigation can get in the way of learner satisfaction. Additional consideration lends towards navigation also negatively affecting learning outcomes, or at least creating obstacles to overcome. The game used a tutorial, and many participants were able to navigate it quickly, but there is still a design component that needs to support the learners navigating the new environment without getting in the way of learning.

The interviewer also observed that participants sometimes used inaccurate or incomplete descriptions when speaking of the model. One of the potential explanations behind this perceived knowledge gap could be related to the way that the content was presented. The game was organized into three major objectives that align with the SLII® model. However, some participants questioned the clarity of the learning outcomes. One participant stated:

> I don't know that I walked away with a clear, like, okay, I do this, this, this, and this, and part of the problem might be that I am comparing it to the model I'm super familiar with where they have a model on one side, that shows you how all these pieces fit together….But I don't know that that's something that I firmly grasped from the escape

> room itself like those key takeaways at the end….if you surveyed 20 people who did this, I don't know they would have the same three key takeaways from the escape room.

This feedback aligns with the observations in learner satisfaction that the narrative and meta-puzzles could have presented challenges to the participants. The meta-puzzle was the final application of the objective and if participants expressed challenges with that experience in terms of satisfaction, it is plausible that it also had an impact on learning acquisition.

Another contributing factor could be related to the amount of content within the game. As some participants noted, when they had previously taken situational leadership training, it lasted a full day or multiple days, where The Leadership Escape Game took anywhere from 30 to 75 minutes to complete. One participant noted:

> I have had some decent knowledge of this information to begin with and this, you know, solidified a lot of things. But I think if it was the first time I'd ever heard of some of these….it might be a little bit more difficult to get through the material.

Another participant stated, "I probably wouldn't have done all of that in one setting, unless I had them have pre-knowledge." Participants offered potential solutions to this challenge:

> There was a lot there. I mean, it wasn't … a slim amount of material …. there was a lot there and I think that's where if you were able to get some, I don't know, PDF file to somebody before you played the game …. that might be beneficial if you had defined things beforehand.

There were multiple recommendations to provide the concepts or present some material prior to the game. Having some knowledge of the content prior to the game would help to either reduce the amount of content in the game or to focus on practical application instead of learning new

material. These conclusions lead to the final consideration about recommendations for the game's design.

Recommendations. One of the themes that emerged when participants reflected on this experience was the opportunity to see results from the study's three surveys that measured learning acquisition (Survey #1 pre-test, Survey #2 post-test, and Survey #3 30-day post-test). One participant said, "…it would be nice if at the end of the algorithms the program told you, based on the survey, this is where you fall, that would be really nice." Another participant asked, "I do really want to know if our scores got better or if we ever get to find that out or no?" Participants did receive feedback about their answers within the game, but did not receive results from the three assessment surveys. This gap in the study will be discussed further in the next chapter.

Another recommendation was to expand the game beyond just the scheduled game session. With The Leadership Escape Game, participants were scheduled for a two-hour session that would include time to gather, instructions, a tutorial, the game that ran 30 to 75 minutes depending on the speed of the group, and Survey#2. All content related to the model was provided within the game. As was noted in the above sections, participants felt that this was a lot of content in a short amount of time. A common recommendation was to use the game within a broader curriculum that would use multiple learning events.

One suggestion was to provide foundational content before game play. "I think if it was the very first time that I had heard of some of these [styles]… I think it would have been a lot more difficult in that situation because I didn't have a background in it." Additional comments echoed this suggestion. This was especially applicable when the game was the first exposure to the model.

A second recommendation was to either have the content chunked into different segments, instead of one full-hour game, or to have a follow-up discussion with a facilitator. In relation to the conversation about presenting content in advance of game play, one participant said, "I probably wouldn't have done all of that in one setting unless I had them [the learners] have pre knowledge of a reading." Regarding the follow-up discussion, another participant said,

> I think that a trainer should use the escape room sort of as a preliminary round to kind of assess where everyone is and then maybe a week or two later, we'll go into live classes. [The facilitator] can say, 'you took a survey about a week ago, well here's the results' … that would be quite interesting. And then you have the whole room talking if you see that the results falter in a particular pattern. But I think as a standalone, it's great, but … it should complement something else to go with it.

The overarching solution, based on participant feedback, is to create a learning experience that includes multiple components. The expanded solution would begin with an overview of the model and important concepts before playing the game. Following the game, the experience would include results from the surveys accompanied by a follow-up discussion. Finally, the learners could leave with a job aid to use back in their working environment.

Team Building as a Factor of Escape Room Game Effectiveness

Escape room games are most often described and used as team-building activities. Of the 13 interviewed participants, while only six had played an escape room game prior to The Leadership Escape Game, all had heard about this game type and primarily described it as a team-building activity. The emergence of this theme within the interviews was expected as an important part of the experience. Analysis showed three components of team building as

influencing factors related to the effectiveness of escape room games for leadership training: relationship-building, working together, and conflict.

The idea of building relationships with team members was established with participants who had previously played an escape game with their co-workers. One participant described that their previous escape room experience was:

> …a good bonding experience. I didn't think it taught us much, but we did get to know each other and there is something to be said for that when you're on a team, knowing who you're working with and how they work is very helpful.

Another participant played The Leadership Escape Game with two participants they did not know and highlighted the value of learning about others in this game. They described the benefit of getting to know the approaches and styles of other people by playing the game. Some participants noted that while they were tackling the topics within The Leadership Escape Game as a group, they were simultaneously building team relationships because of how they had to work together to play the game. One quote highlighted the value of this game in light of how COVID-19 had impacted their team. They said, "I think [The Leadership Escape Game] was a fun way for us to spend a little bit of time, as a group together, especially since, well at that point, we had been away from each other for nine months." The relationship and connection component of team building appeared to be an added benefit of playing The Leadership Escape Game.

Another component of team building was a review of how the participants felt the teams worked together, beyond building relationships. As mentioned earlier, some participants played The Leadership Escape Game with people they did not know. One participant said, "I thought we worked together quite well. Quite well for never having met each other." Other participants were

able to play with their colleagues. While comparing the escape game to other leadership trainings, a participant said, “I enjoyed having a partner to go through it with to talk through things…. [the escape game] was more conversational, like we were doing it together, not just … waiting for it to be my turn to share my thoughts.” Many participants that played group games reflected on how the design of the game required teams to progress together and ensure everyone was working on the same tasks. One participant said, “having the virtual setting and actually forcing us to communicate clearly and stay on the same page with each other is a really good way of doing something like this for leaders.”

Not all players were able to participate with others and instead played solo games. When asked about that experience, some replied that they thought it was easier to play alone, but could have seen the benefit of collaborating with others. One participant said, “I was by myself in the escape room, so I did miss out on that group activity, but in a way, it was kind of easier because I didn’t have to convince anybody of my knowledge.” Another participant expressed that they would have liked being able to talk out different parts of the game with others, especially when they were stuck. These statements bring an interesting perspective to another participant who felt that the escape room was less effective than other leadership programs that they attended. That participant found value in discussing scenarios and how to resolve them. That participant played a solo game and even though they stated that they thought the game was interesting and a “great precursor” for someone who is stepping into a leadership role, they highly valued the discussion and conversations at other in-person workshops. This highlights a potential avenue for future research to compare solo games with group games.

The final component of team building was a pacing conflict. In most escape games, there is a time limit for completing the game within an hour or some defined timeframe, making speed

a valued characteristic. In The Leadership Escape Game, learning outcomes took precedence and time was not introduced or operationalized as a measure of success. A participant described the pace dynamic saying, "… we all came to the conclusions of how to work the game and at different points and so we had some people that were racing ahead and some people that were still trying to figure out how to work the game." Similarly another participant said:

> My initial thought after getting off was that I probably could have done that by myself…. I would be clicking around and doing things and I would verbally be checking with the person, but I already thought I had the answer…. I felt like I could go a lot faster.

On the other end of that pace spectrum, one participant expressed frustration with the other players' pace. They said, "I probably would have gone through it slower and been able to read things a little more in-depth. I felt the person I was with read like three times as fast as I did." This participant went on to describe that they would have either preferred to play alone at their own pace or with people they knew so they could feel comfortable with asking to slow down. Of the interviewed participants, five played solo games, four played games with participants they knew, and four played games with participants they did not know. Further research is recommended to explore the dynamic of pacing and the value of solo games versus group games and games with strangers versus games with colleagues.

The team building theme is an influencing factor of escape game effectiveness for leadership training. As seen from the interviews, participants saw value in building relationships and participating in an activity with their teammates. There were examples of being able to work well together in the game and also the challenge of pacing that could interfere with the experience and learning outcomes. Interpersonal and team building influence presents as an important consideration in educational escape game design.

Challenges with Delivering Leadership Training with Escape Games

In previous sections, challenges were identified related to learner satisfaction and experience as a result of game design. Two final challenges are appropriate to address as influencers of whether The Leadership Escape Game was an effective way to deliver training. These themes include leaders' challenges with application and the impact of COVID-19.

Application Challenge. Some participants expressed that they did not explicitly apply the model, but had been reflecting on possible application. When asked for more information, participants identified obstacles such as the team was too busy or that the model didn't feel as relevant to their team's dynamics. One participant stated:

> I kept an eye out for it, in terms of I think it made me question more am I taking the right approach with each staff member when I'm working with them. A lot of it [the model] seems like it was focused on applying it to changes or new activities and our team right now is on autopilot …. So I haven't applied it as much as I thought it would, but it has been on my mind while I've been supervising my staff.

Similarly another leader mentioned that they had been reflecting on their team and how they would fit into the model. They said, "I haven't really put anything different into practice, but I think that it's helping me to kind of consider how to approach them about upcoming work that we're going to have." When asked for more clarification on what would have helped them to apply the training they replied, "Honestly, it is not related to this. It's just being busy with other tasks, like being buried within other work and not having time to really, you know, spend some time focusing on this." For both of these leaders, the workload appeared to be a barrier to implementing the SLII® model. Participants also noted that stress was an influencing factor. When there were higher levels of stress, participants tended to move toward a more directive

style. One participant said, “I think when I’m…stressed, I tend to go to directing …. I’m not going to coach. I’m not going to support you and I tell you now you need to do and how to get it done.” These participants were deterred from applying the model due to a busy work environment.

A counter example identified participants who were able to apply leadership styles in spite of being busy and the challenges of their environment. One example included an employee that was often used as a trainer and was considered a D4, which is a self-reliant achiever and can be led using a delegating leadership style. However, due to a demanding hiring season and the challenges that were arising during this time, this employee was, “falling back into the third level, which is the jaded.” Recognizing that the employee’s development level changed, the leader knew they needed to adapt their leadership style. The participant noted, “It was a really good opportunity to sit down and talk to her because [it was] a reminder that people can move from the different boxes. Just because they are self-reliant doesn’t mean that something can’t happen that will knock them back.” The participant saw a need to adapt from their normal leadership style in the midst of a busy and chaotic season to support a normally self-sufficient employee navigate through a challenging season. Other participants also noted that changing their leadership style had a positive impact on the team environment. For example, two participants described being less directing and shifting to other leadership styles in a manner that supported the employee more effectively and facilitated getting the work done.

One participant expressed that they did not apply what they learned in The Leadership Escape Game. Responses to other questions revealed that they enjoyed the game and that they had previously attended an SLII® workshop, so the content was not new. When asked for clarification on obstacles to applying what they learned in The Leadership Escape Game, they

mentioned having also attended a comprehensive leadership curriculum that involved multiple months of live virtual sessions and discussions. The participant found that format to be very effective for them and had defined goals from that training that they were implementing instead of focusing on the Leadership Escape Game.

Within the interviews, seven participants shared specific examples of applying what they learned in The Leadership Escape Game. Five participants described that they were considering how to apply it, but described challenges in being able to implement in their workplace. One participant did not apply the game. When considering effectiveness, more than half had examples, but there are certainly opportunities to further explore the obstacles that prevented the remaining participants from applying the training. Solutions to overcome these obstacles include a clearer link to relevance, understanding how the model could apply in a variety of work environments, and providing more specific outcomes or participant goals following the session.

COVID-19. One final challenge was the influence of the COVID-19 pandemic on this study and the participants. While no direct relationship can be drawn to results, studies have shown that the pandemic has had a significant impact on leaders (Graf-Vlachy, et al., 2020). This became apparent as many of the participants mentioned the impact of COVID-19 on themselves and their teams during these interviews.

This study was originally planned as an in-person escape room experience. However, it took place during Fall 2020, where in response to the COVID-19 pandemic and guidelines from health experts, organizations put a halt to in-person events and activities of all kinds. Training experiences around the world shifted to online, virtual activities, and this study was no exception. During the interviews, participants reflected on how COVID-19 impacted their teams in relation to their feelings about The Leadership Escape Game during this season.

The first COVID-19 related theme centered around time. Where one participant noted that they were able to "seek out different trainings, especially since the pandemic, lot more time to participate in just random webinars that catch my attention and might apply to my work," another participant had to push back against their director's suggestion to look at training because they felt, "with COVID, I was like no, no time. Uh uh. There are just too many other things that I need to do." The latter feelings about taking on additional learning opportunities was echoed by another participant who stated that, "…nobody has the emotional capacity to take on much else. I think everyone is feeling pretty tapped out." This seems to match observations of the overall study. There was lower turnout than expected and a significant drop off in participation by the third survey. The above statements of making time for something interesting, but also having a threshold for how much time could be invested into the study seemed to have an impact. This assertion was backed up by interviewed participants who expressed annoyances with the surveys. One participant said, "I understand the purpose of the surveys and the questions, but they were quite long, and I think by the end of those…[you] just want to get through it." Another participant said, "…having to do a survey three times, I was like, 'Oh my gosh, good lord. If I see a survey one more time." This is related to study and game design, but also takes on a potentially new perspective when considering the impact of COVID-19 on participant bandwidth.

The second theme was the transition to a virtual world and the changes that were imposed on teams. A participant expressed, "The world of COVID has changed a lot of things, we've gone from what would be pen and paper all the time to everything is virtual and digital." Participants described how these changes have affected the way they interact with their team

members. One participant expressed the need to focus on more frequent communication because, "there's no more such thing as an open door because it can't see you anymore."

