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Pepperdine University

Graduate School of Education and Psychology

PERFORMANCE AND LEADERSHIP IN MULTIPLAYER ONLINE GAMING

A dissertation submitted in partial satisfaction

of the requirements for the degree of

Doctor of Education in Organizational Leadership

by

Timothy Joseph Magner

November, 2014

John McManus, Ph.D. – Dissertation Chairperson

This dissertation, written by

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under the guidance of a Faculty Committee and approved by its members, has been submitted to and accepted by the Graduate Faculty in partial fulfillment of the requirements for the degree of

DOCTOR OF EDUCATION

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DEDICATION

To my parents, Bob and Maryellen, for their guidance and support,

to my wife Johnette for her inspiration

and to all three for their endless love and encouragement.

ACKNOWLEDGMENTS

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ABSTRACT

Multiplayer online video games are an increasingly popular form of entertainment, and many individuals spend a considerable amount of time playing them. One hallmark of these multiplayer games has been the need for collaboration and teamwork for both individual enjoyment and game success. At the same time the needs of a global marketplace have led to the evolution of the geographically separated, but technology linked, distributed team as a critical business function. The elements and functions of these business-oriented distributed teams closely align with the types of groups that often come together to play online video games. A common trait shared by both of these kinds of teams is the role that leadership plays in their success. Given that these games are becoming a pervasive element in our culture, and that they mirror business teams, this study examined the possibility of a link between an individual's performance in multiplayer online video games and that person's leadership style as measured by the Multifactor Leadership Questionnaire (MLQ). The research questions explored in this paper concern the extent to which traditional leadership styles are linked to successful achievement in collaborative online games and whether there are consistent leadership style profiles associated with tiers of game performance rankings. The findings suggest that while there are links between participation in multiplayer online videogames, additional research must be done to tease out the exact nature of those links and to relate them to offline experiences. In addition while the instrumentation and conceptual frameworks that both define and measure online leadership as expressed in these games have yet to be developed, the study suggests there may be value in extending and enhancing existing leadership constructs, concepts and tool sets such as the Sloan Model and the MLQ to derive such measures. The study also provides future researchers with an enhanced understanding of online data collection as well as a sufficient foundation to further

examine areas of correlation between leadership and performance in online games toward uncovering a set of empirical measures that create a more accurate picture of the substance of and development pathways for online leadership.

Chapter 1: Introduction

Video games are an increasingly popular form on entertainment among players of all ages, and many gamers spend many hours a week playing them. While new research is taking place on a daily basis, to date much of the research into the impact of these games has focused on the prospect that those playing these games develop negative attitudes and behaviors, especially with respect to the violent nature of some of these games. While a causal link has yet to be definitively established, little in the research has yet deterred developers from creating and gamers from pursing and playing these games.

One factor that distinguishes recent games from earlier incarnations is the change in the number and variety of competitors that a player can face. In the early days, the individual played against the computer or against another person located in the same room. When games went online with the advent of online services and the Internet, the computer allowed groups of individuals to play together in multiplayer modes. Today, games are designed to allow literally thousands of players to interact simultaneously in what are called Massively Multiplayer Online Games (MMOG).

The move from individual player, to multiplayer to massively multiplayer has necessitated the development of a range of group and team constructs to both provide new game experiences and to facilitate game success. These game-based teams, *clans* or guilds can range from ad hoc collections of individuals randomly assigned by the computer to persistent communities that engage in long-term online social interactions that both permeate and transcend the particular activity or quest of the moment.

At the same time, the advent of the Internet and the increasingly globalized economy have facilitated the creation of the technology-enabled *virtua*' or *Distributed Team* (DT) as a

critical component of businesses both large and small. These DT's are often ad hoc groups of individuals that span geography, are often connected by technology, and are brought together to complete a set of project-driven tasks. These teams are often ephemeral in duration and coalesce around specific activities. This definition of the business-centric DT mirrors in substance, structure, and duration the kinds of teams, *clans* and guilds that often come together to play multiplayer online games. In addition to their similarities in structure and substance, game-based and business-based teams also share a similarity in their need for leadership to facilitate overall group success.

Given that these games are becoming embedded in our culture, that they mirror these business-focused distributed teams, and that they require leadership for success, this study is designed to explore the extent to which traditional leadership styles are linked to successful achievement in collaborative online games and whether there are consistent leadership style profiles associated with tiers of game performance rankings.

Background

Computer-based or video gaming has been around almost since the invention of the computer, but increasingly powerful computing platforms such as dedicated gaming consoles (e.g. Xbox, PlayStation 3, Wii) have led to enhancements in graphics and game play that have made video games more engaging, more intense and more immersive. With the advent of the Internet, video games also achieved the capacity to allow play not just against a computer but to play with or against tens, hundreds, sometimes even thousands of players simultaneously in seemingly open-ended adventures. Today, literally millions of individuals play these games on a daily basis earning them the moniker (MMOG).

According to Chan and Vorderer (2006) the term *massively* refers to the thousands of players that can play; *multiplayer* means that they can play simultaneously; *online* refers to the use of the Internet and the absence of an *offline* or disconnected version; and *game* can refer to a wide range of play types from highly scripted to more open-ended. These games provide a "3-dimensional virtual world for thousands of players to interact with and explore" (p. 79). As Bainbridge (2010) defines them, MMO's are "a somewhat realistic world in which the user is represented by an avatar or character, interacting with other characters, under the constraint of rules set by the…creators and by the players," (p. 1).

According to Jane McGonigal, (TED Conference LLC, 2010) Director of Game Research & Development at the Institute for the Future, there are 500 million active online gamers worldwide (that will grow to 1.5 billion in the next 10 years).

While there are numerous genres of video games, two of the more pervasive are the adventure game known as the *first person shooter* (FPS) and the massively multiplayer online battle arena (MMOBA). While the FPS game itself may not actually involve shooting (although most do), a main feature of the genre is that the gamer views the action from the point of view of the protagonist of the game. Often the gamer can see hands, weapons or other features of their character as though extensions of the gamer him or herself. This perspective, coupled with the adventure story often associated with these games, heightens the immersive experience for the game player. The attraction of the MMOBA is that while it lacks the first person perspective, it provides a range of opportunities to create avatars in complex worlds that include adventure aspects as well as economies and broader storylines.

In both cases, adding multiple players into the game allows players to see and interact with each other and the shared virtual world, as though they were there in person. While not

universally the case, most of these multiplayer, FPS and MMOBA style games involve groups of individuals banding together to achieve some common objective. Often their characters are collections of soldiers or warriors of some ilk either questing for some object or goal, or fighting other teams for survival or treasure. Often too, players can personalize their character or avatar to distinguish themselves from others. In many cases the aspects of this personalization must be earned through successively successful performance in the game – a payoff for experience which incents the player to continue.

One such game, and the focus of this study is, World of Tanks, an MMOBA where teams of 15 tanks compete for supremacy on a single map. The game has a variety of team modes where individuals can be assigned randomly to teams, where several players can band together in an ad hoc team, or where players can become part of a persistent team called a *Clan*.

To facilitate the ongoing participation in these games, many, including World of Tanks, have developed their own internal economies, wherein access to enhanced weaponry, additional materials or even fancier clothing must be purchased, either through the collection of virtual currency earned through game play, or by making an outright purchase using real-world currency. In some games, the economies themselves have taken on the status of mini-games with individual players focusing their efforts, not on quests and conquest, but on outfitting other players in virtual regalia.

The expansive, immersive and engaging nature of these games has encouraged these millions of gamers to invest billions of hours in online gaming. According to McGonigal, (TED Conference LLC, 2010) three billion hours a week are spent playing online games.

A key component to managing both the massiveness and the multiplayer nature of these games is the creation of groups or teams to provide variety in gaming modes, camaraderie for

players and additional skills and resources to add both complexity and depth. These teams, *clans* or guilds, depending upon the game, can be created in an ad hoc fashion when a player logs in, or they can be ongoing and persistent, creating a true social experience for those involved.

Because many of the games have periods of inactivity and allow individuals to chat directly via either text or speech, in-game relationships can develop between and among players that mirror aspects of off-line relationships. These teams, in addition to providing social cohesion and an affective incentive to continue playing the game also underscore the fact that in order to be successful in many of these games, this collaboration requires communication, organizational and even leadership skills. Recently researchers have begun asking whether these games facilitate leadership skills (Guastello, 2009; International Business Machines Corporation & Seriosity Inc., 2007; Kaplancali, 2008; Lopes, Fialho, Cunha & Niveiros, 2013; Nuangjumnonga & Mitomo, 2012; Powell, S., 2005; Quill, 2007; Reeves, Byron et al., 2007).

In 2007 IBM, in its monograph *Real Leaders, Virtual Worlds,* (International Business Machines Corporation & Seriosity Inc., 2007) argued that online gaming environments facilitate leadership through a range of areas including: project-oriented organization, multiple real-time sources of information upon which to make decisions, transparent skills and competencies among co-players, transparent incentive systems and multiple and purpose-specific communications mediums.

Similarly, Reeves et al, (2007) studied the extent to which the elements of the Sloan Leadership Model were present in a Massively Multiplayer Online Role Playing Game (MMORPG) and found that: “leadership in the games includes all skills currently identified in the Sloan model.” (p. 2)

As discussed earlier, the nature of the teams that coalesce in online games is similar to the business-oriented virtual or distributed team. Lisk et al. (2012) define a business-oriented distributed team (DT) as ones that, "span temporal, technological, geographic, and cultural boundaries, often simultaneously" (p. 135). The groups of individuals who come together playing an MMO also come from different time zones, are geographically separated, are culturally diverse and are all linked by technology - closely fitting this definition of a distributed team.

In addition, the list of skills that Reeves et al. (2008) identified leaders using in online games:

recruiting, assessing, motivating, rewarding, and retaining talented and culturally diverse team members; identifying and capitalizing on the organization's competitive advantage; analyzing multiple streams of constantly changing and often incomplete data in order to make quick decisions that have wide-ranging and sometimes long-lasting effects (Reeves, B. et al., 2008 p. 60)

reads very much like the list of skills that any real-world leader would need to have in order to be effective. They reported as part of their survey of IBM executives who also played online games that, "nearly half said that game playing had already improved their real-world leadership capabilities, particularly for managing teams whose members didn't fall under their formal authority" (Reeves, B. et al., 2008, p. 66).

As the Internet has become a platform for business collaboration giving rise to these teams, it has also led both practitioners and researchers to question how best to lead and manage virtual or distributed teams.

Statement of the Problem

There is growing evidence that certain skills can be facilitated by multiplayer online games. There is also evidence that the structures of groups and tasks in these MMO games mirror the structures and task orientation of distributed teams. Further, there is evidence that the skills that leaders use in both online and offline contexts are similar. Therefore, the questions arise: Are there consistent leadership style profiles that emerge as individuals become more proficient in playing these games? Is the mastery of these games correlated with an increase in the presence of traditional leadership styles?

Purpose of the Study

While research on gaming has attracted significant interest, much of it has been focused on the relationship between the violence present in many videogames and its impact on attitudes and behavior (Anderson et al., 2003; Anderson, Gentile & Buckley, 2007; Anderson et al., 2008; Arbogast, 2010; Barlett, C., Branch, Rodeheffer & Harris, 2009; Brower & LoPolito, 1994; Carlson, 2004; Engelhardt, 2010; Garcia, 2005; Gentile, 2003; Gonzalez, 2007; Ivory, 2002; Koloko, 2010; Olson, Kutner & Warner, 2008; Pusateri, 2006; Smallwood, 2007; Tomaro, 1999). Building on work around the impact of violent media on aggressive behavior (Anderson et al., 2003; Gentile, 2003; Grossman & DeGaetano, 1999) these studies have found that there is a link but not yet a directly causal one between violent video games and aggressive behavior.

On the positive side, there is growing evidence that playing video games does have some positive impact on adolescents including in physical arenas such as manual dexterity, spatial awareness, reaction time and other visumotor activities (Favaro, 1983; Granek, 2008; Sims, 1996; Triplett, 2008), in the realm of cognitive abilities or as a platform for cognitive training (Boot et al., 2006; Caelli, 2004; Gallegos & Mansberger, 2010; Mouck, 2010; Sharritt, 2008) in

academic achievement in subjects such as mathematics (Gillispie, 2008; Kappers, 2009) and even interpersonal areas such as adolescent resistance behavior (Sanford & Madill, 2006), humor (Dormann & Biddle, 2006), gender roles and assignments (Diemer, 2010; Dunn, 2010), helping behaviors (Boggs, 2007) and ethics (Thompson, A. J., 2007) as expressed in the context of video games.

Research Question

The research questions for this study are:

1. To what extent are traditional leadership styles linked to successful achievement in collaborative online games as measured by the MLQ?
2. Are there consistent leadership style profiles as measured by MLQ associated with tiers of game performance rankings, as measured by the WN7 scale?

Importance of the Study

The ubiquity of computing and telecommunications technology has transformed today's economy into one that is hyper-connected, Internet-based, and global in scope. This globalized, technologically-based economy has generated the need for businesses to accomplish tasks across the globe and around the clock, and accelerated the need for the virtual or distributed team. While the Internet makes this global task distribution possible, it does not guarantee that the individuals who make up the team on either end of that transaction will have the capacity to appropriately communicate and collaborate. As with all teams, leadership is essential to team success. Consequently, the need to identify individuals who can lead and manage these distributed teams is critical to ensuring that success.

At the same time, literally millions of individuals across the globe use the same global telecommunications networks to engage every day in creating, leading, and managing distributed teams through their participation in MMOG's.

Therefore, identifying a link between the leadership styles manifest in leading game-based distributed teams and the leadership styles necessary to lead traditional and distributed teams in the real-world would be of significant value to employers as they seek to recognize, hire and promote individuals to undertake those critical roles. If a link can be established between leadership style profiles and game performance, it opens up an entirely new area of potential leadership development, one in which ad hoc participation in an online, team-oriented, task-based informal learning environment can have lasting effects on real-world personal growth and development.

For employees, parents, and students, it opens up the possibility that time spent immersed in these *fun* environments could produce a positive, pro-social and economically valuable return on those hours, characterizing them as *invested* versus *wasted*. For employers, such a correlation could provide multiple advantages. They could enable new means of evaluating prospective employees' leadership potential during the hiring process. Or, as a possible mechanism for developing or measuring leadership development across an employees' career trajectory. And finally, such a correlation could provide the potential for developing structured and intentional leadership development experiences using these environments.

Most studies to date have focused on leadership in MMO's that emphasize the role playing in games such as World of Warcraft, Everquest and EveOnline. These games allow the user to create a specific character and an online gaming culture is created through the development of community, shared identity and social practices established in the context of the

game world itself (Shaw, 2010; Taylor, 2006). This study will contribute to the literature by expanding the genre of games studied through its focus on World of Tanks, an MMOG that is more task oriented and less about a persistent social universe, mirroring the project-oriented approach to distributed teams identified by Reeves et al. (2008).

The study will also contribute to the literature through leveraging a leaderboard type ranking model that uses an *efficiency rating* structure to provide an objective determination of player performance that both embraces and transcends the character-based hierarchies found in role playing games. The use of this individual ranking structure is separate and apart from the overall performance of the group or *clan* to which the specific player belongs and allows one to compare both objective and subjective evaluations of game performance and leadership skills.

Key Definitions

These definitions will be helpful in understanding the following pages.

- First-Person Shooters (FPS) - First-person perspective *shoot-em ups*; often played online with other players (Gelfond & Salonius-Pasternak, 2005).
- Real-Time Strategy Games (RTS) - Fast-paced strategy games; often played online with other players (Gelfond & Salonius-Pasternak, 2005).
- Adventure Games - Slower-paced games in which the player is typically in the role of a character in a world and having an adventure of some sort. As opposed to an action game, adventure games often require the player to solve puzzles using logic rather than employ motor skills. Adventure games typically have strong plotlines, well-developed worlds, and intricate scenery (McCoy, 2010).
- Action Real-Time Strategy Games (ARTS) or Massively Multiplayer Online Battle Arena (MMOBA) – Subgenre of MMO and RTS that involves the use of teams where

each player controls a single character. It blends the strategy of a real-time strategy game with the action perspective of a battle game.

- Role-Playing Games (RPG) - Games in which players take on the role of a character and build upon its knowledge and skills as the storyline progresses; often involves tactical combat (Gelfond & Salonius-Pasternak, 2005).
- Multiplayer Online Role-Playing Games (MORPG) - Online role-playing multiplayer games that allow thousands of gamers synchronously to play in a virtual world.(Rogers et al., 2009)
- Massively Multiplayer Online Games (MMO) – Online games that connect thousands of players in real-time interaction and communication. The game worlds are "continuously available online, which allows for the emergence of complex social structures, reputation systems and economies" (Chan & Vorderer, 2006, p. 77).
- Massively Multiplayer Online Role-Playing Games (MMORPG) – "An Internet-based computer game set in a virtual world, which can be played by many people at the same time, each of whom can interact with the others" ("Mmorpg", n.d.).
- Freemium – A gaming business model in which initial play is free to the end user, but the product may be feature limited and where ongoing play, additional levels, or additional resources require that users pay a fee (Martin, 2012).

Key Assumptions

There is a range of underlying assumptions that support this research study. The most salient revolves around establishing a sufficient sample size and to creating an accurate leadership profile for each subject. Online data collection and self-reported data are inherently problematic, but Wood, Griffiths and Eatough (2004) provide a number of recommendations to

help improve response rates, minimize non-genuine responses, and improve response validity which will be employed during the data collection phase.

Another assumption is that it will be possible to isolate the elements of the leadership profile and the components of the game ranking to identify true correlations. The survey instruments and the analytical approaches have been selected with an eye to addressing that concern.

Limitations

The study is limited by a number of factors. The use of online data collection techniques and the convenient nature of the data collection may result in a sample that is limited by race, age or gender, each of which will reduce its generalizability to the overall population. While the study will control for the amount of time the participants have played this particular game, it will need to rely on the demographic questionnaire for visibility into the range and intensity of other game play and the extent to which individuals have acquired skills through other means and experiences. Every effort will be made to identify and address these confounding variables through the available analytic tools.

The study will also be limited by the specifics of the game selected and the nature of the interpersonal interaction it supports. By limiting the study to a single MMO the number and type of players will be limited as will the range of experiences possible. While these design limitations are essential to control the scope of the study, they create a closed rather than open world model which potentially limits the number, type and variety of opportunities for players' leadership styles to be manifest.

Summary

Online video games are an increasingly popular entertainment choice and have, over the past several decades, become more engaging and immersive for players. Given the immersive nature of these games, and their often violent content, concerns have been raised about the negative impact of these games on behavior and development. Others studies have identified potentially positive impacts as well.

At the same time, the emergence of the Internet as a platform for business collaboration has given rise to the question of how best to lead and manage virtual or distributed teams. The groups of individuals who come together playing these immersive games closely fit the definition of these distributed teams. In addition, the list of skills that leaders in online games need are similar in many ways to the list of skills that any real-world leader would need to have in order to be effective.

Consequently, this study will explore the extent to which there is a correlation between performance in multiplayer online video games and the presence of traditional leadership skills, and further whether there are distinct leadership profiles that correlate with levels of game performance.

Chapter 2: Review of Relevant Literature

Overview

This chapter will examine the literature foundations of the concept of leadership, research on video games, the literature of distributed teams, and the links between video games and leadership.

Leadership

The concept of leaders and leadership has been around for centuries. Bass and Stodgill (1990) assert that it is "one of the world's oldest preoccupations." Although how we define it has changed over time. Bass and Stodgill (1990) also cite the Oxford English dictionary to note that while the term *leader* appears in the English language as early as the 14th century, the term *leadership* was a 19th century innovation. So, while leaders and leadership have clearly been around for a long time, the study of it and its impact are relatively recent.