Participants also discussed how this impacted their interactions with leadership development. One participant described earlier in the interview about a very impactful leadership program they attended that was a series of face-to-face events. They contrasted that experience with an online webinar specifically focused on the topic of leading during COVID and how, "it was really boring. Sitting on Zoom. That's all I've been doing since March." Another participant noted the change in training interactions. "pre-COVID you could join a group as a workshop, and now it's, sometimes you're joining a group virtually." This participant added later that they think The Leadership Escape Game, "…has come at the perfect time when we're all really looking for…any other way to manage a virtual conversation and I think it fits really nicely into this pandemic period." They later added, "I thought it was a really fun way of approaching skill building because that's exactly what you're doing in person." Another participant also applauded the game within the context of COVID-19 changes. They said, "I thought that the escape room game was great for this virtual environment that we're all stuck in now….it was a great way to still be doing an activity with people, even though you're not in front of people."

While there are no direct relationships that can be drawn between COVID-19 and the study's results, the consistent appearance of the pandemic within participant responses and the recognition of the impact they experienced could infer there was an influence on participation or experience within this study.

Qualitative Summary

The interviews provided support for the study's research questions and additional insight into the participant's application of The Leadership Escape Game concepts in their workplaces.

Participants expressed high levels of enjoyment and satisfaction with The Leadership Escape Game experience. They also noted that as they took the surveys and reflected on the scenarios within the game, they believed the game expanded their understanding and skill with Leadership Style Flexibility and Effectiveness.

The final section of the analysis identified additional themes that were related to the primary research question. The first theme discussed a curriculum design recommendation that would involve pre-work, the game, results, a post-game job aid, and supporting discussion. The second theme considered the positive and negative impacts of team building and interactions during the game. The final theme was a reflection of challenges with application and how COVID-19 had an impact, not only on this study, but also on the participants' as they continued to lead and take time to develop their leadership skills during a tumultuous time.

Overall, the interviews present evidence that an educational escape room game can be an effective way to present leadership training. Participants enjoyed the game, described learning acquisition, and provided examples of applying the SLII® model in their workplace.

Chapter 4 Summary

Using a mixed methods research design, the above chapter provided data from quantitative and qualitative analysis. Quantitative data were collected using a post-session learner satisfaction survey and a series of assessments to obtain learning acquisition data. Qualitative data were collected from participant interviews scheduled 30 days after playing The Leadership Escape Game.

Secondary Research Question 1 data demonstrated that participants enjoyed The Leadership Escape Game and expressed that it was a fun and effective way to deliver leadership training. From a quantitative perspective, all survey statements identified statistically significant

positive reactions to The Leadership Escape Game. Further analysis sought to determine if results were influenced by previous experience with escape room games. Only one survey statement, asking if The Leadership Escape Game enhanced leadership skills, showed that those with previous escape game experience selected a statistically significant higher rating. The remaining statements were all statistically equal in rating, meaning that previous escape room experience did not influence learner satisfaction. Similarly, previous situational leadership training was considered to determine an influence on learner satisfaction. Again, only one survey statement had a statistically significant difference. This statement asked if players enjoyed the game. Participants with previous situational leadership experience rated this statement at a 4.955 and those without previous experience rated it at a 4.40. While these were considered a statistically significant difference, both ratings were well above the minimum 4-rating threshold for satisfaction. Previous situational leadership experience did not have an influence on learner satisfaction. In summary, participants enjoyed the game, saw it as a valuable learning experience, and rated high levels of satisfaction on the post-game survey.

Qualitative responses to learner satisfaction were consistently positive with some recommendations for improvement. Participants described the game as fun, interesting, unique, and memorable. They also noted that it was relevant, timely, and an effective way to approach leadership training. There were some challenges that participants faced during the game, which was believed to affect their satisfaction with the game. Examples of challenges included that the storyline and the content did not always lead the participants to a clear set of tactical takeaways from the training experience. This was also combined with some technical challenges related to navigation and understanding the unique mechanics of an escape game. These challenges were believed to influence experience and the ability to navigate the game while also learning new

content. Ultimately, when comparing The Leadership Escape Game to other leadership training experiences, the escape game received an overwhelming positive reaction and confirmation that participants enjoyed playing an escape game to learn leadership skills.

Secondary Research Question 2 data focused on Leadership Style Flexibility as a way to measure learning acquisition and behavior change. The analysis consisted of Survey #1 pre-test, Survey #2 post-test, and Survey #3 30-day post-test assessment scores. A one-way ANOVA test determined that there was a statistically significant difference and an increase across the three sets of Leadership Style Flexibility scores. Follow-up analysis comparing each set of surveys demonstrated a statistically significant increase in scores from the Survey #1 pre-test to each of the post-game assessments. An additional analysis determined there was no statistically significant difference between the Survey #2 post-test and Survey #3 30-day post test scores, implying a retention in knowledge at least 30 days following The Leadership Escape Game. A larger sample size of flexibility scores were analyzed using a paired t-test on just the Survey #1 pre-test and Survey #2 post-test scores. There was a statistically significant difference, and an increase, in Leadership Style Flexibility scores across the two tests. Both sets of analysis confirmed that participants improved their understanding of Leadership Style Flexibility across the three assessments. Additional analysis also determined that there was no statistically significant difference in Leadership Style Flexibility scores based on previous escape room or situational leadership experience. Previous experience with escape rooms or the situational leadership content were not considered prerequisites to success in relation to learning acquisition. Results demonstrate Leadership Style Flexibility learning acquisition, and that this improvement is not dependent on previous experience.

Qualitative responses also supported that Leadership Style Flexibility skills were applied in the workplace following the game. Participants recognized their leadership style preferences or default styles. They demonstrated Leadership Style Flexibility application by applying new leadership style beyond their default styles and adapting to the needs of their employees.

Secondary Research Question 3 focused on Leadership Style Effectiveness. The analysis consisted of the same survey assessments described above, which also produced a Leadership Style Effectiveness score. A one-way ANOVA test comparing the three survey scores calculated $p = .053$. At a confidence level of 95%, this implies that there is no statistically significant difference between the three scores. However, if the confidence level were decreased to 90%, the data would imply there was a statistically significant difference. Follow-up analysis comparing each set of surveys demonstrated a statistically significant increase in scores from the Survey #1 pre-test to each of the post-game assessments. An additional analysis determined there was no statistically significant difference between the Survey #2 post-test and Survey #3 30-day post test scores, implying a retention in knowledge at least 30 days following The Leadership Escape Game. A larger sample size of effectiveness scores were analyzed using a paired t-test to compare just Survey #1 pre-test and Survey #2 post-test scores. There was a statistically significant difference, and an increase, in Leadership Style Effectiveness. A series of paired t-tests also determined that there was not a statistically significant difference between leadership style effectiveness scores when considering previous escape room or previous situational leadership experience. Results demonstrate Leadership Style Effectiveness learning acquisition, and that this improvement is not dependent on previous experience.

Qualitative responses also provided examples of participants demonstrating Leadership Style Effectiveness in their workplaces. Through examples of recognizing their expectations of

employees and also identifying needs for different types of employees, participants were able to identify what leadership styles would be most appropriate to apply. They demonstrated Leadership Style Effectiveness application by matching the appropriate leadership styles based on their employees' competence and commitment around a task.

The Primary Research Question for this study sought to determine how effective an escape room game could be in delivering leadership training. In reflection of the secondary research questions, learners demonstrated their satisfaction, learning acquisition, and behavior change through the above described qualitative and quantitative analysis. Additional themes related to game design and team building highlight that participants believed The Leadership Escape Game was an effective way to learn the SLII® leadership model. There were some noted challenges and improvements that could be made to increase effectiveness, which include game design and learning outcome considerations.

Overall, the results point to a conclusion that escape room games can be an effective way to deliver leadership training. This chapter focused on presenting the findings of both quantitative and qualitative data. In the next chapter, this study will present conclusions and recommendations.

Chapter 5

Discussion, Conclusions, and Recommendations

The purpose of this study was to determine the efficacy of escape room games to deliver leadership training. The Leadership Escape Game was a digital game developed for this study to deliver SLII® training. The objectives of this study were to use learner satisfaction, learning acquisition, and behavior change as data points for determining the effectiveness of The Leadership Escape Game. This study has demonstrated that digital escape room games are an effective way to deliver leadership training.

This chapter will provide an interpretation of the results and a reflection on future work in the area of digital educational escape games. The contents of this chapter begin with a recap of the research questions and hypotheses followed by a discussion of findings. The chapter ends with a reflection on limitations and recommendations for practitioners and future research.

Research Questions and Hypotheses

As presented in earlier chapters, the primary research question for this study asked: How effective are escape room games as a leadership training activity? The primary research question was supported by three secondary research questions (See Figure 5.1). The intention of this study was to determine the effectiveness of delivering leadership training in a digital escape room game through learner satisfaction, learning acquisition, and behavior application data (Kirkpatrick & Kirkpatrick, 2016).

Figure 5.1

Primary and Secondary Research Questions

Primary Research Question

How effective are escape room games as a leadership training activity?

Secondary Research Questions

Q1. How satisfied are learners with the escape room game leadership training activity?
Q2. How does the use of escape room games improve Leadership Style Flexibility?
Q3. How does the use of escape room games improve Leadership Style Effectiveness?

This mixed methods study explored the research questions through the following hypotheses:

Secondary Research Question 1: How satisfied are learners with the escape room game leadership training activity?

- **H_1:** The use of an escape room game for leadership training does not result in statistically significant positive learner satisfaction survey scores.
- **H_2:** There is no statistically significant difference in average learner satisfaction survey scores from participants with and without prior escape room experience.
- **H_3:** There is no statistically significant difference in average learner satisfaction survey scores from participants with and without prior training in situational leadership.

Secondary Research Question 2: How does the use of escape room games improve Leadership Style Flexibility?

- **H_1:** There is no statistically significant difference in participant Leadership Style Flexibility between pre-game, post-game and 30-day post-game assessments following an escape room leadership training.

Secondary Research Question 3: How does the use of escape room games improve Leadership Style Effectiveness?

- **H_1:** There is no statistically significant difference in participant Leadership Style Effectiveness between pre-game, post-game and 30-day post-game assessments following an escape room leadership training.

From these hypotheses, the study seeks to draw conclusions about the efficacy of a digital escape room game to deliver leadership training.

Discussion of Findings

The Primary Research Question asked, "How effective are escape room games as a leadership training activity?" This study concludes that escape room games are effective at delivering leadership training as measured by learner satisfaction, learning acquisition, and behavior change. Learners rated positive levels of satisfaction with The Leadership Escape Game. Participants demonstrated learning acquisition through statistically significant improvement of Leadership Style Flexibility and Leadership Style Effectiveness scores collected from a pre-test, post-test, and 30-day post-test series of assessments. Behavior change was confirmed from participant application examples shared in the 30-day post-game interviews. Therefore, the data analysis concludes that digital escape room games are an effective way to deliver leadership training.

The data from this study, in union with existing literature, provide justification for the effectiveness of a digital escape room game for leadership training. The design of the game, including how the content was presented, is a primary antecedent in achieving desirable learning outcomes (Clarke & Higgs, 2016). The following discussion of findings will explore the factors

that influenced learner satisfaction, learning acquisition, and behavior change, thus making an effective leadership escape game experience.

Learner Satisfaction and The Leadership Escape Game

Participants provided positive satisfaction ratings on the post-game survey. Their ratings and interview comments demonstrated that participants enjoyed playing the game, were satisfied with the quality and online format of the game, felt that it was effective and engaging, and that they had an overall good experience and would recommend it other leaders. These results are in alignment with previously published studies on the use of game-based learning and educational escape games (Gallegos et al., 2017; Pitt et al., 2015; Tobias et al., 2014; Tsai et al., 2016). Studies show that educational games support retention, encourage engagement with the content, motivate learners to persevere through challenges, and receive satisfactory reactions from most participants. More specifically, over the last few years, educational escape games have received positive reactions from participants and have even been noted as participants' most enjoyable components of broader curricula (Friedrich et al., 2018; Gomez-Urquiza et al., 2019). Participants find educational escape games to be engaging, unique, and effective. This study's data, in alignment with existing literature, concludes that digital escape games are an effective way to deliver leadership training in terms of learner satisfaction.

Three findings demonstrate associations between learner satisfaction and the effectiveness of digital educational escape games: novel experience, narrative, and gameplay structure as factors of learning satisfaction. These findings are supported by the participant interviews, surveys, and game-based learning literature.

Novel Experience as a Factor of Learner Satisfaction

The first key finding is that escape room games provide a unique experience for participants. This game type builds on the familiar feel of scavenger hunts and creates an engaging, fun, and challenging experience that has been used for social, team building, and learning activities (Nicholson, 2015; Gomez-Urquiza et al., 2019, Reade, 2017). Escape rooms promote critical thinking, collaboration, and problem-solving in a unique game approach that creates high levels of engagement and team building (Coffman-Wolph et al., 2017; Styling et al., 2018). Participants that played The Leadership Escape Game confirmed the opinion that this game type is a novel experience. They enjoyed participating in this unique leadership training activity. Some even commented that if they had to choose between a traditional leadership webinar, an online course, or The Leadership Escape Game, they would pick the latter. Therefore, a novel experience is one factor of how learner satisfaction relates to the effectiveness of leadership escape room games.

Narrative as a Factor of Learner Satisfaction

A second key finding within learner satisfaction is the use of narrative to support the game experience. Narrative appears in many taxonomies and design models for game-based learning (de Lope & Medina-Medina, 2017, Juul, 2018). The story within The Leadership Escape Game communicated that the participants had gathered in a conference room for a leadership training, but the facilitator was running late. They were instructed to get started with the training by exploring the room and completing the activities. This narrative set up the reason for participants to be in the training and why they would be exploring the room instead of waiting for the facilitator.

Nicholson (2016a) advises escape room designers to consider the purpose behind components that are included in the game and how it supports the experience. For example, within The Leadership Escape Game, the facilitator called in to check on the participant's progress. In a later section, the participants unlocked a video that would have been part of the training. Both of those mechanics served as summaries of what was learned in each section of the game. The purpose of the summaries was to ensure understanding of the content and using the mechanics of the call and the video fit within the narrative of the game.