However limited the duration, that study has resulted in the development of a range of conceptual frameworks that have been used to organize and define leadership, many of which have coexisted simultaneously at various times (Bass & Stogdill, 1990).

The vast majority of the research literature on leadership however is focused on adults. While this is understandable it misses a very important population of leaders – the adolescent or emergent leader. Historically, young people, especially young men, acquired leadership skill through social interactions in formal and informal settings: schools, churches, teams and through peer-group interaction.

With the advent of computer technology and the increasing prevalence of video games, adolescents in general, and young men in particular, are spending increasing amounts of time engrossed in these immersive, interactive, multiplayer experiences and to some extent these

experiences fill the void mentioned above. A Kaiser Family Foundation (Rideout, Foehr & Roberts, 2010) study indicates that the amount of time young people spend playing video games has increased from 26 minutes daily in 1999 to an average of 73 minutes a day in 2009. This begs the question: Does participation in these immersive, collaborative, goal oriented experiences provide an environment in which players, especially young men, can exhibit leadership styles? And, do these games encourage or support the development of leadership styles among these players?

Definitions of leadership. There are literally hundreds of definitions of leadership and a significant amount of research has gone into synthesizing these disparate definitions into workable frameworks.

Bass and Stogdill (1990) provide a summary of conceptual frameworks for defining leadership including: a focus of a group process, a matter of personality, a matter of inducing compliance, the exercise of influence, particular behavior, a form of persuasion, a power relationship, an instrument to achieve goals, an effect of interaction, a differentiated role, initiation of structure, as well as combinations of these.

Northouse (2010) provides a similar synthesis by identifying four components that are central to the phenomenon of leadership:

- Leadership is a process
- Leadership involves influence
- Leadership occurs in groups
- Leadership involves common goals

Fleishman et al. (1991) synthesized 65 different classifications of leadership behavior into a set of functional leadership behavior dimensions (LBD's). They identified two overarching

dimensions: facilitation of group social interaction and objective task accomplishment. These are further broken down to include Information Search and Structuring, Information Use and Problem Solving, Managing Personnel Resources, and Managing Material Resources.

The video game context is one that is both tightly and loosely structured, depending on the game scenario, but it includes the need for group collaboration to achieve a common objective. As such, we will be focusing on a set of factors including influencing others, problem solving, group interaction and achieving common goals.

Relevant leadership approaches. There are also a range of other theoretical constructs that have emerged over the years including the trait approach, the skills approach, the style approach, the situational approach, the contingency theory, the path-goal theory, the leader-member exchange theory (LMX), transformational and authentic leadership, to name the most widely recognized (Northouse, 2010), as well as the Sloan Leadership Model as developed by Ancona, Malone, Orlikowski, and Senge (2007) at the MIT Sloan School of Management (Reeves, Byron et al., 2007).

This study will look at the range of leadership styles proposed by Avolio, Bass, Walumbwa, and Zhu (2004), that include transformational, transactional, and passive/avoidant – leadership, which builds on prior work on autocratic versus democratic leadership, directive versus participative leadership, and task versus relationship-oriented leadership (Avolio, Bruce et al., 2004).

While the trait approach is based on the notion that there are specific "innate qualities and characteristics that differentiate leaders from followers" (Northouse, 2010). In 1948, Stogdill identified a series of leadership traits that he and Bass (1990) updated, undertaking a series meta-

analyses of extant trait-related research between 1948 and 1970. They identified six categories under which the factors associated with leadership could be identified:

- Capacity (intelligence, alertness, verbal facility, originality, and judgment).
- Achievement (scholarship, knowledge and athletic accomplishments).
- Responsibility (dependability, initiative, persistence, aggressiveness, self-confidence, and the desire to excel).
- Participation (activity, sociability, cooperation, adaptability, and humor).
- Status (socioeconomic position and popularity)
- Situation (mental level, status, skills, needs and interests of followers, objectives to be achieved, etc.)

While the trait approach is "intuitively appealing" (Northouse, 2010, p. 29) because it focuses on the individual and observable characteristics, and h.as a significant body of research behind it, the research is inconsistent with regard to a specific set of traits and thus subject to a wide range of interpretations (Northouse, 2010).

In contrast, the authentic leadership approach posits that leadership is about whether the leader and his/her leadership is real or genuine (Northouse, 2010). The increased attention in this form of leadership arose in large part due to "an upswing in highly publicized corporate scandals, management malfeasance, and broader societal challenges facing public and private organizations" (Walumbwa, Peterson, Avolio, Wernsing & Gardner, 2008, p. 90). George (2003) who coined the term *authentic leadership* in his popular book, defines it in terms of the leader him or herself: "Authentic leaders genuinely desire to serve others through their leadership. They are more interested in empowering the people they lead to make a difference

than they are in power, money, or prestige for themselves. They are guided by qualities of the heart, by passion and compassion, as they are by qualities of the mind" (George, 2003, p. 12).

He also outlines the following characteristics (George, 2003):

- They use their natural abilities but recognize their shortcomings and work to overcome them.
- They lead with purpose, meaning and values.
- They build enduring relationships with people.
- Others follow them because they know where the leader stands.
- They are consistent and self-disciplined.
- They refuse to compromise their principles.
- They are dedicated to continuously developing their own capacity to improve their leadership throughout their lifetime.

Gardner et al. (2005) add that an authentic leader must achieve authenticity, through self-awareness, self-acceptance, and authentic actions and relationships, and that relationships with followers are characterized by: a) transparency, openness, and trust, b) guidance toward worthy objectives, and c) an emphasis on follower development.

The strengths of an authentic approach are its moral and ethical dimensions, and with its emphasis on trust it inspires confidence in leaders, especially in times of uncertainty. In addition with the emphasis on self-awareness, and in a manner similar to the trait approach, it provides leaders a set of criteria to aspire to (Northouse, 2010). However, in a similar fashion to the trait approach, the specific set of criteria and the exact definitions, particularly from the moral dimension are variable (Northouse, 2010).

With the advent of computer technology in the late 20th and early 21st centuries, organizations moved from being hierarchical and concentrated to flatter and more geographically distributed. Because of these changes, Avolio and Bass (2004) believed that the existing leadership literature did not sufficiently describe the leadership styles that were necessary to lead organizations through these transformational periods. While Avolio and Bass (2004) indicate that a transactional approach was well suited to these earlier more structured hierarchies as organizations moved to "what Drucker (1989) called *networked organizations*, or what Quinn (1992) labeled the *intelligent enterprise*, with compressed hierarchies and blurred lines of authority, the need to explore a broader range of leadership styles suited for these new environments is apparent" (p. 1).

According to Avolio and Bass (2004), whereas transactional leadership is focused on, " setting up and defining agreements or contracts to achieve specific work objectives, discovering individuals' capabilities, and specifying the compensation and rewards that can be expected upon successful completion of the tasks" (p. 3), transformational leadership is "a process of influencing in which leaders change their associates' awareness of what is important, and move them to see themselves and the opportunities and challenges of their environment in a new way" (p. 94). They see transformational leaders as proactive, seeking to optimize individual, group and organizational development and innovation, and convincing their followers to achieve not just greater effectiveness, but to strive for higher levels of moral and ethical standards (Avolio, Bruce et al., 2004).

In response, they created the MLQ, which contains 45 items "that identify and measure key leadership and effectiveness behaviors shown in prior research to be strongly linked with both individual and organizational success" (Avolio, Bruce et al., 2004, p. 12). The MLQ will

be the instrument used for this research as it was, "developed to expand the dimensions of leadership measured by previous surveys" (Avolio, Bruce et al., 2004, p. 3).

Multifactor Leadership Questionnaire (MLQ). The data collection instrument will be the MLQ Form 5X, "a validated form of 45 items for organizational survey and research purposes and for preparation of individual leader reports" (Avolio, Bruce et al., 2004, p. 5). The MLQ, developed by Avolio and Bass (2004) identifies and measures, "key leadership and effectiveness behaviors shown in prior research to be strongly linked with both individual and organizational success" (p. 12).

Respondents will answer using a 5 point Likert scale:

0 = Not at all

1 = Once in a while

2 = Sometimes

3 = Fairly often

4 = Frequently, if not always

The leadership survey will be conducted online through the Mind Garden Transform online platform.

Leadership factors covered by the MLQ. The MLQ is designed to identify nine separate leadership factors in three leadership styles: transformational leadership, transactional leadership and passive/avoidant behavior.

Transformational leadership (The "5 I's"). The MLQ identifies five attributes (known as the 5I's) which are characteristic of the transformational leader:

- Idealized Attributes
- Idealized Behaviors

- Inspirational Motivation
- Intellectual Stimulation
- Individual Consideration

The Idealized Attributes (IA) and Behaviors (IB) point to leaders that are admired, respected and trusted, due to their principles and consistent ethics and values. These leaders place their followers' needs above their own, share risks with their followers. These followers in return want to emulate and identify with the leader (Avolio, Bruce et al., 2004).

In terms of Inspirational Motivation (IM), transformational leaders encourage a focus on a desired future end state, and are enthusiastic in presenting those ideas. Leaders also encourage a spirit of teamwork as well as of individual contribution (Avolio, Bruce et al., 2004).

With regard to Intellectual Stimulation (IS), these leaders are open to creative problem solving through input from subordinates, and foster a culture of questioning and identifying new approaches to existing problems. Ridicule and public criticism are avoided (Avolio, Bruce et al., 2004).

For Individual Consideration (IC), transformational leaders are supportive of followers through teaching and coaching. They create a supportive climate in which followers can grow in skill and capacity, and where individual needs and abilities are identified and recognized (Avolio, Bruce et al., 2004).