An example where The Leadership Escape Game strayed from narrative consistency involved a puzzle that opened a trap door, which led to an outside area for the final section of the game. Some participants loved this new setting; others did not understand why the setting change happened. This example demonstrates how the design did not follow the narrative. A better connection to how the outside area fit within the narrative would have made a more cohesive and satisfying experience (Baron et al., 2016; Bopp, 2007; Nicholson, 2018).

Providing the narrative context and purpose for playing the educational escape game sets expectations and influences learner satisfaction. The use of narrative sets the stage for why the participant is taking the ownership of exploring and completing challenges and also provides a consistent story that unites the game experience with the learning outcomes.

Gameplay Mechanisms as a Factor of Learner Satisfaction

The final learner satisfaction finding involves gameplay mechanics. Li et al. (2021) describe gameplay as the mechanics that differentiate an experience as a game. These include "goals, challenges, progress, and rewards" (p. 6). These same components are found within escape game and learning design, but instead may use words, such as objectives, learning, and feedback, or use challenge, action, and reward (Clarke & Higgs, 2016; Wiemker et al., 2015). As

a key finding, gameplay mechanics include the decisions that address satisfaction, motivation, and capturing attention through emotion and understanding (de Lope & Medina-Medina, 2017).

When considering the learner satisfaction survey in this study, the questions essentially asked the learners to rate their gameplay experience. They assessed effectiveness, enjoyment, application confidence, value, engagement with teammates, and satisfaction with the quality of the game. Once the learning outcomes are defined, the narrative is developed, and navigation is planned, gameplay considers the mechanisms within the game that promote interest and motivation to propel the game forward (Jabbar & Felicia, 2016).

Learner Satisfaction Summary

Results indicated positive learner satisfaction with The Leadership Escape Game, supporting the premise that escape room games are an effective way to deliver leadership training. The quantitative learner satisfaction surveys resulted in statistically significant ratings demonstrating participants' positive reactions to The Leadership Game. Qualitative results from the 30-day post-game interviews also reveal that participants enjoyed the experience and found the game to be effective and engaging. This study concludes that learners were satisfied with the experience of playing The Leadership Escape Game and identifies the unique experience, narrative, and gameplay mechanics as three key findings in escape room game design that support learner satisfaction results.

Learning Acquisition and Behavior Change

Secondary Research Questions 2 and 3 used Leadership Style Flexibility and Leadership Style Effectiveness as the variables to assess learning acquisition and behavior change. Results showed that both flexibility and effectiveness scores demonstrated statistically significant improvement between the Survey #1 pre-test and the Survey #2 post-test taken after playing The

Leadership Escape Game. The data also demonstrated that between Survey #2 and Survey #3, there was no statistically significant difference in the scores, implying a retention of learning to at least the 30-day post-game assessment. Literature shows that game-based learning supports retention and is connected to learning achievement, behavior change, and has been associated with memory connections imprinting on the brain (Gallegos et al, 2017; Pitt et al., 2015, Tsai et al, 2016). Qualitative examples also revealed that participants applied the SLII® model with their employees following the game. Examples demonstrated adapting new styles in contrast to preferred or default leadership styles, acknowledging leader expectation versus employee capacity, and identifying leadership styles suited to different types of employees. The flexibility and effectiveness scores and the interview examples demonstrated learning acquisition and behavior change following The Leadership Escape Game.

In addition to determining whether or not participants learned and applied the training, the Secondary Research Questions sought to understand by what methods The Leadership Escape Game influenced learning acquisition and behavior change. Based on participant interviews and design literature, this study highlights segmenting and scaffolding as two instructional design strategies that align with educational escape room game design.

Segmenting Content to Support Learning Acquisition and Behavior Change

The SLII® model presents a framework of three skills: 1) Goal setting, 2) Diagnosing, and 3) Matching (The Ken Blanchard Companies, 2013). To present this framework, The Leadership Escape Game was developed in three parts, with each part supporting one of the objectives. The content and supporting materials were explored and obtained throughout the course of the game to support the learning challenges and practice (Jabbar & Felicia, 2016). This approach, as applied in the design of The Leadership Escape Game, aligns with the multimedia

and online learning principle of segmenting, where complex content is presented in smaller chunks for more manageable learning outcomes (Mayer, 2017).

The segmenting design strategy also aligns with escape room puzzle pathways. Whether using an open, linear, or multi-linear puzzle path, segmenting creates milestones that help the designer to organize content, challenges, and practice within similar and meaningful chunks (Baron et al., 2016; Wiemker et al. 2015). In the Leadership Escape Game, the segments of content were organized by objective. The challenges and puzzles within the game guided the participant to learn new content and then apply it to solve a puzzle or complete a scenario-based challenge. At the end of each segment, a final practice provided the opportunity to apply newly learned skills to what was completed in the previous parts of the game. This final application was considered the meta-puzzle, that pulled together all the work from the challenges and objectives within the game (Nicholson, 2016b, Pan et al., 2017).

Scaffolding Content to Support Learning Acquisition and Behavior Change

Participants expressed an appreciation for how the game gradually built on previously learned concepts as a way to develop the SLII ® skills. After completing the first part of the game, participants began to develop the second skill of SLII® while continuing to reinforce the first. This strategy of building content on top of previously understood and relevant content is called scaffolding (Gunter et al., 2008). While there are many aspects to scaffolding, this research is focusing on a basic, constructivist definition. The primary application of this design strategy was the gradual building of practice (Doo et al., 2020). Effective game-based leadership training design provides participants an opportunity practice learned skills, receive feedback, learn from failing in a safe environment, and to practice again with the newly acquired knowledge or skill (Adams et al., 2018, de Frietas & Routledge, 2013; Ward et al., 2017). An

example within The Leadership Escape Game is found in a section where participants are presented four different employee scenarios. They have to use the skills they previously learned and then add the newly learned skills to achieve the next objective of the game. If they answer incorrectly, they are provided feedback and an opportunity to try again. In combination with the above-described segmenting mechanic, these strategies provide guidance to designers of educational escape games to chunk content and reinforce the learning within each segment of the designed game.

Learning Acquisition and Behavior Change Summary

Assessment results demonstrated learning acquisition and the 30-day post-game interviews revealed examples of behavior change. These results support the conclusion that a digital escape room game is an effective way to deliver leadership training. Two instructional design strategies stand out as the key findings to address the question of how escape room games improve learning acquisition and behavior change. These strategies include segmenting and scaffolding. These strategies are at an intersection of both instructional design and escape room design principles.

Previous Experience Impact on Leadership Escape Game Effectiveness

An additional analysis using the survey assessments sought to understand if previous escape room or situational leadership experience were pre-requisites to success within the game. Learner satisfaction data showed that even though all participants rated the satisfaction statements positive, there were two exceptions where previous experience did impact satisfaction results. The two exceptions, while statistically significant calculations, do not fit within the larger picture of the data to be able to conclude that lack of previous experience had a negative effect on learner satisfaction. Learning acquisition data reflected that neither previous escape room nor

situational leadership experience had a calculated influence on Leadership Style Flexibility and Effectiveness scores. Therefore, previous experience with escape rooms or the leadership content is not indicated as a pre-requisite to success in an educational escape room game.

Discussion of Findings Summary

The primary research question for this study explored the efficacy of a digital escape room game to deliver leadership training content. Conclusions are based on the aggregate analysis of learner satisfaction, learning acquisition, and behavior change as measured by the study's surveys and interviews (Kirkpatrick & Kirkpatrick, 2016). Results demonstrate that digital escape room games are effective for delivering leadership training.

Participants provided statistically significant positive ratings for all statements in the post-game learner satisfaction survey. The 30-day post-game interviews confirmed that participants enjoyed the experience and even wished they could have invited more team members to join. This feedback, both quantitative and qualitative, are in alignment with learner satisfaction data found in other educational escape game studies (Baker et al., 2020; Friedrich et al., 2018; Gomez-Urquiza et al., 2019, Wu et al., 2018). As one component of determining efficacy, learner satisfaction provides support that escape room games are an effective, if at least an enjoyable, delivery method for leadership training. Key findings in the design of escape rooms that promoted learner satisfaction include the novelty of the experience, the cohesiveness and support of narrative, and the overall consideration of gameplay experience.

Learning acquisition was determined through the Survey #1 pre-test, Survey #2 post-test, and Survey #3 30-day post-test scores where Leadership Style Flexibility and Effectiveness were calculated using the LBA II® assessment (Blanchard et al., 2013). Results demonstrated that participants successfully acquired knowledge from The Leadership Escape Game and were able

to apply it to the post-test assessments. Behavior change was determined through the 30-day post-game interviews. Participants provided examples of applying what they learned with their employees. These results demonstrated that escape room games are effective at delivering leadership training in terms of learning acquisition and behavior change. To describe how escape room games are effective for learning, key findings include the intersection of segmenting and scaffolding that are inherent in the design of escape room game and instructional design principles.

Limitations

Limitations for this study included low participation, retention, and the global pandemic. Each of these limitations presented a unique challenge that are relevant to the data collection and analysis of this study.

Low participation as a result of recruitment practices was the first challenge. The researcher partnered with two leadership organizations with access to over a thousand potential participants, with the hopes of recruiting at least 64, based on G*Power calculations. These organizations sent out multiple invitations with the included informed consent and explanation of the project, but resulted in fewer than 10 participants. A new study goal was established to at least have 30 participants (Sekaran, 2003). Recruitment practices expanded, with an approved amendment for the study's IRB, and additional recruitment invited leaders through various organizations and networks. At the close of the data collection stage, 46 participants completed most of the study components. There are two potential sources for the low participation and recruitment challenges. First, the study required a significant level of effort to participate. There were three surveys, each with multiple parts and a two-hour game session. In addition, participants were invited to complete an interview. The numerous activities in this study may

have deterred participation. Second, there was no compensation offered for participation in the study. This was due to the researcher's failure to organize a means for fair and equal opportunity of compensation. Looking back, it is possible to see how a compensation component would have been both feasible and beneficial for recruitment purposes.

Retention was also a challenge with this study. Table 5.1 identifies the trend of participation across the study components. Note that these numbers do not factor in individually missed responses to survey questions. Please reference chapter 4 findings for data that was eligible for analysis. The same sources of recruitment challenges are anticipated as influencing retention. Level of effort to participate and lack of compensation are high potential causes for the drop in participation across the length of the study.

Table 5.1

Retention of Participants

Study Component	# Participants
Informed Consent	57
Survey #1	53
The Leadership Game registration	51
Played the Leadership Escape Game	46
Survey #2	43
Survey #3	24
30-day post-game Interview	13

Due to the low participation and retention, the findings of this study may have challenges with generalizing to the broader conclusion that escape room games are effective. While the data presented in this study demonstrate learner satisfaction, learning acquisition and behavior change, it is recommended that additional studies with larger samples sizes are conducted to support or refute the conclusions put forth in this study.

Finally, the impact of COVID-19 has certainly had an impact on this study, as it has had an undeniable global impact. As was mentioned in multiple participant interview responses, the pandemic left participants feeling "tapped out" and not having the "emotional capacity" to take on tasks that were generally outside of their immediate scope. Many studies have shown the emotional and mental health impact of COVID-19 (Weiss & Li, 2020). One study shared a "March 2020 [survey that] showed that 72% of Americans felt that their lives were impacted" and that survey occurred at the beginning of the pandemic's timeline in the United States. (Bhattacharjee & Acharya, 2020, p. 1135). Specifically, the target population of people leaders for this study were found to have elevated levels of stress, anxiety, and depression, especially as they perceived to be taking on more work and saw organizations threatened with downsizing due to the economy (Graf-Vlachy, et al., 2020). While low recruitment and retention could have been improved by fewer participation milestones and by including compensation, it would be remiss to not reflect on the likely impact of COVID-19 on participation.

Recommendations to Practitioners

The purpose of this study was to determine the efficacy of an escape room game as a method for delivering leadership training. Efficacy was assessed using three levels of evaluation: learner satisfaction, learning acquisition, and behavior change (Kirkpatrick & Kirkpatrick, 2016). This study concluded that escape room games designed to deliver leadership training can be effective. There are some considerations about the design and implementation of educational escape games that this study can contribute to the future practice of educational escape games.

Design Implications

When considering the use of an escape game to deliver leadership content, the design of the game remains to be a high determining factor in outcomes (Clarke & Higgs, 2016). As

discussed in the Chapter 2 leadership training section, effective leadership training uses real-world problems, is relevant, challenging, interesting, and offers active problem-solving and practice (Blackler & Kenny, 2004; Grant, 2019; Lester, 2015; Turner et al., 2018). Mechanisms such as a cohesive storyline, collaboration, quick wins, opportunity to fail with low consequences, and clear feedback with opportunities to practice are essential from a Game-Based Learning perspective (de Lope & Medina-Medina., 2017; Juul, 2018, Prensky, 2001; Tobias et al., 2014). Specifically looking at escape games, the design must factor in these same considerations for leadership training and Game-Based Learning, then apply mechanics specific to this game type, such as challenges, puzzle paths, exploration, and the construct of roles and hints to support the game (Clare, 2015; Nicholson, 2016b; Wiemker et al., 2015). The three recommendations described below for instructional design practitioners are to prioritize learning outcomes over escape game mechanics, consider navigation support, and develop a curriculum of multiple learning events.

Prioritize Learning Outcomes over Escape Game Mechanics

The design for this study's Leadership Escape Game carefully considered how the content would drive the flow and mechanics within the game. The content and learning outcomes were the primary focus, which determined how to best present and engage the players within the game. For example, the SLII® model is a framework that is built on the relationship between the four different leadership styles and the criteria that determine the correct leadership approach (Blanchard et al, 1993). The selection of puzzles and challenges within the game was a secondary decision to ensure these mechanics supported the model's concepts. This approach aligns with Nicholson's (2016a) recommendation to make intentional decisions around what is

included in a game. The content drove the decisions of what puzzles were utilized and how the information was conveyed.