Transactional leadership. In contrast to transformational leaders, transactional leaders, "display behaviors associated with constructive and corrective transactions. The constructive style is labeled contingent reward and the corrective style is labeled management-by-exception" (Avolio, Bruce et al., 2004, p. 95). There are two types of transactional leadership styles:

1. Contingent Reward

2. Management-by-Exception: Active

Contingent Reward (CR) is characterized by a belief that providing clear direction and rewarding achievement will lead to overall improvement in individual and group performance, while Management-by-Exception: Active focuses on identifying objective performance criteria and rewarding achievement as well as closely monitoring for and quickly correcting mistakes or errors (Avolio, Bruce et al., 2004).

Passive/Avoidant behavior. The third leadership approach identified by the MLQ is more passive and *reactive* and does not respond to situations and problems systematically. The two types of passive/avoidant behavior are Management-by-Exception: Passive (MBEP) and Laissez-Faire (LF). As Avolio and Bass (2004) note, "passive leaders avoid specifying agreements, clarifying expectations, and providing goals and standards to be achieved by followers. This style has a negative effect on desired outcomes—opposite to what is intended by the leader-manager" (p. 96).

Research supporting the MLQ. Numerous studies have been conducted over the years which validate the MLQ in a range of settings from education (Castiglione, 2006; Dussault, Payette & Leroux, 2008; Koh, Steers & Terborg, 1995; Pounder, 2006), military (Gasper, 1992; Johnsen, Eid, Pallesen, Bartone & Nissestad, 2009), public sector (Mary, 2005; Mora & Ticlau, 2012), religious leaders (Carter, 2009), healthcare (Longenecker, 2006; Top, Tarcan, Tekingündüz & Hikmet, 2013; Wylie & Gallagher, 2009), and business (Peterson, Walumbwa, Byron & Myrowitz, 2009; Schippers, Den Hartog, Koopman & van Knippenberg, 2008; Smith, B., Andras & Rosenbloom, 2012; Waldman, Siegel & Javidan, 2006) as well as a number of meta-analyses (Clarke, 2013; DeGroot, Kiker & Cross, 2000; Fuller, J. B., Patterson, Hester & Stringer, 1996; Leong, Yin & Fischer, 2011; Lowe, Kroeck & Sivasubramaniam, 1996).

As discussed above, all four components of the Sloan Leadership model were found by Reeves et al. (2007) to be present in massively multiplayer online role playing games (MMORPG).

Ancona et al. (2007) highlight a number of elements that comprise the four elements of their model: Sensemaking, Relationships, Visioning and Inventing.

For Sensemaking, a term originally coined by Weick (2001) they identify on four elements that comprise active sensemaking: getting data from multiple sources, involving others in one's sensemaking, using early observations to create an iterative experimental loop, and keeping oneself open to new possibilities (Ancona et al., 2007).

For Relationships Ancona et al. (2007) identify spending time understanding others' perspectives, encourage others to voice their opinions, trying to anticipate how others will react to your ideas and assessing how well you relate to others as key components.

With regard to Visioning, elements include practicing creating a vision in many arenas of one's life, developing a vision about something that you are enthusiastic about, explaining why people should care about your vision, emphasizing the vision, not the details of execution, and using images, metaphors and stories to covey complex situations (Ancona et al., 2007).

For Invention, they offer the following admonitions, don't assume the way things are is always the best way, encourage creative approaches to problem solving, experiment with different ways of organizing work and explore other options (Ancona et al., 2007)

With a few exceptions, each of these components is also found in the MLQ offering a link between the research conducted by Reeves et al. (2007) and the current research. Table 1 demonstrates the links between the two approaches.

Table 1

Comparison of Sloan Leadership Model and MLQ

	Sloan Model	**MLQ**
Sensemaking	Getting data from multiple sources	…problems from many different angles…
	Involving others in one's sensemaking	…important values and beliefs…
		…differing perspectives…
	Using early observations to create an iterative experimental loop	…re-examine critical assumptions…
	Keeping oneself open to new possibilities	…differing perspectives…
Relationships	Spending time understanding others' perspectives	…differing perspectives…
		…different needs, abilities…
	Encourage others to voice their opinions	…get others to look at problems…
	Try to anticipate how others will react to your ideas	…that are satisfying…
		…go beyond self-interest…
	Assess how well you relate to others	…treat others as individuals…
		…others' respect for me…
Visioning	Practice creating a vision in many arenas	…compelling vision…
	Develop a vision about something that you are enthusiastic about	…talk enthusiastically…
		…talk optimistically…
	Explain why people should care about your vision	…sense of purpose…
	The emphasis is on the vision, not the details of execution	… collective sense of mission…
	Use images, metaphors and stories to covey complex situations	None
Invention	Don't assume the way things are is always the best way	…from many different angles…
		…new ways of looking…
	Encourage creative approaches to problem solving	…from many different angles…
	Experiment with different ways of organizing work	…new ways of looking…
	Explore other options	…new ways of looking…

Note. The data in this table are from the Sloan Leadership Model as featured in Reeves, et al (2007) and the Multifactor Leadership Questionnaire Third Edition, Manual and Sample Set by Avolio et al. (2004)

Research on Videogames

A number of researchers (Bonk & Dennen, 2005; De Waal, 1995; Hurd, 1986; Lenert, 1983; Park, 2006; Yee, Nick, 2002; Yee, N., 2006) have explored the reasons why these games are of such interest to players. Both De Waal (1995) and Park (2006) point to the physiological and arousal responses triggered by participation in intense video game experiences. Yee (2006) identifies ten components that impact individuals motivation to engage in online game play. These ten were grouped down into three meta components: achievement, social and immersion. The achievement component included the desire for advancement through gains in power, status or wealth within the game, mechanics, or understanding the rules and systems of the game, and the desire for competition. The social component included socializing with others, the desire to form meaningful relationships and the satisfaction of teamwork. The Immersion component included discovering new element of the game, developing an in-game persona and creating the story of the game and being able to create a custom avatar or character. While Bonk and Dennen (2005) focus on the motivational aspects of self-directed exploration and discovering new solutions and highlight a Department of Defense identification of motivational principles such as challenge, conflict, curiosity, control, and fantasy. Lisk, Kaplancali & Riggio(2012) identify providing multiple paths to success and the challenge of unpredictable human opponents.

While research on gaming has attracted significant interest, much of it has focused on the relationship between the violence present in many videogames and its impact on attitudes and behavior (Arbogast, 2010; Brower & LoPolito, 1994; Carlson, 2004; Engelhardt, 2010; Garcia, 2005; Koloko, 2010), often finding a positive correlation with anger and aggression.

However, other researchers have begun exploring more discrete aspects of gaming itself such as player behavior or skill while the player is using or in response to specific elements of

the video games' structure or environment such as actual player performance (Baba, 1993), a players use of navigation maps (Wainess, 2006), player persistence in game play (Eike, 1983; Shand, 2010), the development of player flow both individually (Smith, B. P., 2006) and in teams (Penney, 2009) any of which may also prove important. These elements may be critical in determining the extent to which the nature and experience of the video game environment contributes to the conditions that either support or retard the presence or absence of leadership.

Barlett, Anderson et al. (2009) have summarized much of the evidence to date in a graphic that appears as Figure 1. In this rendering, they bring together four different versions of video game content: violent, non-educational; non-violent non-educational; violent educational; and non-violent educational. They then pair these versions with various outcomes, and link the content and outcomes with solid lines denoting confirmed effects and dashed lines representing speculative effects (Barlett, C. P. et al., 2009).

Based on their research, they indicate that violent games, regardless of their content have confirmed effects related to aggression, decreases in pro-social behavior, as well as increases in visual and cognitive performance abilities. Non-violent games on the other hand, have confirmed effects on increases in visual and cognitive performance abilities, and educational games, regardless of the presence of violence, have confirmed effects on increases in visual and cognitive performance abilities as well as on specific content knowledge acquisition. What is also interesting to note is that all of the game types have only speculative effects related to cognitive control process deficits (Barlett, C. P. et al., 2009). In addition, they note that, "video games can be useful in aiding children and adults in learning educational content and visuospatial or visuotemporal skills, but the current literature suggests that these benefits do not depend on violent content" (Barlett, C. P. et al., 2009, p. 396).

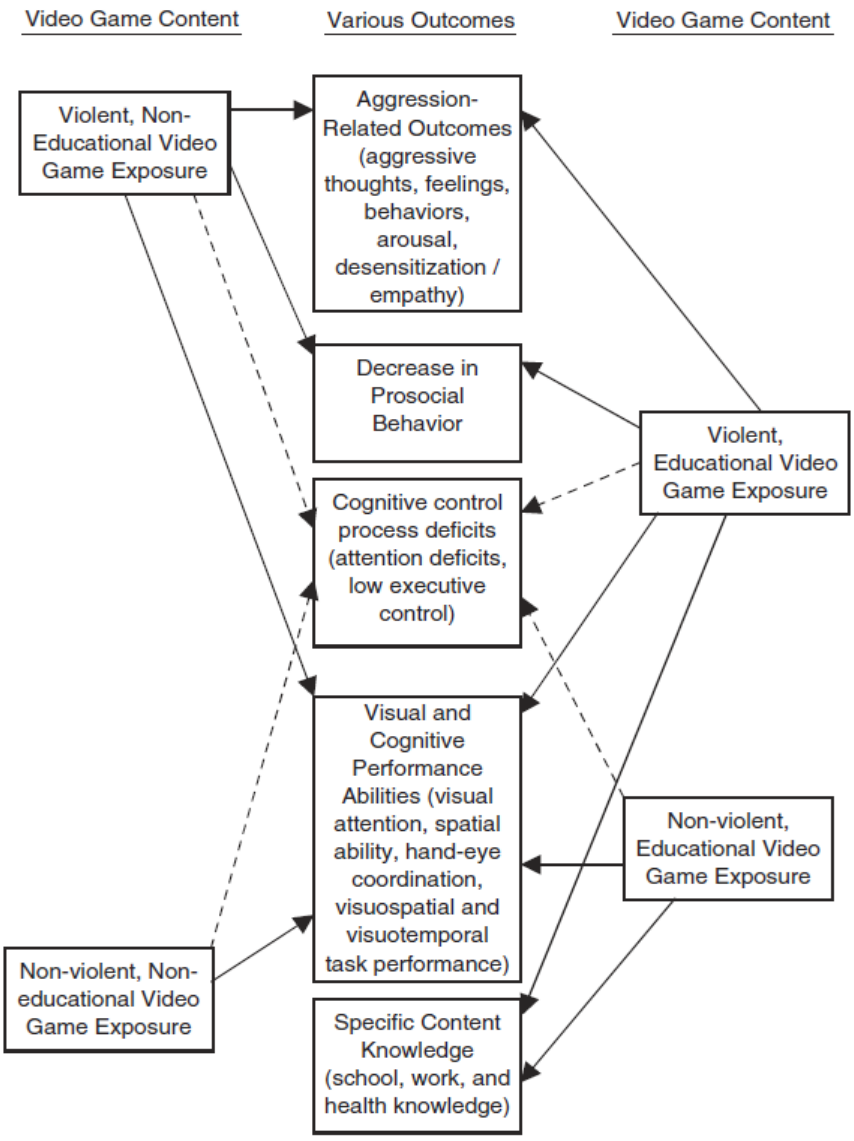

Figure 1. Relationships between video game content exposure and various outcomes. From Barlett, C. P., Anderson, C. A., & Swing, E. L. (2009 (2009)). Video game effects—confirmed, suspected, and speculative: A review of the evidence. Simulation & Gaming, 40(3), p. 397 doi:10.1177/1046878108327539

Videogames & Leadership

Computer-based or video gaming has been around almost since the advent of the computer, but increasingly powerful computing platforms such as dedicated gaming consoles (e.g. Xbox, PS3, Wii) have led to enhancements in graphics and game play that have made video games more involving, more intense and more immersive. With the advent of the Internet, video

games also achieved the capacity to allow play not just against a computer but to play with or against tens, hundreds, sometimes even thousands of players simultaneously in seemingly open-ended adventures. And literally millions of people have responded.

While there are numerous genres of video games, one of the most pervasive is a genre of the adventure game known as the *first person shooter*. While the game itself may not actually involve shooting (although most do), a main feature of the genre is that the gamer views the action from the point of view of the protagonist of the game. Often the gamer can see hands, weapons or other features of their character as though extensions of the gamer him or herself. This perspective, coupled with the adventure story often associated with these games, heightens the immersive experience for the game player.

Adding multiple players into the game then, allows players to see and interact with each other and the shared virtual world, as though they were there in person. While not universally the case, many of these multiplayer, first person shooter-style games involve groups of individuals banding together to achieve some common objective. Often their characters are collections of soldiers or warriors of some ilk either questing for some object or goal, or fighting other teams for survival or treasure. Often too, players can personalize their character or avatar to distinguish themselves from others. In many cases the aspects of this personalization must be earned through successively successful performance in the game – a payoff for experience which incents the player to continue.

The expansive, immersive and engaging nature of these games has encouraged these millions of gamers to invest billions of hours in online gaming. According to McGonigal, (TED Conference LLC, 2010) three billion hours a week are spent playing online games.

But in order to be successful in many of these games, it is necessary to collaborate with other gamers and that collaboration requires communication, organizational and even leadership skills. Recently researchers have begun asking whether these games facilitate leadership skills in adults.

So there is some evidence that certain skills can be facilitated by these games, but as these are adults the question arises whether these games are simply opportunities for established skills to emerge or whether the games are developing nascent or heretofore unexpressed leadership skills.

With the advent of multiplayer and massively multiplayer games the need for team constructs for organizational efficiency and enhanced game play emerged. As with face-to-face teams, some element of leadership is vital for the team to function both efficiently and effectively. Recent research has begun to look at the role of leadership within video games.

Yee (2002) building on the work of Bartle (1996) identified leadership as an underlying motivation behind why individuals play online games. As Yee (2002) notes, "Players who score high on this factor prefer to group rather than solo. They are often assertive individuals and usually drift to leadership positions when in a group. Because a group led by an indecisive leader often gets fragmented, the assertiveness of these players probably allows them to be effective group leaders in the game" (p. 9).

Beck and Wade (2006) have shown that, "young professionals with extensive gaming experience display the same attitudes as much more experienced managers," (p. 129) and that these individuals tend to be less authoritarian in their approach and are equally comfortable getting input from subordinates and peers one-on-one and in group settings.

As IBM (2007) noted in its monograph *Real Leaders, Virtual Worlds*, online gaming environments facilitate leadership in adults through:

1. Project-oriented organization
2. Multiple real-time sources of information upon which to make decisions
3. Transparent skills and competencies among co-players
4. Transparent incentive systems
5. Multiple and purpose-specific communications mediums

Similarly, Reeves et al. (2007) studied the extent to which the elements of a well-accepted leadership model were present in an MMORPG.

The leadership model they chose was the Sloan Leadership Model, which identifies four behaviors engaged in by leaders:

1. Visioning: creating compelling visions of the future
2. Relating: developing key relationships within and between organizations
3. Inventing: turning vision into reality
4. Sensemaking: making sense of ambiguous circumstances

Reeves et al. (2007) found that: "leadership in the games includes all skills currently identified in the Sloan model, but puts a premium on the dimensions of Relating and Inventing. Leadership in the games happens fast, it encourages risk taking, it promotes temporary rather than permanent leadership roles, and there are numerous opportunities for leadership practice." (p. 2)

Other authors have explored the extent to which specific elements of leadership behaviors and skills such as decision-making (Green, C. S. & Bavelier, 2008; Lingenfelter, 2009; Powell, S., 2005; Smallwood, 2007) and teamwork (Beck & Wade, 2006; Craighead, 2009; Penney,

2009; Powell, S., 2005) are present in video games. These studies, among others (Green, M. & McNeese, 2008; Kaplancali, 2008; Lisk et al., 2012; Lopes et al., 2013; Nuangjumnonga & Mitomo, 2012) provide a critical research foundation for examining the presence or absence of the full complement of integrated behaviors and skills that constitute *leadership*.

Powell (2005) discussed a "feudal hierarchy" (p. 325) where a variety of team skills are evident in game play, where shared control is evident but where each contributor is valued for what they bring to the effort. While Beck and Wade (2006) found that frequent gamers were both less authoritarian in their decision-making styles and comfortable with a more egalitarian decision-making style overall. Craighead (2009) found that an individual's prior game play had an effect on team performance, and that team training had a positive impact on communication in ad-hoc team situations.

Nuangjumnonga and Mitomo (2012) link Lewin and Lippitt's (1938) three leadership styles – authoritarian, democratic and laissez-faire – to four distinct game-roles from the game Defense of the Ancients – Carry, Support, Ganker and players with no defined role. Their research aligned an authoritarian leadership style with both the Carry and Ganker roles. Carry roles typically lack in strength and require protection from other members during early stages of the game, and are dependent on items in order to gain more strength. However, they become critical to the success of the team later in the game due to their ability to inflict the highest amount of damage on opponents. The authoritarian style was also linked with the Ganker role. Gankers are individuals, either Carry or Support roles, who are opportunistic in attacking weaker opponents and provide teams an advantage by eliminating opponents early in the game (Nuangjumnonga & Mitomo, 2012).

The democratic leadership style was linked with the Support role, which provides teammates with support and protection from opponents. The value of Support is that they allow their teammates to inflict greater damage by disrupting opponents and providing better opportunities for teammates (Nuangjumnonga & Mitomo, 2012).

The laissez-faire leadership style was linked with those individuals who expressed no specific role preference during game play and tended to be *hands off* both in terms of their game play, and their leadership style (Nuangjumnonga & Mitomo, 2012).

Lisk et al. (2012) found that in the MMORPG World of Warcraft and Eve Online participants leading guilds reported significantly higher leadership than participants who were not in guilds and that guild leaders reported higher leadership scores than who functioned even as the "equivalent of middle managers" (p. 141). Lisk et al. (2012) asserts that "these findings show that leadership exists and matters in an online *for fun* video game not at all designed for leadership training" (p. 141).

Virtual and Distributed Teams

With the integration of computer technology into the business world in the early 1990's the virtual or distributed team was conceived. One of the earliest definitions of a virtual team by Lipnack and Stamp (1997) sought to combine the traditional definition of a team as "a group of people who interact through independent tasks guided by common purpose" (p. 6) with the distributed component where members work "across space, time, and organizational boundaries with links strengthened by webs of communication technologies" (p. 7).

Although Lisk's (2012) definition cited in Chapter 1 is a more recent construct, as Hertel, Geister & Konradt (2005) point out, the specific definition of virtual teams is still controversial. However, they identify four components that form the "minimal consensus" (p. 71) of the

elements of a virtual team: "(a) two or more persons who (b) collaborate interactively to achieve common goals, while (c) at least one of the team members works at different location, organization, or at a different time so that (d) communication and coordination is predominately based on electronic communication media" (Hertel et al., 2005, p. 71).