Another example from the game was a section that felt less like a game and more like a traditional eLearning. Scenarios were presented and the participant had to select the correct response from provided options. This multiple-choice mechanic was deemed a necessary and relevant way to give the participants meaningful practice of learned concepts. The escape room mechanic was fit around this by providing a gradual collection of clues that would be used to progress in the game in a later puzzle. Participants were provided practice for immediate learning application within the game and the escape game mechanics supported that goal.

To summarize this recommendation, the design of the escape game learning experience should first focus on the content, make intentional decisions about what and why a puzzle or game mechanic is included, and then build the escape game to support the learning outcomes. Do not let the use of an escape game mechanic take precedence over the experience and learning objectives. Always keep the learning outcomes and content as the prioritized focus and fit the escape game mechanics to support those outcomes.

Provide Guidance to Successfully Navigate within a Digital Escape Game

Within The Leadership Escape Game, comments were split with some participants finding the game easy to navigate, and others struggling with what to click on or where to search. Li et al. (2021) reference this experience as the usability of a game, or the "user interface ... and its ease of use" (p. 6). Participants in this study noted that playing The Leadership Escape Game was a unique experience. Escape rooms games are often considered a unique experience that encourages players to collaborate and to solve problems in ways that are not often found in traditional training classes (Coffman-Wolph, et al., 2017). Lack of familiarity with this unique

game type challenged some participants who were not prepared to explore and engage in an escape room game environment. In the broader world of escape room games, a pre-game explanation is a standard component of the experience and is sometimes customized or more detailed for new players who may not understand the unique mechanics within an escape room game (Budoya, et al., 2019; Clare, 2015).

Since game design is linked to learning outcomes and learners' attitudes, navigation is an important consideration in learner satisfaction (Abbott, 2019; Arnab & Clarke, 2017; Pitt et al., 2018). From the start of The Leadership Escape Game, participants were expected to explore the environment by navigating to and clicking on different interactable objects. The goals were to locate both the content and also the puzzles or challenges where they would use the content. Often escape room games provided minimal up-front direction, however, studies show that instructions for game-based learning can influence student performance (Erhel & Jamet, 2019). The Leadership Escape Game included a tutorial and an instructional video, but still found some participants to be challenged with navigation. For example, one participant even noted that they thought the tutorial was very clear and linear, but then when they got into the real game, the options to explore were wide open, and this created hesitation on not knowing what or where to click to progress.

The recommendation for navigation, specifically in a digital environment, is to design an orientation to the game that slowly introduces the learners to the space and teaches how to interact with the mechanics in the game. This strategy aligns with educational game design to develop quick wins and manageable milestones (Baron et al., 2016). Within the quick wins and milestones, learners can quickly become familiar with the game environment, so that they are able to engage with the game and are not challenged by navigation or mechanics.

Multiple Event Curriculum

Another instructional design recommendation is to consider how the presentation of content is incorporated into the overall learning experience. This recommendation is a general learning design principle (de Freitas & Routledge, 2013). Within The Leadership Escape Game, participants were introduced to three objectives, provided the learning content, and were given opportunities to practice and build on each objective, while also navigating through a new escape room environment. Participants noted that there was a significant amount of content to digest within the game and in that timeframe. They noted the benefit of the job aid provided after the game experience, but would have liked to understand foundational concepts prior to the game. Mayer (2017) discusses study results of pretraining benefits stating, "People learn better from computer-based multimedia lessons when they receive pre-training in the key elements" (p. 412). Pre-training could include reading, a facilitated presentation, or other methods for introducing the concepts prior to playing the game. A designer might also consider a post-game summary, such as a follow-up conversation, especially if the results of learner assessments could be included. These strategies would improve the experience and align with Game-Based Learning theory. Jabbar and Felicia (2016) recommend that educational games should include multiple components supporting both playing the game and applying the knowledge. In summary, the escape room game learning experience would be most effective as part of a curriculum that includes pre-work or other instruction to become familiar with concepts, the game that would allow critical thinking and application, a follow-up discussion including personal results and plans for application, and then ongoing performance support that would facilitate application in the workplace.

Implementation Recommendations

From this study, there are also recommendations related to implementation of an educational escape game. These recommendations cover playtesting and Game Master support.

Playtesting

Playtesting is a critical step in general game design (Eckardt & Robra-Bissantz, 2018). The Leadership Escape Game developed for this study went through a significant process of playtesting. Playtesting began during the design of the game as content was being organized into potential puzzles. The designer met with situational leadership subject matter experts and with escape room designers to ensure synergy between game mechanics and the content. When the game was fully developed, a series of tests, including the study's pilot test, were conducted to validate the storyline, the technical aspects, accuracy of content, and the overall experience. Even though there was extensive playtesting, early runs of the game identified minor components that could have been adjusted to improve player experience. Winn and Heeter (2006) state, "Play testing not only helps designers refine the game mechanics, but it can also help resolve conflicts among pedagogy, content, and gameplay" (p. 5). The role of playtesting is critical, and the thorough practice of testing game mechanics and the accurate conveyance of content will be the differentiator of a successful educational escape game.

Support from a Game Master

The role of the Game Master is used in live synchronous games to provide support to players through explaining the rules, setting the stage for the narrative and objectives, and providing support during the game (Wiemker et al., 2015) This study used a script to organize what the Game Master needed to say to the players and the links that were throughout the game. The flow of the game was also mapped out so that the Game Master could follow along with the

progress of players and make notes if there were sections that were more challenging or where there was a break in the experience. Having a scripted game flow is highly recommended to support the Game Master's ability to ensure consistency of game experience and for observation and formative evaluation for improvements.

An additional component of the Game Master's role is to provide hints during the game when participants are stuck on a challenge (Nicholson, 2016b). Within The Leadership Escape Game, some of the hints were built into the programming of the game and revealed at specifically timed moments. The Game Master also would provide hints through the chat or verbally when the participants were stuck. However, in The Leadership Escape Game, many participants did not see hints sent in the Zoom chat room because they were looking at the game in another browser window and there were no sound indicators that a hint was available. The hint system needs to be easy for the participants to receive and to understand the hints. The hint system also needs to provide hints that are meaningful, which can be a challenge with pre-recorded hints that may not provide what the participants need. The recommendation for implementation is to determine what hint system will be most effective for the game experience.

Future Research

There are many opportunities and recommendations to improve on this study and for future research to continue to explore the use of educational escape room games. There are two categories of recommendations in this section: improvements on this study and additional research question topics.

Improvements on this Study

The above dissertation study explored multiple facets of using an educational escape game to deliver leadership training. In reflection of the study, future researchers may wish to explore the following areas of opportunity.

Previous Experience Data Collection

The first recommendation is around data collection and previous experience with escape rooms. This study was able to collect quantitative data around previous experience and use that as a factor of analysis for learner satisfaction and learning acquisition. What would have improved the analysis is asking more specific questions on the Survey #2 learner satisfaction survey and within the interviews about how participants saw their previous experience with escape rooms as either a benefit or a detriment. It was noted in the interviews that participants had some challenges with navigation and figuring out what to do within the game. These challenges were found from both those with and without previous experience. It was also noted that while approximately half of the interviewed participants had previous experience with escape room games and all interviewed participants had heard of escape room games, none had previously participated in a digital escape room game. Further data on how previous experience, or the lack of it, benefited or hindered participants can help with future educational escape game design. This can also be applied to the questions around previous experience with the content. Those with previous situational leadership experience saw this as a great reinforcement, but still sometimes struggled with the navigation piece. Future research could explore how escape game mechanics can be presented without creating an obstacle for understanding the content.

Level 3 Behavior Change and Level 4 Results Data Collection

Another improvement on data would be to find better mechanisms for behavior data collection. This study used the interview as a way to collect self-assessment of application. While there were seven participants who were able to share examples of how they applied the model, there were still some challenges with understanding the accuracy of the behavior change. Future research could be designed that would focus solely on the behavior change or use the surveys as a way to collect that data instead of relying on the interviews. This study stopped at Level 3 Behavior in the levels of evaluation, but future research could also explore Level 4 Results when focused on specific teams or industries (Kirkpatrick & Kirkpatrick, 2016). Demonstrating the impact of educational escape room games on organizational metrics would provide beneficial insight into the return of investment on this game-based approach to leadership training.

Escape Game Mechanics

The final future research recommendation is to look into the mechanics of escape room games and identify which mechanic support and which detract from the learning experience. An example of escape game mechanics to research are the different types of puzzles and how they support or detract from learning. Another angle would be to determine if certain puzzles are better suited for certain types of content. For example, in The Leadership Escape Game, I used an acrostic puzzle to present the concept of goal setting. Research could examine if using an acrostic puzzle is an appropriate way to present terminology, if it detracts from learning it, or if there is a better puzzle approach to introduce new terms to participants. There are many possibilities of further research that look into the specific escape game mechanics and how they influence the effectiveness of a learning game.

Future Research

Additional recommendations for research additional situational leadership research and the impact of team dynamics.

In the realm of SLII® specific content, the data available with the Leader Behavior Analysis II® tool makes it possible to explore many avenues. Specifically related to preferences of leadership styles, the LBA II® data is able to calculate a learners' primary leadership style, secondary leadership styles, areas for development, and what leadership style does the participant incorrectly use most often. Further studies could research how a digital escape game would influence a participant's primary and secondary leadership styles as well as a shift in incorrectly chosen leadership styles.

The final area of future research recommendation follows the interview themes of team dynamics. Within the interviews, participants recognized that non-educational escape games are often used for team building. Participants also stated that they saw the value of working with teammates, or wishing they were able to work with others, in The Leadership Escape Game. There were also some participants who found the team dynamic stressful and that they would have preferred to play alone. A study researching the difference between group games and solo games could provide insight into how educational escape games, especially online ones, are designed for the future. A similar recommendation for future research is to determine whether or not the number of people in a room impacts learning. In this study, there were solo games and up to 5 players in a game. A study to determine how games progress, levels of learner satisfaction, or even transfer of content would be interesting to explore in terms of how many players were in each game.

The popularity of educational escape games and academic literature is growing rapidly. Studies in recent years look at learner satisfaction, with few considering learning acquisition. To continue to further research in the use of educational escape room games, studies need to be able to recruit greater sample sizes and to explore facets of educational escape games, such as design, mechanics, and team dynamics.

Summary

Results from this study revealed that digital escape room games are an effective delivery method for leadership training based on learner satisfaction, learning acquisition, and behavior change data. This conclusion aligns with previous research that game-based learning and educational escape games are engaging experiences that can result in positive learning outcomes. Learner satisfaction results from this study complements existing educational escape room game data. This study contributes learning acquisition and behavior change data, which were previously underrepresented perspectives in evaluating educational escape room games.

Learner satisfaction demonstrated statistically significant and positive ratings for all of the statements within the post-game satisfaction survey. Interviews also highlighted that The Leadership Escape Game was an enjoyable, unique, and valuable experience. Key findings emphasize that the unique experience of an escape room game, the use of narrative, and interesting gameplay mechanics create a meaningful experience that supports learner satisfaction. In summary, this study concludes that escape games used to deliver leadership training are effective from a learner satisfaction perspective.

Pre-test and post-test results showed that there were statistically significant increases for Leadership Style Flexibility and Effectiveness scores, demonstrating learning acquisition. Between the immediate post-test and 30-day post-test, scores did not demonstrate a statistically

significant difference, implying a retention of knowledge. The data supports the conclusion that escape room games have a positive impact on learning acquisition.

Behavior change was the final component of analysis in this study. Interviews demonstrated that just over half of the participants communicated explicit behavior change following The Leadership Escape Game. The remaining participants communicated a consideration of applying the model, but did not provide explicit behavior change examples. This study concludes that the use of escape room games does have a positive, marginal influence on behavior change.

Segmenting and scaffolding are strategies found in both escape room design and instructional design. This alignment of practice highlight the mechanics which support the capability of escape room games to deliver leadership training effectively.

Additional analysis considered the influence of previous escape room and situational leadership experience on learner satisfaction and learning acquisition. 11 of the 12 satisfaction survey statements demonstrated no statistically significant results, implying that neither previous escape room nor situational leadership experience influenced learner satisfaction. Previous experience did impact one statement for previous escape room and one for previous situational leadership experience, though all ratings were within the positive range. Regarding learning acquisition, previous escape room or situational leadership experience did not produce statistically significant differences in Leadership Style Flexibility or Effectiveness scores. The study concludes that previous experience with escape rooms or situational leadership does not impact satisfaction or learning and therefore, is not considered a pre-requisite to success in a digital leadership escape game.

Limitations for this study included low participation due to recruitment and retention. Additionally, this study occurred during the global pandemic of COVID-19. Interviewed participants noted the impact the pandemic had on their capacity and literature also notes the impact to leaders and mental health during this season. It is anticipated that these limitations affected participation, resulting in a smaller sample size than desired.

Recommendations for practitioners were organized in two categories: design and implementation. Design recommendations advise future educational escape game designers to consider the learning outcomes and content over escape game mechanics, to develop a clear orientation to navigating within the game environment, and developing a curriculum that extends beyond just the game. The extended curriculum is recommended to include pre-work, post-game discussion, and performance support.

Recommendations for future research consider three perspectives. The first recommendation is to explore the influence of previous escape room experience on learning outcomes. The second recommendation is to collect level 4 results data as a means to draw stronger conclusion about the effectiveness of educational escape games. The final recommendation is to explore escape game mechanics and determine which support or detract from achieving learning outcomes.

The Leadership Escape Game presented the SLII® leadership model concepts and provided opportunities to practice the model within the mechanics of a digital escape game. Participants stated that they enjoyed this unique experience and found it to be an effective and engaging way to learn the leadership model. Scores improved across the three assessments demonstrating learning acquisition. Participants also provided examples of behavior change as they applied the model with their employees following the game experience. This data supports

the conclusion that digital educational escape games are an effective method to delivery leadership training.

References

Adams, V., Burger, S., Crawford, K., & Setter, R. (2018). Can you escape? Creating an escape room to facilitate active learning. *Journal for Nurses in Professional Development, 34*(2), E1-E5.