In a similar fashion to work on traditional teams, a growing body of research exists exploring the elements (Bell & Kozlowski, 2002; Hambley, Laura A., ONeill & Kline, 2007; Sarker, S., Ahuja, Sarker & Kirkeby, 2011; Saunders & Ahuja, 2006; Staples & Webster, 2007; Townsend & Hendrickson, 1998; Turel & Zhang, 2010), affordances and efficacy (Fuller, M. A., Hardin & Davison, 2007; Johnson, Bettenhausen & Gibbons, 2009; Staples & Webster, 2007; Zornoza, Orengo & Peñarroja, 2009), management models (Andressen, Konradt & Neck, 2012; Hertel et al., 2005; Lurey & Raisinghani, 2001; McComb, Kennedy, Perryman, Warner & Letsky, 2010; Potter, Cooke & Balthazard, 2000; Serçe et al., 2011; Wakefield, Leidner & Garrison, 2008) and leadership traits (Al-Ani, Horspool & Bligh, 2011; Avolio, B., 2003; Avolio, B. J., Kahai & Dodge, 2000; Bell & Kozlowski, 2002; Cascio, 2003; Connaughton, Shuffler & Goodwin, 2011; de Rooij, 2009; Gajendran & Joshi, 2012; Hambley, L. A., O'Neill & Kline, 2007; Huang, Kahai & Jestice, 2010; Kaplancali, 2008; Levasseur, 2012; Purvanova & Bono, 2009; Shuffler, Wiese, Salas & Burke, 2010; Zaccaro, 2003; Zigurs, 2003; Zimmermann, Wit & Gill, 2008) necessary for the smooth functioning of a virtual team.

Sarker et al. (2011) argued that trust centrality plays a key mediating role between communication centrality and performance and is the best explanation for the impact of trust and communication on individual performance in distributed teams. They assert that communication's effect on individual performance is through trust which highlights the prominent role of trust in distributed teams, where it (i.e., trust) has been viewed as facilitating

"glue" (p. 275) by prior researchers. Along those lines, Townsend and Hendrickson (1998) identify four aspects of communication that are required by members of virtual teams:

- Virtual team members must learn new ways to express themselves and to understand others in an environment with a diminished sense of presence.
- Virtual team members will be required to have superior team participation skills. Because team membership will be somewhat fluid, effective teams will require members who can quickly assimilate into the team.
- Virtual team members will have to become proficient with a variety of computer-based technologies.
- In many organizations, virtual team membership will cross national boundaries, and a variety of cultural backgrounds will be represented on the team. This will complicate communications and work interactions, and will require additional team member development in the areas of communication and cultural diversity.

Saunders and Ahuja (2006) suggests that, in contrast to temporary distributed teams, ongoing distributed teams must tackle process and structural issues. In addition, where temporary teams are more focused on task-related outcomes, ongoing distributed teams are more difficult to manage and experience greater variance in well-being related outcome levels.

Staples and Webster (2007) found that self-efficacy for teamwork was more important in virtual teams and that self-efficacy for teamwork was significantly related to perceived effectiveness such as, individual performance, intention to remain with the team, ability to cope with adversity, team performance, and satisfaction with the team itself.

Turel and Zhang (2010) demonstrate that it is important to consider the configuration of virtual teams as it can significantly influence team outcomes. They make several practical

recommendations. Because their research indicates that because high within-team variation in conscientiousness (how diligent one will be in completing a specific task) will negatively impact team performance, managers should work to build teams with individuals who share similar conscientiousness scores. They can also increase the within-team variance in extroversion by assigning individuals with different extroversion scores to teams.

Johnson et al. (2009) found that it is important to vary the communications methods used in team interactions. She found that team members who used computer-mediated communication more often experienced lower levels of positive affect while working with their teams and had lower levels of affective commitment to their teams. In fact, she found that using computer-mediated communication more than 90% of the time was a tipping point at which such communication became particularly detrimental to team outcomes.

Bell and Kozlowski (2002) posit fifteen propositions concerning the composition and functioning of virtual teams:

Proposition 1: The more specialized the expertise underlying the collective task a team needs to perform, the greater the likelihood that it will not be found in a proximal location. Virtual teams provide organizations with the means of accessing unique, highly specialized expertise that is distributed in space (Bell & Kozlowski, 2002, p. 23).

Proposition 2: Virtual teams performing less complex tasks are expected to be able to effectively manage their information and collaboration requirements with asynchronous communication media. As virtual teams perform more complex, dynamic, and challenging tasks, however, they are expected to be more likely to adopt synchronous, or tightly-linked, communication media to facilitate collaboration, information richness, and group decision making (Bell & Kozlowski, 2002, p. 25).

Proposition 3: The ability of virtual team leaders to perform key leadership functions is limited by the distribution of team members across space and the consequent lack of face-to-face contact. Thus, effective virtual team leaders are expected to be more likely than leaders of traditional teams to create structures and routines to substitute for the functions and to distribute the leadership functions to the team. They are also expected to be more likely to create self-managing teams by providing direction and specific goals, monitoring environmental conditions, updating or revising goals and strategies as environmental contingencies warrant, and facilitating collaboration and cohesion among team members (Bell & Kozlowski, 2002, p. 24).

Proposition 4: The need for virtual teams to operate in real time (vs. distributed time) is expected to become more critical as tasks become more complex, workflow arrangements become more reciprocal and intensive, and situations require dynamic, external links. The ability of virtual teams to operate effectively in distributed time is expected to increase as tasks become less complex, workflow arrangements become more additive and sequential, and situations are less dynamic with looser external links (Bell & Kozlowski, 2002, p. 31).

Proposition 5: Virtual teams often cross functional, organizational, and/or cultural boundaries. However, the degree to which these boundaries, once crossed, are permeable is expected to depend on the nature of the tasks the team performs. When tasks are more complex, requiring established operating procedures and more stable relationships, a virtual team's boundaries are expected to remain less malleable over the team's lifecycle. However, when tasks are on the less complex end of the continuum, personnel inflows and outflows cause less disruption to team processes and established operating procedures are less critical, and a virtual team's boundaries are expected to be more permeable (Bell & Kozlowski, 2002, p. 33).

Proposition 6: When the tasks a virtual team performs are complex and challenging, the team is expected be more likely to maintain a stable team membership and develop a more continuous lifecycle. When tasks are less complex and challenging, however, a virtual team is expected to be able to function effectively with a dynamic team membership and a more discrete lifecycle (Bell & Kozlowski, 2002, p. 34).

Proposition 7: Virtual team members often hold multiple roles both within and across different virtual teams. However, as the tasks a virtual team is required to perform become more complex and challenging, requiring greater levels of expertise and specialization, a higher premium is expected to be placed on synchronous workflow arrangements and the roles of individual team members will be more likely to be clearly defined, fixed, and singular. Under conditions of low task complexity, however, there is minimal interdependence among team members and more asynchronous workflow arrangements are expected to be adopted. In these situations, a virtual team's members can hold multiple roles without compromising the effectiveness of the team (Bell & Kozlowski, 2002, p. 35).

Proposition 8a: As virtual teams become temporally distributed, the information leaders receive is more likely to be degraded and delayed, making it more difficult for them to perform critical performance management functions. In these situations, effective virtual team leaders are expected to be more likely to be proactive in the creation of explicit structures that help the team manage its performance. They are also expected to be more likely to focus attention on anticipating problems, providing clear direction and goals to allow team members to regulate their own performance, and enabling team members to adapt to changing environmental conditions (Bell & Kozlowski, 2002, p. 36).

Proposition 8b: Leader developmental functions will be more critical when virtual teams operate in real time. Effective virtual team leaders are expected to be more likely to determine how to use communication technologies to provide team members with necessary developmental experiences. This will likely involve evaluating the degree of coherence required for team success and choosing appropriate communication media based on these requirements (Bell & Kozlowski, 2002, p. 37).

Proposition 9a: As virtual teams span different functions, organizations, and cultures, we propose that effective leaders will need to assess how individual and team self-regulation methods translate across these different boundaries. Under these conditions, virtual team leaders are expected to be more likely to consider contextual factors when performing critical performance management functions. They are also expected to be more likely to identify what factors (e.g., differences in cultural dimensions or values) are relevant and to tailor their performance management functions based on relevant individual differences across the team (Bell & Kozlowski, 2002, p. 37).

Proposition 9b: Team developmental functions will be more challenging when virtual teams are distributed across multiple boundaries. In these instances, effective virtual team leaders are expected to be more likely to build a unique team culture by developing bonds of mutual respect, trust, and obligation between team members at all levels (Bell & Kozlowski, 2002, p. 38).

Proposition 10a: When virtual teams have more discrete lifecycles, it will be more difficult for leaders to establish operating patterns that help team members regulate their own performance. Therefore, effective leaders of these teams are expected to be more likely to

provide clear direction and team and individual goals to facilitate an early transition to performance (Bell & Kozlowski, 2002, p. 39).

Proposition 10b: When a virtual team is characterized by a more discrete lifecycle, it will be more difficult for a leader to perform critical team development functions. Effective leaders of these teams are expected to be more likely to focus on only the most critical issues, such as quickly establishing working relationships between team members. When a virtual team is characterized by a more continuous lifecycle, a leader's team development functions are expected to be even more critical. Under these conditions, effective leaders are expected to be more likely to establish long-term, effective working relationships among team members and to facilitate the development of complex workflow arrangements that are necessitated by the more complex tasks these teams perform (Bell & Kozlowski, 2002 , p. 39).

Proposition 11a: As team members hold multiple roles within and across different virtual teams, role ambiguity and role conflict are expected to make leader performance management functions more challenging. To manage virtual team performance, effective leaders are expected to be more likely to clearly specify each team member's role within the team, design backup plans in case team members are called away to other teams, and clearly specify how much time each individual is expected to commit to the team (Bell & Kozlowski, 2002, p. 40).

Proposition 11 b: As team members hold multiple roles across different virtual teams, leaders' developmental functions are expected to be more difficult to perform. To create coherence and interdependence among team members, effective leaders are expected to be more likely to specify not only individual team member roles but also the interrelationships between the roles of team members. These functions are expected to be even more critical as teams perform more complex and challenging tasks, requiring more reciprocal and intensive workt1ow

arrangements. Effective leaders are expected to be more likely to establish clearly defined role networks by providing each team member with a singular, fixed, and defined role within the team (Bell & Kozlowski, 2002, p. 41).

In general the research has reinforced the notion that there are some similarities in patterns of behavior among members of both virtual and traditional teams as well as parallels in the leadership traits necessary to lead each kind of team. While certain similarities exist, there are also significant differences, not surprisingly, due to varying degrees on the combinations of task complexity, temporal and geographic distances and the differences between face to face and online communication modalities (Al-Ani et al., 2011; Daim et al., 2012; Proaps, 2011; Zimmermann et al., 2008).

In fact, Zimmerman (2008) identifies thirty traits that were perceived as being more critical for virtual than for face-to-face team management. Zimmerman grouped these thirty traits across three domains, the Task Domain, the Task-and-Relationship Domain and the Relationship Domain:

Task Domain.

- Set clear tasks for the team members
- Ensure a common understanding of tasks
- Stimulate information sharing with different teams
- Define clear roles of what is expected of team members
- Focus on outcomes and deliverables rather than on activities
- Monitor commitment of the team members to their task
- Be sensitive to new business opportunities
- Set clear goals for teams

Task-and-Relationship Domain.

- Coordinate interactions between different time zones
- Encourage use of different computer-mediated communications, e.g. video-conferencing, e-mail
- Demonstrate proficiency with computer mediated communication
- Have a very organized way of interacting with team members
- Communicate clearly in writing
- Prevent misunderstandings in communications
- Organize regular face-to-face meetings (travel, if required)
- Ensure availability and accessibility of team members
- Delegate responsibility for implementation of decisions to team members
- Synchronize or prioritize contributions among team members
- Stimulate information sharing among the team members
- Let people participate in decision-making
- Recognize individual team members' contributions
- Solicit and listen to ideas and opinions from team members
- Keep his or her own promises
- Demonstrate confidence in the professionalism of others

Relationship Domain.

- Make people feel part of the team
- Be sensitive to cultural diversity among team members
- Emphasize shared values among members of the team
- Quickly build and sustain effective relationships

What was particularly striking was that for fourteen of these elements, the extent to which they were deemed important varied with the degree of virtual-ness of the respondents relationship with their manager (Zimmermann et al., 2008). For example, Zimmerman (2008) found that six of the eight task oriented elements became more important to respondents as the degree of virtual-ness increased. Not surprisingly, elements having to do with clarity and direction, such as *setting clear tasks for the team members* or *defining clear roles of what is to be expected of team members* and *setting clear goals for teams*, were deemed most critical by those with the least face-to-face contact.

With particular relevance to this paper, researchers (Chen, 2009; Craighead, 2009; Dabbish, Kraut & Patton, May, 2012; Faria, Hutchinson, Wellington & Gold, 2009; Heyne, Pavlas & Salas, September, 2011; Lisk et al., 2012; Lopes et al., 2013; Penney, 2009; Powell, S., 2005; Proaps, 2011) have also begun to link the construct of business focused virtual teams with the kinds of teams that are generated through video game play.

Chen (2009) for example looks at the impact of communication and collaboration in the effectiveness of a group playing the online multiplayer game World of Warcraft. He found that their success improved through collaborative improvements on communication and coordination. They emphasized sustaining and building player relationships and learning together as well as defining and retaining a coherent group identity which created a set of shared social incentives that transcended individual player incentives.

Craighead (2009) demonstrated that game-based training improved the amount of information sharing between team participants, even when those teams are created in an ad hoc fashion, while Dabbish et al. (May, 2012) demonstrated that communication fostered in the early stages of group development caused members to communicate more frequently throughout the

life of the group which increased their commitment to the group through the creation of a positive group dynamic. They also found that social communication by a peer is especially valuable in increasing commitment to the team.

Heyne et al. (September, 2011) looks at the concept of flow as defined by Csikszentmihalyi (1991) which posits a mental state in which an individual is completely immersed in a task and experiences tremendous feelings of energy, focus, involvement, and success in the process of completing the task. Heyne et al. (September, 2011) extended the individual notion of flow to all of the members of a team, simultaneously involved in a simulation scenario and found that team flow was positively correlated with mission success and with the extent to which team members shared information during the simulation. While Lisk (2012) found evidence that differences exist between leading distributed and traditional teams.

Our research will build on this connection by exploring the extent to which leadership styles are linked to video game performance rankings.

Relevant Research on Adolescents

McGonigal (TED Conference LLC, 2010) indicates that active online gamers in the US spend about 10,000 hours playing games by the time they are 21. This is almost the same amount of time that they spend in school from fifth to twelfth grade. In addition, it corresponds to the 10,000 hours that Malcolm Gladwell (2008) indicates that it takes to become a virtuoso at any task.

Thirty-two percent of today's gamers are under 18 years of age, and adolescent boys under 17 years of age comprise almost twenty percent of the gaming population, making them a disproportionately large percentage of those who play online games (Entertainment Software Association, 2013). Boys also spend almost four times as much time playing console games

(averaging an hour a day) as do girls (Rideout et al., 2010). In addition, a recent study by the UC Davis Graduate School of Management (2005) found that men outnumbered women in leadership positions in business by a ratio of 10:1 indicating a likelihood that many boys will one day assume leadership positions.

Further, as the data in Figure 2 demonstrates, while the percentage of adolescent gamers has gradually increased over time the number of older gamers has also continued to rise, indicating that adolescent gamers continue to play sometimes long after they reach the age of majority (Entertainment Software Association, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013).

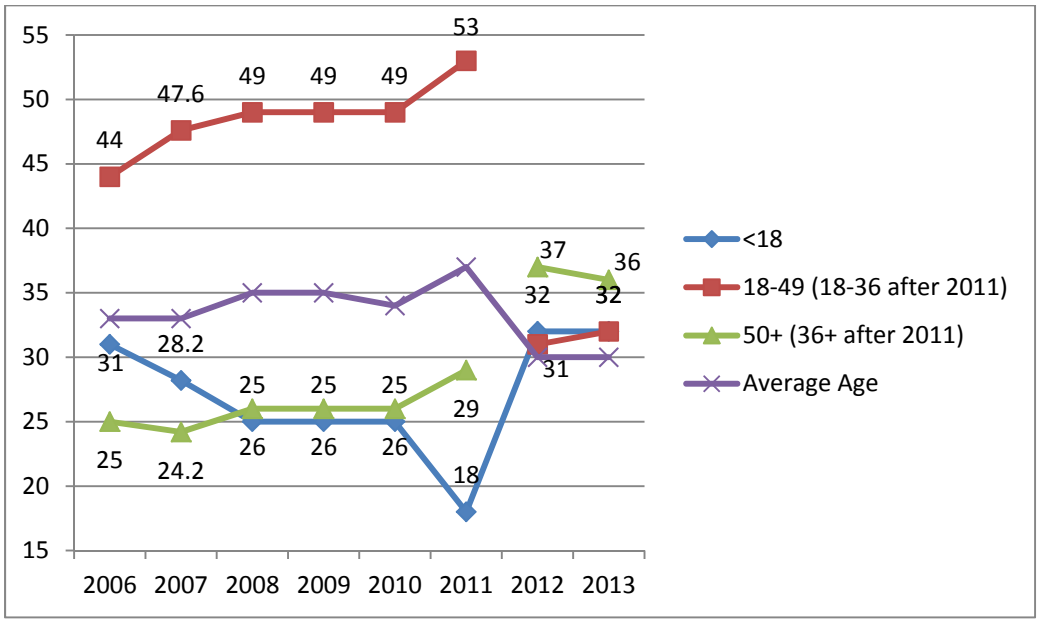

Figure 2. Age of gamers 2006-2013. From Entertainment Software Association, (2007-2013). Essential facts about the computer and video game industry: sales, demographic and usage data.

The prevalence of these games, the extent to which boys are disproportionally drawn to them and play them for significant periods of time, coupled with the disproportionate likelihood that as men these boys will assume some leadership role, whether in public, private or commercial life, leads us to question the impact that these games are having on adolescent

development, specifically the development of leadership skills. Consequently, because the impact of these games on individuals begins in adolescence, an overview of the research on adolescents, leadership, and videogames is germane to this study and will be discussed below.

Adolescents and Authentic Leadership

Seeking to create an authenticity framework for adolescent leadership development, Whitehead (2009) builds on Bhindi and Duignan's (1997) four categories that comprise authenticity in organizations and Woods (2007) three categories of authenticity: personal, ideal and social, to construct his framework of four mutually exclusive categories that comprise authenticity:

1. Self core; Being able to know and understanding the inner-workings of one's own heart is fundamental to consistently influencing either individuals or organizations for good.
2. Empathetic core: Developing others is an important value to the authentic leader. Authentic leaders and their followers engage in activities that bring happiness, express excellence of character, and contribute to an existence as *one's true self*.
3. Trust-building core; Authentic leaders engender trust among their followers and bind them together through a confluence of faith, hope, commitment, and mutual appreciation.
4. Community core; Authentic leaders are deeply embedded in the purpose, events, history and social structure of the community or organizational and exemplify their values.

He also suggests that adolescent leaders emerge from one of two prototypes (Whitehead, 2009):

1. Pro-Social: students who wore cool clothes, were athletic, excelled in academics, were socially adept and considerate to others and exhibited positive social behaviors
2. Anti-Social: students who were disruptive, exhibited physical power, were athletic, wore cool clothes, were tough and exhibited moderate to low academic competence

And further that because adolescents view anti-social behavior as indicators of autonomy and independence, that in contrast to adult views that pro-social leaders exact more influence, unconventional leaders possess a disproportionate influence on their peer group enhancing the status and power of anti-social leaders (Whitehead, 2009). However, as Whitehead (2009) notes, in contrast to transformational, transactional, charismatic and other forms of leadership, authentic leadership by definition lacks a "dark side" (p. 850). Consequently, making every effort to channel anti-social leaders into pro-social contexts by developing adolescent leaders under an authentic leadership paradigm is beneficial and urgently needed.

Computer video games are often perceived as anti-social, in large part because of the violence often associated with them, but also because despite the online communication that often accompanies multiplayer games, game players are physically isolated from one another. However, as discussed below, the collaborative nature of the activities that gamers undertake in these games do include many of the characteristics of traditional leadership models. The proposed study will explore whether positive leadership characteristics can thus emerge from a seemingly anti-social construct.