Abbott, D. (2019) Modding tabletop games for education. In M. Gentile., M. Allegra., H. Söbke (Eds) *Games and Learning Alliance. GALA 2018. Lecture Notes in Computer Science*, (Vol 11385, pp. 318-329). Springer International Publishing.

Abouel-Enin, M. A. (1994). *The relationship among perceived leadership style, leadership decision making criteria, and leadership effectiveness in business settings in southern California* (Publication No. 9503984) [Doctoral dissertation, United States International University]. ProQuest Dissertations and Theses Global.

Aldoobie, N. (2015). ADDIE model. *American International Journal of Contemporary Research, 5*(6). 68-72.

Arnab, S., & Clarke, S. (2017). Towards a trans-disciplinary methodology for a game-based intervention development process. *British Journal of Educational Technology, 48*(2), 279-312.

Ayre, C., & Scally, A. J. (2014). Critical values for Lawshe's content validity ratio: revisiting the original methods of calculation. *Measurement and Evaluation in Counseling and Development, 47*(1), 79-86.

ATD. (2019). *2019 State of the Industry*. https://www.td.org/soir2019

Baker, C. M., Crabtree, G., & Anderson, K. (2020). Student pharmacist perceptions of learning after strengths-based leadership skills lab and escape room in pharmacy practice skills laboratory. *Currents in Pharmacy Teaching and Learning*, *12*(6), 724-727.

Baron, T., Heath, C., & Amresh, A. (2016). Towards a context agnostic platform for design and assessment of educational fames. *Proceedings Of The European Conference On Games Based Learning*, 34-40.

Bhattacharjee, B., & Acharya, T. (2020). The COVID-19 pandemic and its effect on mental health in USA–a review with some coping strategies. *Psychiatric Quarterly*, *91*(4)*,* 1135-1145.

Blackler, F., & Kennedy, A. (2004). The design and evaluation of a leadership programme for experienced chief executives from the public sector. *Management Learning, 35*(2), 181-203.

Blanchard, K. (2010). *Leading at a higher level.* FT Press.

Blanchard, K., Zigarmi, D., Forsyth, D., & Hambleton, R. (2013). *Leader behavior analysis II ®: Self scoring* [Measurement instrument]. The Ken Blanchard Companies.

Blanchard, K. H., Zigarmi, D., & Nelson, R. B. (1993). Situational leadership® after 25 years: A retrospective. *Journal of Leadership Studies*, *1*(1), 21–36. https://doi.org/10.1177/107179199300100104

Bloom, B. S. (1956). *Taxonomy of educational objectives, Handbook I: The cognitive domain*. David McKay Co, Inc.

Bopp, M. (2007). Storytelling as a motivational tool in digital learning games. In T. Hug (Ed.), *Didactics of microlearning. Concepts, discourses and examples* (pp. 261–279). Waxmann, V.

Borrego C. Fernandez, C., Blanes, I. & Robles, S. (2017). Room escape at class: Escape games activities to facilitate the motivation and learning in computer science. *Journal of Technology and Science Education, 7*(2), 162-171.

Bosse, T., Duell, R., Memon, Z. A., Treur, J., & van der Wal, C. N. (2017). Computational model-based design of leadership support based on situational leadership theory. *Simulation, 93*(7), 605–617. https://doi.org/10.1177/0037549717693324

Braad, E., Degens, N., & IJsselsteijn, W. (2019). *Towards a Framework for Metacognition in Game-Based Learning*. [Paper presentation] 13th European Games-Based Learning Conference, Odense, Denmark.

Breakout Edu. (n.d.) What is Breakout EDU? https://www.breakoutedu.com/learnmore

Brown, N., Darby, W., & Coronel, H. (2019). An escape room as a simulation teaching strategy. *Clinical Simulation in Nursing, 30*(1), 1-6.

Budoya, C., Kissaka, M., & Mtebe, J. (2019). Instructional design enabled agile method using ADDIE model and feature driven development method. *International Journal of Education and Development using ICT, 15*(1), 35-54.

Burch, P. (2011). The effect of leadership flexibility and effectiveness on city manager tenure (Publication No. 3460567) [Doctoral dissertation, Walden University]. ProQuest Dissertations and Theses Global.

Cain, J. (2019). Exploratory implementation of a blended format escape room in a large enrollment pharmacy management class. *Currents in Pharmacy Teaching and Learning, 11*(1), 44-50.

Caldas, L. M., Eukel, H. N., Matulewicz, A. T., Fernández, E. V., & Donohoe, K. L. (2019). Applying educational gaming success to a nonsterile compounding escape room. *Currents in Pharmacy Teaching and Learning*, *11*(10), 1049-1054.

The Center for Leadership Studies. (2021). https://situational.com/about-us/

Chaneski, W. S. (2016). Employing the right leadership style. *Modern Machine Shop, 89*(6), 44-46.

Chrosti, C. (2017, February 10). *The state of the escape room industry* [Web log entry]. https://blog.updraftventures.com/the-state-of-the-escape-room-industry-603773ba6cdd

Church, A. H. (2017). The art and science of evaluating organization development interventions. *OD Practitioner*, *49*(2), 26–35.

Clare, A. (2015). *Escape the game: How to make puzzle and escape rooms*. Wero Creative Press.

Clarke, N., & Higgs, M. (2016). How strategic focus relates to the delivery of leadership training and development. *Human Resource Management*, *55*(4), 541–565. https://doi.org/10.1002/hrm.21683

Clarke, S., Peel, D., Arnab, S., Morini, L., Keegan, H., & Wood, O. (2017). EscapEd: A framework for creating educational escape rooms and interactive games to for higher/further education. *International Journal of Serious Games, 4*(3), 73-86.

Clauson, A., Hahn, L., Frame, T., Hagan, A., Bynum, L. A., Thompson, M. E., & Kiningham, K. (2019). An innovative escape room activity to assess student readiness for advanced pharmacy practice experiences (APPEs). *Currents in Pharmacy Teaching and Learning*, *11*(7), 723-728.

Coffman-Wolph, S., Gray, K. M., Pool, M. A. (2017). Design of a virtual escape room for K-12 supplemental coursework and problem-solving skill development [Paper presentation]. *American Society for Engineering Education Zone II Conference*.

Cohen, J. (1992). A power primer. *Psychological bulletin*, *112*(1), 155.

Cote, R. (2017). Vision of effective leadership. *International Journal of Business Administration, 8*(6), 1-10.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches.* Thousand Oaks, California: SAGE Publications, Inc.

Crossey, B. J. (2018). *An action research study for increasing math proficiency at pine school* (Publication No. 10844832) [Doctoral dissertation, University of Mississippi]. ProQuest Dissertations and Theses Global.

Cull, W. L., O' Connor, K. G., Sharp, S., & Tang, S. F. S. (2005). Response rates and response bias for 50 surveys of pediatricians. *Health services research*, *40*(1), 213-226.

Cunningham J. B., McCrum-Gardner, E. (2007) Power, effect and sample size using GPower: practical issues for researchers and members of research ethics committees. *Evidence Based Midwifery,* 5(4), 132-136.

Dack, H., van Hover, S., & Hicks, D. (2016). "Try not to giggle if you can help it": The implementation of experiential instructional techniques in social studies classrooms. *Journal of Social Studies Research*, *40*(1), 39–52. https://doi.org/10.1016/j.jssr.2015.04.002

Daly, K. (2019). *Comprehensive guidance programs in New York state: A study of the preparation and practice of high school counselors New York state* (Publication No. 13855623) [Doctoral dissertation, St. John's University]. ProQuest Dissertations and Theses Global.

Davis, C. (2017). *History teachers' perspectives of time constraints, engagement, and relevance in the curriculum* (Publication No. 10636637) [Doctoral dissertation, Walden University]. ProQuest Dissertations and Theses Global.

Day, D. V., Fleenor, J. W., Atwater, L. E., Sturm, R. E., & McKee, R. A. (2014). Advances in leader and leadership development: A review of 25 years of research and theory. *The Leadership Quarterly, 25*(1), 63-82.

de Freitas, S., & Routledge, H. (2013). Designing leadership and soft skills in educational games: The e-leadership and soft skills educational games design model (ELESS). *British Journal of Educational Technology, 44*(6), 951-968.

de Lope, R. P., & Medina-Medina, N. (2017). A comprehensive taxonomy for serious games. *Journal of Educational Computing Research, 55*(5), 629-672.

Dick, W., Carey, L., & Carey, J. O. (2010). *The systematic design of instruction.* Pearson.

Doo, M. Y., Bonk, C., & Heo, H. (2020). A Meta-Analysis of Scaffolding Effects in Online Learning in Higher Education. *International Review of Research in Open and Distributed Learning*, *21*(3), 60-80.

Doran, G. T. (1981). There's a S.M.A.R.T. way to write management's goals and objectives. *Management Review*, *70*(11), 35-36.

Dugan, N. (2018). *Security awareness training in a corporate setting* (Publication No. 10980391). [Master thesis, Iowa State University]. ProQuest Dissertations & Theses Global.

Dunnagan, M. (2014). *Work group composition effects on leadership styles in aircraft manufacturing organizations* (Publication No. 3665373) [Doctoral dissertation, Walden University]. ProQuest Dissertations & Theses Global.

Duyugulu, S., & Kublay, G. (2010). Transformational leadership training programme for charge nurses. *Journal of Advanced Nursing, 67*(3), 633–642.

Eckardt, L., & Robra-Bissantz, S. (2018). Playtesting for a Better Gaming Experience: Importance of an Iterative Design Process for Educational Games. In *PACIS,* 78-86.

Erhel, S., & Jamet, E. (2019). Improving instructions in educational computer games: Exploring the relations between goal specificity, flow experience and learning outcomes. *Computers in Human Behavior*, *91*, 106-114.

Eukel, H. N., Frenze, J. E., & Cernusca, D. (2017). Educational gaming for pharmacy students: Design and evaluation of a diabetes-themed escape room. *American Journal of Pharmaceutical Education, 81*(7), 1-5.

Eukel, H., & Morrell, B. (2021). Ensuring educational escape-room success: The process of designing, piloting, evaluating, redesigning, and re-evaluating educational escape rooms. *Simulation & Gaming, 52*(1), 18-23.

Farber, M. (2016). *Game-based learning in action: How transformational leaders use games in their teaching practice* (Publication No. 10616228) [Doctoral dissertation, New Jersey City University]. ProQuest Dissertations & Theses Global.

Fanning, R. M., & Gaba, D. M. (2007). The role of debriefing in simulation-based learning. *Simulation in Healthcare, 2*(2), 115-125.

Fielder, F. E. (1967). *A theory of leadership effectiveness.* McGraw-Hill.

Friedrich, C., Teaford, H., Taubenheim, A., Boland, P., & Sick, B. (2018): Escaping the professional silo: An escape room implemented in an interprofessional education curriculum. *Journal of Interprofessional Care, 33*(5), 573-575.

Gagné, R. (1985). *The conditions of learning (*4th ed). Rinehart & Winston.

Gallegos, C., Tesar, A. J., Connor, K., & Martz, K. (2017). The use of a game-based learning platform to engage nursing students: A descriptive, qualitative study. *Nurse Education in Practice, 27,* 101-106. https://doi.org/10.1016/j.nepr.2017.08.019

García, O., Fernández, D., Membrives, J., & Ris, A. (2018). Welcome aboard: Applying motivational design to a corporate onboarding project. In *European Conference on Games Based Learning*, (pp. 126–135). Academic Conferences International Limited.

Garneli, V., Giannakos, M., & Chorianopoulos, K. (2017). Serious games as a malleable learning medium: The effects of narrative, gameplay, and making on students' performance and attitudes. *British Journal of Educational Technology, 48*(3), 842-859.

Gomati, I. (2017). "The Golden Rule": A portable escape room designed to promote empathy and playfulness in challenging social contexts. [Masters thesis, State University of New York College at Buffalo]. ProQuest Dissertations & Theses Global.

Gómez-Urquiza, J. L., Gómez-Salgado, J., Albendín-García, L., Correa-Rodríguez, M., González-Jiménez, E., & Cañadas-De la Fuente, G. A. (2019). The impact on nursing students' opinions and motivation of using a "Nursing Escape Room" as a teaching game: A descriptive study. *Nurse Education Today.72*(1), 73-76.

Graeff, C. L. (1997). Evolution of situational leadership theory: A critical review. *Leadership Quarterly*, *8*(2), 153. https://doi.org/10.1016/S1048-9843(97)90014-X

Graf-Vlachy, L., Sun, S., & Zhang, S. X. (2020). Predictors of managers' mental health during the COVID-19 pandemic. *European Journal of Psychotraumatology, 11*(1), https://doi.org/10.1080/20008198.2020.1834195

Graham, J., & Trendafilova, S. (2016). Implementing self-managed teams at western university: A human resource and leadership case study. *Case Studies Sport Management, 5*(1), 64–72.

Grant, T. K. (2019). *Transfer of leadership training for middle managers in a large agriculture company* (Publication No. 22615324). [Doctoral dissertation, Wilmington University (Delaware)]. ProQuest Dissertations & Theses Global.

Gunter, G. A., Kenny, R. F., & Vick, E. H. (2008). Taking educational games seriously: using the RETAIN model to design endogenous fantasy into standalone educational games. *Educational Technology Research and Development, 56*(5), 511-537.

Hamari, J., Shernoff, D. J., Rowe, E., Coller, B., Asbell-Clarke, J., & Edwards, T. (2016). Challenging games help students learn: An empirical study on engagement, flow and immersion in game-based learning. *Computers in Human Behavior*, *54*, 170-179.

Hanus, M. D., & Fox, J. (2015). Assessing the effects of gamification in the classroom: A longitudinal study on intrinsic motivation, social comparison, satisfaction, effort, and academic performance. *Computers & Education, 80*, 152-161.

Heldal, I., Backlund, P., Johannesson, M., Lebram, M., & Lundberg, L. (2017). Connecting the links: Narratives, simulations and serious games in prehospital training. *Studies in Health Technology & Informatics, 235*, 343–347. https://dx.doi.org/10.3233/978-1-61499-753-5-343

Henkel, T., & Bourdeau, D. (2018). A field study: An examination of manager's situational leadership styles. *Journal of Diversity Management, 13*(2), 7-14.

Henriksen, T. D., & Børgesen, K. (2016) Can good leadership be learned through business games? *Human Resource Development International, 19*(5) 388-405. http://dx.doi.org/10.1080/13678868.2016.1203638

Hermanns, M., Deal, B., Campbell, A.M., Hillhouse, S., Opella, J. B., Faigle, C., & Campbell IV, R. H. (2018). Using an "Escape Room" toolbox approach to enhance pharmacology education. *Journal of Nursing Education and Practice, 8*(4), 89 - 95.

Hersey, P., Blanchard, K. H., & Johnson, D. E. (2001). *Management of organizational behavior: Leading human resources* (8th Ed). Prentice Hall.

Ho, A. M. (2018). Unlocking ideas: Using escape room puzzles in a cryptography classroom. *Primus: Problems, Resources & Issues in Mathematics Undergraduate Studies, 28*(9), 835–847. https://doi.org/10.1080/10511970.2018.1453568

Jabbar, A. L. A., & Felicia, P. (May 2016). Gameplay engagement and learning in game-based learning: A systematic review. *Review of Educational Research, 20*(10) 1-40.

Jakubik, L. D. (2016). Mentoring practice and mentoring benefit 2: Mapping the future and career optimism - An overview and application to practice using mentoring activities. *Pediatric Nursing*, *42*(3), 145–146.

Juul, J. (2018). The game, the player, the world: Looking for a heart of gameness. *PLURAIS-Revista Multidisciplinar, 1*(2), 248-270.

Karagiorgas, D. N., & Niemann, S. (2017). Gamification and game-based learning. *Journal of Educational Technology, 45*(4), 499-519.

Keller, J.M. (1983). Motivational design of instruction. In Reigeluth C.M. (Ed.), *Instructional design theories and models: An overview of their current status*. Lawrence Erlbaum, 383–434.

The Ken Blanchard Companies. (2013). *Situational Leadership II® at a Glance* [Handout]. The Ken Blanchard Companies.

Kim, B., Park, H., & Baek, Y. (2009). Not just fun, but serious strategies: Using meta-cognitive strategies in game-based learning. *Computers & Education*, *52*(4), 800-810.

Kirkpatrick, J. D., & Kirkpatrick, W. K. (2016). *Kirkpatrick's four levels of training evaluation.* Alexandria, VA: ATD Press.

Knowles, M.S. (1980). *The modern practice of adult education: From pedagogy to andragogy* (2nd ed.). Cambridge Books.

Kuchynková, L. (2016). Identification of factors associated with leadership-style efficiency of managers. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis, 64*(6), 1971–1979. s https://dx.doi.org/10.11118/actaun201664061971

Kusrini, N. A. R. (2018). Comparative theory on three instructional designs: Dick and Carey, Kemp, and Three Phases. https://osf.io/wkv6c/download

Lacerenza, C. N., Reyes, D. L., Marlow, S. L., Joseph, D. L., & Salas, E. (2017). Leadership training design, delivery, and implementation: A meta-analysis. *Journal of Applied Psychology*, *102*(12), 1686–1718. https://doi.org/10.1037/apl0000241

Lama, A. V. (2018). Millennial leisure and tourism: The rise of escape rooms. *Cuadernos de Turismo, 41*, 743-746.

Lama, A. V., & Martin, M. G. (2021). Decoding escape rooms from a tourism perspective: A global scale analysis. *Moravian Geographical Reports, 29*(1), 2-14.

Lameras, P., Arnab, S., Dunwell, I., Stewart, C., Clarke, S., & Petridis, P. (2017). Essential features of serious games design in higher education: Linking learning attributes to game mechanics. *British Journal of Educational Technology, 48*(4), 972-994.

Lawshe, C. H. (1975). A quantitative approach to content validity. *Personnel Psychology, 28*(4), 563-575.

Lee, Y. H., Hsieh, Y. C., Hsiao, C., & Lin, C. H. (2018). From virtual worlds to reality. *Information Technology & People, 31*(2), 557-577.

Leslie, J. B. (2013). *Feedback to managers: A guide to reviewing and selecting multirater instruments for leadership development (4th Ed.),* Center for Creative Leadership.

Lester, S. W. (2015). Melding Service Learning and Leadership Skills Development: Keys to Effective Course Design. *Journal of Experiential Education, 38*(3), 280–295.

Li, X., Zhang, Z., & Stefanidis, K. (2021). A Data-Driven Approach for Video Game Playability Analysis Based on Players' Reviews. *Information 2021, 12*(3), 129-147.

Lui, R. W., & Au, C. H. (2018). Establishing an educational game development model: From the experience of teaching search engine optimization. International Journal of Game-Based Learning (IJGBL), 8(1), 52-73.

Lynch, B. (2015). Partnering for performance in situational leadership: A person-centred leadership approach. *International Practice Development Journal*, *5*, 1–10.

Marusteri, M., & Bacarea, V. (2010). Comparing groups for statistical differences: how to choose the right statistical test? *Biochemia medica: Biochemia medica*, *20*(1), 15-32.

Mason, M. (2010). Sample size and saturation in PhD studies using qualitative interviews. In *Forum: qualitative social research*, *11*(3).

Mayer, R. E. (2017). Using multimedia for e-learning. *Journal of Computer Assisted Learning*, *33*(5), 403-423.

Mawhirter, D. A., & Garofalo, P. F. (2016). Expect the unexpected: Simulation games as a teaching strategy. *Clinical Simulation in Nursing, 12*(4), 132-136.

Maxwell, J. A. (2008). Designing a qualitative study. *The SAGE handbook of applied social research methods*, *2*, 214-253.

McCall, J. (2012). Navigating the problem space: The medium of simulation games in the teaching of history. *History Teacher*, *46*(1), 9–28.

McLaughlin, T. J. (2019). *The impact of game-like learning on content comprehension and retention in an eighth grade social studies classroom* (Publication No. 10807928) [Doctoral Dissertation]. Available from ProQuest Dissertations & Theses Global.

Meier, D. (2016). Situational leadership theory as a foundation for a blended learning framework. *Journal of Education and Practice, 7*(10), 25–30.

Meirovich, G., & Gu, J. (2015). Empirical and theoretical validity of Hersey-Blanchard's contingency model. *The Journal of Applied Management and Entrepreneurship, 20*(3), 56-74.

Nicholson, S. (2015). Peeking behind the locked door: A survey of escape room facilitates [White paper]. http://scottnicholson.com/pubs/erfacwhite.pdf

Nicholson, S. (2016a). Ask why: Creating a better experience through environmental storytelling and consistency in escape room design. *Proceeding from Meaningful Play 2016*, Lansing, Michigan. http://scottnicholson.com/pubs/askwhy.pdf

Nicholson, S. (2016b). The state of escape: Escape room design and facilities. *Proceedings from Meaningful Play*. http://scottnicholson.com/pubs/stateofescape.pdf

Nicholson, S. (2018). Creating engaging escape rooms for the classroom. *Childhood Education, 94*(1), 44-49.

Noon, E. J. (2018). Interpretive phenomenological analysis: An appropriate methodology for educational research. *Journal of Perspectives in Applied Academic Practice, 6*(1), 75-83.

Northouse, R. G. (2016) *Leadership theory and practice.* SAGE Publications

Olatunji, A. G., Ojelabi, A., Isiaq, A. A., Moshood, I., & Ewaoda, A. S. (2017). Leadership training and delivery prospects of team leaders in Communication Network Support Services Limited, Ilorin. *Africa's Public Service Delivery & Performance Review*, *5*(1), 1–8. https://doi.org/10.4102/apsdpr.v5i1.139

Olt, M. C., & Szasz, M. A. (2019). Objective smart si obiceiuri bune. *Review of Management & Economic Engineering, 18*(1), 107–112

Pajo, B. (2018). *Introduction to research methods: A hands-on approach.* SAGE Publications, Inc.

Pan, R., Lo, H., & Neustaedter, C. (2017). Collaboration, awareness, and communication in real-life escape rooms. In *Proceedings of the 2017 Conference on Designing Interactive Systems* (pp. 1353-1364). ACM.

Pereira, L. (2017). The effects of gender-aware leadership-development training on the leadership-behavioral competencies of women software engineers in California's Silicon Valley. (Publication No. 10606961) [Doctoral dissertation, University of San Francisco]. ProQuest Dissertations & Thesis Global.

Perrotta, C., Featherstone, G., Aston, H., & Houghton, E. (2013). Game-based learning: Latest evidence and future directions. *NFER Research Programme: Innovation in Education. Slough: NFER*. https://www.nfer.ac.uk/nfer/publications/GAME01/GAME01.pdf

Pitt, M. B., Borman-Shoap, E. C., & Eppich, W. J. (2015). Twelve tips for maximizing the effectiveness of game-based learning. Medical Teacher, 37(11), 1013-1017.

Pomerantz, S. D. (1992). *Comparison of the effect of microcounseling and situational leadership training on the manager-worker interaction, worker performance and stress: Developing*

a comprehensive leader-follower model [Doctoral dissertation, University of San Francisco]. ProQuest Dissertations & Theses Global.

Prensky, M. 2001. *Digital Game-Based Learning*. McGraw-Hill.

Qian, M., & Clark, K. R. (2016). Game-based learning and 21st century skills: A review of recent research. *Computers in Human Behavior, 63*, 50-58.

Raffo, D. M., & Clark, L. A. (2018). Using definitions to provoke deep explorations into the nature of leadership. *Journal of Leadership Education*, *17*(4).

Raza, S. A., & Sikandar, A. (2018). Impact of leadership style of teacher on the performance of students: An application of Hersey and Blanchard situational model. *Bulletin of Education and Research, 40*(3), 73-94.

Reade, T. (2017). The clock is ticking: Library orientation as puzzle room. *Knowledge Quest, 45*(5), 48-53.

Reza, M., Rofiaty, R., & Djazuli, A. (2018). The influence of situational leadership, organizational culture and training on employee performance and work motivation of millenial generation at the inspection office of BRI malang. *Wacana: Jurnal Sosial Dan Humaniora, 21*(2), 89–95

Reio, T. G., Jr., Rocco, T. S., Smith, D. H., & Chang, E. (2017). A critique of Kirkpatrick's evaluation model. *New Horizons in Adult Education & Human Resource Development, 29*(2), 35–53.

Rice, M. E., & Harris, G. T. (2005). Comparing effect sizes in follow-up studies: ROC Area, Cohen's d, and r. *Law and human behavior*, *29*(5), 615-620

Ruben, B. D., De Lisi, R., & Gigliotti, R. A. (2018). Academic leadership development programs: Conceptual foundations, structural and pedagogical components, and operational considerations. *Journal of Leadership Education, 17*(3), 241-254.

Salehzadeh, R. (2016). Which types of leadership styles do followers prefer? A decision tree approach. *International Journal of Educational Management, 31*(7), 865-877.

Schein, E. (2010). Organizational culture and leadership (4th ed.). San Francisco, CA: Jossey-Bass.

Schnell, R., Bachteler, T., & Reiher, J. (2010). Improving the use of self-generated identification codes. *Evaluation Review*, *34*(5), 391-418.

Sekaran, U., 2003. *Research methods for business: A skill building approach.* John Wiley & Sons.

Senturk, M. (2018). *Investigation of organizational resilience through team operations in challenging conditions* (Publication No. 13875539). [Doctoral dissertation, The University of Edinburgh (United Kingdom)]. ProQuest Dissertations & Theses Global.

Siegle, D. (2015). Technology: Learning can be fun and games. *Gifted Child Today, 38*(3), 192-197.

The SLII® Experience Learning Design. (2020). *SLII® Powering Inspired Leadership* ™. https://www.kenblanchard.com/Products-Services/SLII

Sousa, M. J., & Rocha, Á. (2019). Leadership styles and skills developed through game-based learning. *Journal of Business Research, 94*, 360-366.

Sowcik, M., Benge, M., & Niewoehner-Green, J. (2018). A practical solution to developing county extension director's leadership skills: Exploring the design, delivery and

evaluation of an online leadership development program. *Journal of Agricultural Education*, *59*(3), 139–153.

Spira, L. (8 August 2019). *5 year US escape room industry report (August 2019)*. https://roomescapeartist.com/2019/08/08/5-year-us-escape-room-industry-report-august-2019/

Stiles, J. L. (2008). Presidential assistants in higher education: The association between situational leadership styles and their sources and use of power (Publication No. 3303344) [Doctoral dissertation, East Carolina University]. ProQuest Dissertations and Theses Global.

Stogdill, R. M. (1950). Leadership, membership and organization. *Psychological bulletin*, *47*(1), 1-14.

Stręk, N. (2018). The idea of situational leadership in political parties. A*nnales Universitatis Mariae Curie-Skłodowska, sectio K–Politologia*, *25*(2), 41-52.

Strickland, H. P., & Kaylor, S. K. (2016). Bringing your A-game: Educational gaming for student success. *Nursing Education Today, 40*, 101-103.

Styling, G., Welton, C., Milijasevic, N., Peterson, E., & Sia, S. (2018). You can escape, but did you learn? Using escape rooms to measure knowledge and increase awareness. *Canadian Journal of Respiratory Therapy, 54*(2), 51.

Sung, H. Y., & Hwang, G. J. (2013). A collaborative game-based learning approach to improving students' learning performance in science courses. *Computers & education*, *63*, 43-51.

Tafvelin, S., Hasson, H., Holmström, S., & von Thiele Schwarz, U. (2019). Are formal leaders the only ones benefitting from leadership training? A shared leadership perspective.

Journal of Leadership & Organizational Studies, *26*(1), 32–43. https://doi.org/10.1177/1548051818774552

Tannenbaum, R. & Schmidt, W. H. (1973). How to choose a leadership pattern. *Harvard Business Review, 51*(3), 162–180.

Theodosiou, S., & Karasavvidis, I. (2015). Serious games design: A mapping of the problems novice game designers experience in designing games. *Journal of e-Learning and Knowledge Society, 11*(3), 133-148.

Thompson, G., & Glasø, L. (2015). Situational leadership theory: A test from three perspectives. *Leadership & Organization Development Journal, 35*(5) 527-544.

3 ways to help managers and direct reports collaborate to achieve goals. (2019, March 5). *The Ken Blanchard Companies.* https://resources.kenblanchard.com/blanchard-leaderchat/3-ways-to-help-managers-and-direct-reports-collaborate-to-achieve-goals

Tobias, S., Fletcher, J. D., & Wind, A. P. (2014). Game-based learning. In J.M. Spector et al (Eds.) Handbook of Research on Educational Communications and Technology (pp. 485-503). Springer.

Tortorella, G. & Fogliatto, F. (2017). Implementation of lean manufacturing and situational leadership styles: An empirical study. *Leadership & Organization Development Journal, 38*(7), 946-968. https://doi.org/10.1108/LODJ-07-2016-0165

Tsai, M. J., Huang, L. J., Hou, H. T., Hsu, C. Y., & Chiou, G. L. (2016). Visual behavior, flow and achievement in game-based learning. *Computers & Education*, *98*, 115-129

Turner, J. R., Baker, R., Schroeder, J., Johnson, K. R., & Chung, C. H. (2018). Leadership development techniques. *European Journal of Training and Development 42*(9), 538-557.

Vartanian, L. (2006). The relationship between emotional intelligence and situational leadership II [Doctoral dissertation, San Diego Alliant International University]. ProQuest Dissertations and Theses Global.

Vecchio, R. P., Bullis, R. C., & Brazil, D. M. (2006). The utility of situational leadership theory: A replication in a military setting. *Small Group Research, 37*(5), 407-424.

Veldkamp, A., van de Grint, L., Knippels, M.C. P.J, van Joolingen, W. R. (2020). Escape education: A systematic review on escape rooms in education/ *Educational Research Review, 31,* 1-18. https://doi.org/10.1016/j.edurev.2020.100364

Vörös, A. I. V., & Sárközi, Z. (2017). Physics escape room as an educational tool. In *AIP Conference Proceedings, 1916*(1), 050002-1 – 050002-6. AIP Publishing LLC

Wang, X., & Knight, W. H. (1991). Readiness and achievement motivation: An investigation of the validity of the readiness scales in Hersey and Blanchard's situational leadership. *Paper presented at the Mid-South Educational Research Conference, Lexington, KY.*

Ward, M., McAuliffe, E., Ní Shé, É., Duffy, A., Geary, U., Cunningham, U., Korpos, C. (2017). Imbuing medical professionalism in relation to safety: a study protocol for a mixed-methods intervention focused on trialing an embedded learning approach that centers on the use of a custom designed board game. *BMJ Open, 7*(7), https://dx.doi.org/10.1136/bmjopen-2016-014122

Weiss, P. G., & Li, S. T. T. (2020). Leading change to address the needs and well-being of trainees during the COVID-19 pandemic. *Academic pediatrics*, *20*(6), 735-741.

Wiemker, M., Elumir, E., & Clare, A. (2015). Escape room games. *Game Based Learning, 55.*

Whitton, N. (2018). Playful learning: tools, techniques, and tactics. *Research in Learning Technology. 26*(1), 2035-2047. http://dx.doi.org/10.25304/rlt.v26.203

Winn, B., & Heeter, C. (2006). Resolving conflicts in educational game design through playtesting. *Innovate: Journal of Online Education, 3(2).*

Wu, C., Wagenschutz, H., & Hein, J. (2018). Promoting leadership and teamwork development through escape rooms. *Medical Education, 52*(5), 561–562. https://doi.org/10.1111/medu.13557

Zhang, X. C., Lee, H., Rodriguez, C., Rudner, J., Chan, T. M., & Papanagnou, D. (2018). Trapped as a group, escape as a team: applying gamification to incorporate team-building skills through an 'escape room'experience. *Cureus, 10*(3), https://dx.doi.org/10.7759/cureus.2256

Zigarmi, D., Forsyth, D., Blanchard, K., & Hambleton, R. (1991). *Leader behavior analysis II.*

Zigarmi D., & Roberts, T.P. (2017). A test of three basic assumptions of Situational Leadership ® II model and their implications for HRD practitioners. *European Journal of Training and Development, 41*(3), 241-260. https://doi.org/10.1108/EJTD-05-2016-0035

Appendix A

Permissions to Use Models

The following emails present documentation of permissions to use and reprint the following models in this dissertation study.

Figure 1

Permission to use SLII® from Ken Blanchard Companies

Permissions Request
Rachel Arpin Sun, Dec 29, 2019 at 2:31 PM
To: "[redacted]

Good morning,

My name is Rachel Arpin and I am a doctoral candidate at Franklin University in Columbus, Ohio.

I am studying escape games as a leadership training activity. There are strong connections between the team work, critical thinking, and hands-on engagement that lends to escape rooms being an effective learning environment.

Recently, I attended a Situational Leadership® II session at work and realized the content and assessment tools would fit well with my study.

The items I would like to request permission to use are the following materials:

- Situational Leadership ® II at a Glance worksheet
- Leader Behavior Analysis II® Self Questionnaire
- Leader Behavior Analysis II® Self Scoring
- Situational Leadership ® II SLII ® Game: Matching

My intention is to use these documents in my study in the following manner (I will reference the document by the bulleted letter above for easier reading).

The overall study is going to teach a condensed overview of Situational Leadership ® II. This includes the three steps: goal setting, diagnosing, and matching.

There will be two participant groups in my study. The control group will experience a 1-2 hour instructor-led overview of the content. The experiment group will experience a 1-2 hour escape game that will contain the same content, but presented in the form of the escape game environment.

The worksheet (a) will be the final take-away from the session. The control group will receive it as part of the session. The experiment group will pull together the pieces from each section during the flow of the escape game to form this final worksheet.

The self-questionnaire (b) will be taken prior to the session and scored (c) to create a baseline of data on the participants' leadership style flexibility and effectiveness. This assessment will be taken again 30 days following the training to compare any changes in flexibility and effectiveness once applying the content in the real world.

The Game (d) questions will be answered prior to the session and then also following the session to act as a pre-session and post-session knowledge assessment.

I noticed on the bottom of the documents a permissions note that states, "Blanchard training participants may download, print, copy, electronically transmit, and/or post for internal business purposes."

It is important to me to know that using these materials for the purposes of my study would still be approved and to find out if there are any additional steps I need to take for permission in order to be able to publish my dissertation results. I will gladly share my dissertation findings or write a white paper for your site once the study is complete.

May I ask for your approval and permissions to use these materials for the purposes of my dissertation study?

Please feel free to email at LearnAndLive.Rachel@gmail.com or call/text at 614-203-4220.

Thank you and I hope you have a wonderful New Year's!
Rachel Arpin

[redacted]kenblanchard.com> Thu, Jan 2, 2020 at 7:38 PM
To: Rachel Arpin <[redacted]>

Hi Rachel,

Thank you for reaching out to us with your permissions inquiry. I will meet with [redacted] next Monday to discuss your request, as he heads up our IP Office and is responsible for managing the intellectual property assets of our company. One of the first questions he will probably ask is where you attended your SLII workshop. Can you please share that with me, and then I can discuss this request with him.

Thank you,

[redacted]

[redacted] | Intellectual Property Office
[redacted]
[redacted] | Escondido, CA 92029
www.kenblanchard.com

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Disclaimer

The information contained in this communication from the sender is confidential. It is intended solely for use by the recipient and others authorized to receive it. If you are not the recipient, you are hereby notified that any disclosure, copying, distribution or taking action in relation of the contents of this information is strictly prohibited and may be unlawful.

Rachel Arpin <[redacted]> Thu, Jan 2, 2020 at 8:26 PM
To: [redacted]

My previous employer (Express Scripts) led a session in October 2019. The facilitator was one of the licensed facilitators for the Ken Blanchard program. I now work for The Ohio State University (as of November).

I am happy to provide any information needed to get permission. My dissertation course begins Monday and I will need to submit my methodology within the month. Situational leadership is my first choice and I am happy to do whatever is needed to get the permission as soon as possible.

Thank you, [redacted]!

Rachel Arpin
[redacted]

[redacted]kenblanchard.com> Tue, Jan 7, 2020 at 6:51 PM
To: Rachel Arpin <[redacted]>

Hi Rachel,

Thank you for the additional information. I spoke with Richard again this morning and he is approving your use of the limited SLII® intellectual property for your study, but he would like you to confirm that you agree to the following:

- There may be no commercial use whatsoever;
- It cannot be shared with anyone outside of the University;
- It cannot be posted on the Internet; and
- You provide us with reports on your progress as often as feasible.

It's rather rare for Richard to say "yes" to something like this, but he is interested in your study and how it develops. Best of luck with your project!

Thank you,

[redacted]

Rachel Arpin <[redacted] Sun, Jun 7, 2020 at 3:25 PM
To: [redacted]

Hello [redacted]

I am checking in with another update on my dissertation. I truly appreciate the permission granted to use the Situational Leadership II(R) content.

Upcoming steps within my study:

- Applying for IRB (Institutional Review Board) approval to conduct my game and collect data from the participants
- Developing the online game and preparing the logistics for implementation

There are some minor changes to my study in terms of methodology. They do not impact our agreement, but thought you would want to know what has changed.

- The study will solicit approximately 100 - 160 participants. There will no longer be a control group and all participants will experience the escape game.
- The data collection will follow Kirkpatrick's levels of evaluation.
    - Level 1: Post-training (escape game) satisfaction survey
    - Level 2: Learning acquisition using the LBA II(R) and measuring the change in leadership flexibility and effectiveness across a pre-test, post-test, and 30-day follow-up test
    - Level 3: Behavior through interviews of a sample of participants

I am excited about these changes as we will get a much better picture of the impact of the game on applying the Situational Leadership II(R) training.

Thank you again for your support of my dissertation study. The content within Sit Lead II is perfect for an escape game. I can't wait to share with you the data we get from the study. My goal is to have another update on data collection and data analysis for you around August.

Thank you!

Figure A.2

Permission to use the Spiral Educational Game Development Model

From: Rachel Arpin <[redacted]
Sent: Tuesday, May 5, 2020 6:17 PM
To: Lui, Richard [COMP] <[redacted]>
Subject: Spiral Educational Game Development Model

Greetings Dr. Lui,

I am working on my dissertation, a study of an escape room game as a leadership training environment. I would like to use your and Dr. Au's Spiral Educational Game Development Model as a basis for my game design.

May I have your permission to include the image of the Spiral Educational Game Development Model from the below citation in my dissertation literature review?

Lui, R. W., & Au, C. H. (2018). Establishing an Educational Game Development Model: From the Experience of Teaching Search Engine Optimization. International Journal of Game-Based Learning (IJGBL), 8(1), 52-73.

Thank you!
Rachel Arpin
Doctoral candidate, Franklin University, Columbus, OH

From: Lui, Richard [COMP] [redacted]
Sent: Wednesday, May 6, 2020 1:31 AM
To: Rachel Arpin <[redacted]
Subject: RE: Spiral Educational Game Development Model

Hi Rachel,

Nice to meet you.

Sure, please feel free to do so.

Regards,
Richard

Figure A.3

Permissions to use the RETAIN Model rubric

RETAIN Rubric
Rachel Arpin <[redacted]
Tue 5/5/2020 6:21 AM
To:[redacted]
Hello Dr. Gunter,

I am working on my dissertation, a study of escape room games as a leadership training activity. I am planning to use the RETAIN rubric as an evaluation of my game. May I include a reproduction of the RETAIN Rubric from the below article in the Appendix of my dissertation please?

Gunter, G. A., Kenny, R. F., & Vick, E. H. (2008). Taking educational games seriously: using the RETAIN model to design endogenous fantasy into standalone educational games. Educational technology research and Development, 56(5-6), 511-537.

Thank you!
Rachel Arpin
Doctoral candidate, Franklin University, Columbus, OH

Re: RETAIN Rubric
Glenda Gunter [redacted]
Tue 5/5/2020 3:57 PM
To: Rachel Arpin <[redacted]

Hi Rachel,

Good to hear from you and I am very excited about your dissertation. We have quite a bit of research that supports using the rubric.

The actual rubric is copyrighted but I talked to my colleagues and we would let you use in the dissertation with two requirements.

One at the bottom of the actual true rubric needs to be this phrase:

Copyright 2006-2020. Reprinted with permission from the authors, Gunter, Kenny & Vick. All rights reserved.

This will cover you since the document is copyrighted.

Second I would like a copy of your completed dissertation. I am looking forward to learning more about your game – it sounds very interesting!

Dr. Gunter

Glenda A. Gunter, PhD
Professor
Program Coordinator, Instructional Design & Technology:

Educational Technology and eLearning
College of Community Innovation and Education
Department of Learning Sciences and Educational Research
[redacted], Florida 32816
Program Website: https://ccie.ucf.edu/lser/instructional-design-and-technology/

Figure A. 4

Permissions to use the escapED Framework

EscapED Framework permission

Rachel Arpin <[redacted] Tue, Mar 24, 2020 at 6:37 AM
To: "[redacted]

Good morning,

I am studying the use of escape rooms as a leadership training activity. I believe your escapED Framework is a beneficial guideline for designing an educational escape room. I am referencing it in my dissertation and using as a design guide for my room.

May I have your permission to reproduce the visual of the escapED Framework in my dissertation (of course with proper citation)?

Attached is the article with the specific image I am referencing. It is on page 78 (p. 7) – Figure 4.
Thank you for your consideration!
Rachel Arpin
Doctoral candidate – Franklin University, Columbus, OH

Samantha Clarke [redacted] Tue, Mar 24, 2020 at 8:30 AM
To: Rachel Arpin [redacted]

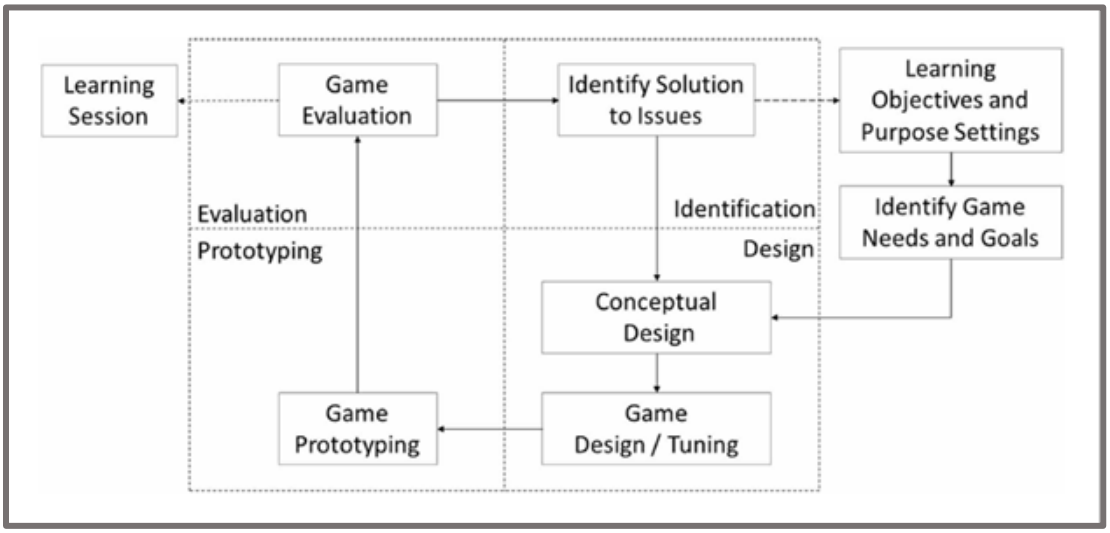
Hi Rachel,

Yes no problem at all. Happy to answer any questions you have about it if needed as well.
Would love to see what you end up developing

Best,
Sam

Appendix B

Spiral Educational Game Development Model



Reprinted with permission from the authors.

Lui, R. W., & Au, C. H. (2018). Establishing an educational game development model: From the experience of teaching search engine optimization. *International Journal of Game-Based Learning (IJGBL), 8*(1), 52-73.

Appendix C

RETAIN Model

	Level 0	Level 1	Level 2	Level 3
Relevance	The story/fantasy creates little stimulus for learning and is in a format that is of little interest to the players/ learners nor does it utilize advanced organizers. The player/learner does not know the state of the game or the required learning content based on the choices presented.	The story/fantasy is age/content appropriate or it has a limited educational focus and little progression. The pedagogic elements are somewhat defined but occasionally players/learners are allowed by the embedded fantasy to become engaged in inappropriate content or contexts.	In addition to overcoming limitations and/or adding to Level I features, the following are also present: Specific didactic content is targeted and learning objective s are clearly defined. Creates interest in what is to be learned and a natural stimulus and desire to learn more.	In addition to overcoming limitations and/or adding to Level I & 2 features, the following are also present: ls relevant to players ' /learners' lives, (real or imagined) and/ or the world around them using characters and themes familiar to them. Matches the players/learners to their appropriate developmental level by providing adequate cognitive challenges.
Embedding	The " teachable" moments disrupt the players/learner's gameplay, that is, flow of the game. Has no interactive focus/hook either on the emotional, psychological, physical, or intellectual level.	Didactic elements are both present but are not cohesively integrated one or the other is added as an afterthought to the first. Content to be learned is exogenous to the fantasy context of the game.	In addition to overcoming limitations and/or adding to Level l features, the following are also present: Allows for extended experience s with problems and contexts specific to the curriculum. Intellectual challenges are presented to players/ learners of sufficient level to keep them interested in completing the game.	In addition to overcoming limitations and/or adding to Level I & 2 features, the following are also present: Involves the players/ learners both mentally and emotionally in such a way that they are conditioned to accept change and invest in the belief. Educational content is fully endogenous to the fantasy context.

	Level 0	Level 1	Level 2	Level 3
Transfer	Offers no anchored or scaffolded levels of challenge, no evidence of using integrated content from previous levels, or little challenges at an increasing level of difficulty. Process knowledge is not mapped to targeted academic content.	Offers levels of challenge that emphasize similar lines of thought and problem analysis to be applied to other implied contexts. Contains 3D cues and interactive animation that facilitate the transfer of knowledge during pedagogic events.	In addition to overcoming limitations and/or adding to Level I features, the following are also present: Players/learners are able to progress through the levels easily. Active problem solving is required to move to the next level. Players/learners can progress through instructional elements that are introduced in a hierarchical manner so that knowledge gained during gameplay can be transferred to other situations.	In addition to overcoming Level l & 2 features, the following are also present: Includes authentic real life experiences that reward meaningful "post-event" knowledge acquisition. Contains "'after action reviews" that offers players/learners an opportunity to teach other (computation or actual) players/learners what they have learned.
Adaptation	Fails to involve the players/learners in an interactive context. Information is not structured in a way that can be at least partially grasped by the learner. Does not sequence the material that is to be learned.	Builds upon the player's/ learner ' s existing cognitive structure s. New content is sequenced based on the principle of cognitive dissonance - as a result players' - learners' need to interpret events in order to determine what about the new content contradicts what they already know.	In addition to overcoming limitations and/or adding to Level l features, the following are also present: Instruction is designed to encourage the player – learners to go beyond the given information and discover new concepts for themselves. Content sequenced in such a way as to require players/learners to identify old schema and transfer it to new ways of thinking.	In addition to overcoming limitation s and/or adding to Level I & 2 features, the following are also present: Makes learning an active participatory process in which the players/ learner s construct new ideas based upon their prior knowledge Presents information that focuses on external or internal characteristics that enable the learner to associate new information with previous learning.

	Level 0	Level 1	Level 2	Level 3
Immersion	**Provides no progressive,** formative feedback during each unit of gameplay. Presents little or no opportunity for reciprocal action and active participation for players/learners.	Elements of play are not directly involved with the didactic focus, but they do not impede or compete with pedagogic elements. Presents some opportunity for reciprocal action in a defined context, that is, a context that is meaningful, repeatable, and interactive, but players/ learners do not feel fully interactive in the learning.	In addition to overcoming limitations and/or adding to Level l features, the following are also present: Requires the player-learner to be involved cognitively, physically, psychologically, and emotionally in the game content. The use of mutual modeling creates a shared responsibility for learning among the participants	In addition to overcoming limitations and/or adding to Level 1 & 2 features, the following are also present: Presents opportunity for reciprocal action and active participation for players/learners. Presents both the environment and the opportunity for belief creation.
Naturalization	Presents little opportunity for the mastery of facts or a particular skill. Target content/skills are rarely revisited. Little opportunity is given to build upon previous knowledge and/or skills in a logical and sequential manner.	Replay is encouraged to assist in retention and to remediate shortcomings. Improves the speed of cognitive response, automaticity, and/or visual processing.	In addition to overcoming limitations and/or adding to Level l features, the following are also present: Encourages the synthesis of several elements and an understanding that once one skill is learned it leads to the easier acquisition of later elements. Requires the players/learners to make judgments about ideas and materials.	In addition to overcoming limitations and/or adding to Level l & 2 features, the following are also present: Causes players/learners to be aware of the content in such a way that they become efficient users of that knowledge. Causes the player-learners to spontaneously utilize knowledge habitually and consistently.

Appendix D

Level One: Learner Satisfaction Survey

The following survey was used to collect learner satisfaction immediately following the game.

Thank you for participating in the Leadership Escape Room Game.

Please provide feedback about your experience with this game. The survey asks you to rate each statement on scale from Strongly Disagree to Strongly Agree.

Survey Questions	Yes	No
I have participated in an escape room game before playing the Leadership Escape Room Game.		
I have participated in a Situational Leadership II® training prior to playing the Leadership Escape Room Game.		

Survey Questions	Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
I enjoyed playing this game.					
I am satisfied with the quality of the escape room game experience.					
It was difficult for me to focus on learning because I was feeling stressed or overwhelmed from playing the game.					
The escape room game was an effective way to learn new information related to Situational Leadership.					
I enjoyed the online format for this escape room game leadership training.					
I feel I was able to engage with my teammates to complete the escape room game.					
I feel confident applying the leadership skills taught in this escape room game.					
The escape room encouraged me to think about how to choose leadership styles in a new way.					
I believe that the escape room game enhanced my leadership skills.					
The Game Master facilitated a good experience in the escape room game leadership training.					
Overall, I think the escape room game was a valuable learning experience.					
I would recommend this activity to other leaders.					

Appendix E

Level Three: Interview Protocol

Project: Escape room games as a Situational Leadership training activity

Date:	
Time:	
Location:	
Interviewer:	
Interviewee (PIC):	

Introduction

Good morning (afternoon). My name is Rachel and I will be conducting the interview for a study you are participating in. This interview is part of a dissertation research study investing the use of escape room games for leadership training. Thank you for taking the time to speak with me today.

About 30 days ago, you participated in the Leadership Escape Room Game that taught the Situational Leadership II® model. This interview is going to ask about your experience with that escape room game leadership training and will take approximately an hour.

There are no right or wrong, desirable or undesirable answers. I encourage you to say what you really think and how you really felt about that activity. The purpose of the study is to determine whether or not escape room games can be used to train the concepts and skills related to the Situational Leadership ® II model.

Your name and our conversation will remain anonymous and confidential throughout this interview. We will use your Participant Identification Code (PIC) to identify this interview.

Recording Consent

We previously discussed and you provided consent that this interview would be recorded. The audio from this recording will be transcribed and saved in a safe location. Any potentially identifiable information will be removed.

For confirmation, are you still ok with me recording our conversation today? (Y/N)

> **If yes:** Thank you. If at any time you feel uncomfortable, we can stop or pause the audio recording.
>
> **If no:** I understand. I still appreciate discussing this topic with you. I will take notes about the contents of the conversation and will not record the audio.

Before we begin, what questions do you have for me?

If you think of any questions or need me to clarify at any point in this interview, please ask.

Interview Questions

- **Introduction and Leadership questions -**

1. You have been identified as a people leader. What is your current role/title and how many employees directly report to you?

2. What kinds of leadership training activities or workshops have you previously participated in, outside of the Leadership Escape Room Game activity?

3. How would you rate how well you applied the other leadership trainings into your work, on a scale of 1, being not at all to 5 your leadership approach completely changed because of the training? Please explain your answer.

- **Escape room game questions –**

4. Have you ever participated in an escape room game before this study?

5. What are your thoughts about playing an escape room game as a way to learn leadership concepts and skills?

6. How would you compare your experience of previous leadership training to the escape room game?

7. Consider the last month since the escape game leadership training, what have you put into practice that you learned in training activity?

- **Training objectives/research questions application questions -**

8. An objective of the training was to match leadership styles based on an individual's development level. Of the four leadership styles in Situational Leadership, what styles do you use most often? **[Have leadership style definitions available for description if participant asks]**

9. If you were to assess your own skill, how well do you match the appropriate leadership style to an employee's developmental level?

10. If you were to assess your own skill, how well do you use all four of the leadership styles in different scenarios?

- **Final wrap up questions**

11. When you think about the last month, how would you describe how the escape game leadership training activity influenced your leadership practices?

12. When you consider the escape room game leadership training, is there anything that you think the designer of the game would like to know to improve the game for future leadership training?

13. Any other final things you would like to share?

14. Do you have any questions for me?

Closing

Thank you for your time and for your honesty with answering these questions. Your insight and experience with the escape room game as a leadership training activity is helpful for this study.

FRANKLIN UNIVERSITY **APPENDIX F**

Date: July 28, 2020
PI: Rachel Arpin
Department: College of Education, Doctoral Studies
Re: Initial - IRB-2020-21
Escape room games as an effective leadership training activity

The Franklin Institutional Review Board has rendered the decision below for Escape room games as an effective leadership training activity.

Decision: Exempt
Category: Category 2.(ii). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording).
Any disclosure of the human subjects' responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation.
Category 3.(i)(B). Research involving benign behavioral interventions in conjunction with the collection of information from an adult subject through verbal or written responses (including data entry) or audiovisual recording if the subject prospectively agrees to the intervention and information collection.
Any disclosure of the human subjects' responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation.
Category 3.(ii). For the purpose of this provision, benign behavioral interventions are brief in duration, harmless, painless, not physically invasive, not likely to have a significant adverse lasting impact on the subjects, and the investigator has no reason to think the subjects will find the interventions offensive or embarrassing. Provided all such criteria are met, examples of such benign behavioral interventions would include having the subjects play an online game, having them solve puzzles under various noise conditions, or having them decide how to allocate a nominal amount of received cash between themselves and someone else.

Findings: The PI is using a mixed methods research design, with three primary means of data collection: surveys, escape game, and individual interview. Each methodology has been reviewed by the IRB and determined to be exempt in the following categories:

1. Surveys (§46.104(d)(2)(ii)) - includes pre-session assessment with demographic data collection, post-session learner satisfaction survey, post-session assessment, and 30-day follow-up assessment
2. Escape game (§46.104(d)(3)(i)(B) and §46.104(d)(3)(ii))
3. Individual interview (§46.104(d)(2)(ii))

Research Notes: The PI has two contacts at The Ohio State University who are assisting with participant recruitment only; they are not engaged in the research and data collection components of the study. Each contact will send a study invitation email to potential participants and a follow-up invitation email, as needed, if the initial response is low. The contacts will not have access to actual participant lists or any data that is collected.

The IRB determination of exemption means:

- You must conduct the research as proposed in the Exempt application, including obtaining and documenting(signed) informed consent if stated in your application or if required by the IRB.
- Any modification of this research should be submitted to the IRB prior to implementation to determine if thestudy still meets federal exemption criteria.
- You are responsible for notifying the IRB Office with any problems or complaints about the research.

Students, please note the following:

- You must use only the approved consent and assent forms (as applicable).
- When you have completed your project, you will need to submit a Final Study Report to the IRB Office toclose the study.

Any modifications to the approved study or study closures must be submitted for review through Cayuse IRB. All approval letters and study documents are located within the Study Details in Cayuse IRB.

You may contact the IRB Office at 614-947-6037 or irb@franklin.edu with any questions.

Sincerely,

Franklin Institutional Review Board