Trait Theory and Adolescents

In a 1993 study Mumford et al. (1993) identified a set of background data they used to develop a predictive model of leadership. They found that cognitive constructs such as Inductive Reasoning, Deductive Reasoning, Creativity and Practical Intelligence were strongly related to

leadership activities in part because problem solving places a premium on cognitive capacity which in turn permits leadership activity to emerge. Constructs such as Achievement Motivation, Energy Level and Work Ethic Values were also predictive as were social interaction scales such as Persuasive/Dominance and Social Adjustment, in contrast to the personality variables not found to be effective predictors (Mumford et al., 1993). They posit that it is possible that a leader's capacity to develop and implement problem solutions that contribute to group maintenance and task accomplishment may outweigh personality issues.

Both the predictive nature of some of these traits as well as the absence of personality as a leadership predictor may have significant relevance for this study especially in light of the lack of physical social interaction that often characterizes game players.

Research on Adolescents & Videogames

As noted above, as with adults, research on adolescents and gaming has been focused on the relationship between the violence present in many videogames and its impact on adolescent attitudes and behavior (Anderson et al., 2003; Anderson et al., 2007; Anderson et al., 2008; Garcia, 2005; Gentile, 2003; Gonzalez, 2007; Pusateri, 2006; Smallwood, 2007; Tomaro, 1999). Building on work around the impact of violent media on aggressive behavior (Anderson et al., 2003; Gentile, 2003; Grossman & DeGaetano, 1999) these studies have found that there is a link but not yet a directly causal one between violent video games and adolescent aggressive behavior. This research is relevant to the question because the game World of Tanks contains violence and thus the manner and extent to which positive behavioral traits such as leadership styles may be acquired, enhanced and transferred may be linked to the manner and extent to which these negative attitudes and traits are, or are not, also acquired, enhanced or transferred.

There is also growing evidence that playing video games does have some positive impact on adolescents including in physical arenas such as manual dexterity, spatial awareness, reaction time and other visumotor activities (Favaro, 1983; Granek, 2008; Sims, 1996; Triplett, 2008), in the realm of cognitive abilities or as a platform for cognitive training (Boot et al., 2006; Caelli, 2004; Gallegos & Mansberger, 2010; Mouck, 2010; Sharritt, 2008) in academic achievement in subjects such as mathematics (e.g. Gillispie, 2008; Kappers, 2009).

As we look to other areas of complex interpersonal behavior, the research may prove valuable here as well. For example, studies examining adolescent resistance behavior (Sanford & Madill, 2006), humor (Dormann & Biddle, 2006), gender roles and assignments (Diemer, 2010; Dunn, 2010), helping behaviors (Boggs, 2007) and ethics (Thompson, A. J., 2007) in the context of video games. The value of these studies is that interpersonal elements are often constituents or indicators of a leader's emotional intelligence and thus may be useful components of or proxies for leadership behaviors. These lines of inquiry are also relevant because they point to evidence that knowledge, behaviors and skills acquired during video game play can persist beyond game play and may be transferred to certain other non-technology and technology based activities or environments.

The research on males both young (Hamlen, 2009; Piotrowski, 2007) and older (Beal & Army Research Institute for the Behavioral Social Sciences, 2005; Noland & Jones, 2005; Powell, C. L., 2008) will be helpful in spotting longitudinal trends and persistent behavior patterns that may either originate earlier or persist after adolescence.

In addition, Mitra (2005) explored adolescent leadership from a community of practice construct leveraging Wenger's (1998) three dimensions of communities of practice:

- Joint enterprise: Developing and negotiating the activities of the group, including reconciling conflicting interpretations and holding each other accountable for this work.
- Mutual engagement: Building relationships and establishing roles with others through direct interaction and drawing on previous interactions and identities.
- Shared repertoire: Producing and adapting shared symbols and tools, including skills, language and norms.

She found that how a group works together can influence what a group accomplishes and can serve as an outcome in itself by increasing student leadership skills. The immersive, interactive and collaborative nature of these video games provides ample opportunity for Wenger's (1998) three dimensions to emerge and thus suggests that Mitra's (2005) contention may hold true in this context as well.

Theoretical Framework

Adaptive structuration theory. DeSanctis and Poole (1994), have proposed an Adaptive Structuration Theory, which posits that there is a recursive relationship between technology and the social system into which the technology is introduced. There are social systems which pre-date the technology, and which the technology attempts to mimic. These mimicked social structures in turn, once introduced impact the functioning of the social structure itself. This recursion is ongoing as the technology and the social system continually shape one another.

Game-related research has already demonstrated the advent of fundamental changes in behavior that have accompanied the widespread adoption of immersive gameplay and the games themselves have evolved to adapt to human-centered constructs such as teaming and leadership of those teams.

As we have seen, current research has demonstrated the existence of links between video games and behavior. This should not be a surprise given that anything done in quantity is bound to have some impact on the doer. Much of the research however has been done on the negative correlations rather than exploring the gaming experience for positive outcomes. This research works under the theoretical assumption that given the similarities in team structures between games and business-focused distributed teams, as with those teams success of game-based teams requires a certain level of leadership.

In personal communication with video game designer Kelly Toyama (2012), he asserts that a team of players who work together consistently will almost always trump a *pick up team* comprised of whoever happens to spawn on the server at a particular time. This primacy of structure over an ad hoc approach, points to the importance both of leadership and of true teamwork as opposed to parallel play.

It is also often the case, that those who are playing together consistently tend to be of higher individual ranks because they are able to level up more quickly due to the fact that individual leveling increases can be tied to collaborative success.

Thus, the foundational theory is that these games provide an environment in which players can learn and practice leadership styles.

Conclusion

Over the past 30 years, the availability of video games and their level of engagement and interaction have expanded dramatically. Although this tide is changing, much of the extant research literature has focused on links between game-based violence and negative behavior patterns among gamers. Because of the Internet and advances in computing power, these games are also able to host literally thousands of simultaneous users throughout the globe. These

changes in technical structure have coincided with an increase in the complexity of the game-play dynamic through the introduction of team-based play.

At the same time, the rise of the Internet also facilitated the creation of the technology-enabled virtual or distributed team. These business-oriented distributed teams share many structural and procedural similarities with game-based teams, including the observation that leadership of these teams is critical for success whether on the virtual battlefield or the actual board room.

The goal of the proposed research is to explore to what extent are traditional leadership styles linked to successful achievement in collaborative online games and are there consistent leadership style profiles associated with tiers of game performance rankings.

Chapter 3: Methodology

This research will be a quantitative correlational study that will involve a discovery approach from a quantitative primary, quantitative first perspective.

The research will involve an Internet-based survey of at least 200 players of the multiplayer online game World of Tanks. The players will complete a leadership questionnaire and their leadership style profiles will be correlated with their game-based performance using the Weighted and Normalized (WN7) ranking scale, their attainment of leadership positions in a *Clan*, and demographic characteristics.

Research Questions

The research questions for this study are:

1. To what extent are traditional leadership styles linked to successful achievement in collaborative online games as measured by the MLQ?
2. Are there consistent leadership style profiles as measured by MLQ associated with tiers of game performance rankings, as measured by the WN7 scale?

Description of the Research Methodology

Video game: World of Tanks. The video game selected for study is World of Tanks, an Action Real-Time Strategy Game (ARTS) or Massively Multiplayer Online Battle Arena (MMOBA) where teams of tanks compete for supremacy on a single map. The game can be played by individuals who are randomly assigned to a team or by groups of individuals who join ad hoc Tank Companies or a persistent team called a *Clan*. Developed by the Belarusian company Wargaming.net in 2010, it has become one of the most widely played games on the Internet, with more than 45,000,000 players worldwide. It holds the Guinness World Record in

the category of Most Players Online Simultaneously on one MOG server with 190,541 players playing simultaneously (World of Tanks).

The structure of the game is a freemium model where initial game play is free, but advanced features and acquiring additional equipment require a single payment or a subscription. The free version allows the player access to three types of Random Battles:

- Standard Battle: two opposing teams, each defending its own base.
- Assault: two opposing teams and a single base belonging to the defensive team.
- Encounter Battle: two opposing teams and a single neutral base located in between initial positions of the teams. The neutral base does not belong to either of the teams.

The fee-based version adds the ability to create Platoons of up to 3 individuals who know one another, as well a Tank Company which can include up to 15 players who know one another and can play as a complete team for a single game.

In addition, players can participate in a *Clan*. A *Clan* is a persistent group of individuals who play other teams on a global basis. To participate in a *Clan*, a player must have played at least one game in a vehicle of tier 5 or higher. *Clans* are limited to a total of 100 players, although only 15 players may participate in any one game at one time. The *Clan Wars* version involves both tank battles as well as an economic and geopolitical strategy component as *Clans* attempt to conquer and maintain territory through an ongoing series of strategic battles. In contrast to the traditional game, teams and territory are not reset after each game in *Clan Wars* and the game persists over the course of many months.

Clans include eight different positions which are endowed with different permissions in the game environment and which are provided various responsibilities for the leadership and maintenance of the *Clan*. *Clan* positions are included in Table 2.

Table 2

Clan Positions and Responsibilities in World of Tanks

Position	Permissions
Commander	Modify clan data and settings
	Manage the clan
	Perform all actions on the Global Map
	Access restricted clan information on the Global Map
	Participate in Clan Wars battles
Deputy Commander	Manage the clan (except assigning clan Commander)
	Perform all actions on the Global Map
	Access restricted clan information on the Global Map
	Participate in Clan Wars battles
Company Commander	Access restricted clan information on the Global Map
	Move chips on the Global Map
	Participate in Clan Wars battles
Diplomat	Access restricted clan information on the Global Map
	Participate in Clan Wars battles
Treasurer	Allocate clan Treasury funds to clan members
	Access restricted clan information on the Global Map
	Participate in Clan Wars battles
Recruiter	Send invitations to the clan
	Consider applications to the clan
	Access restricted clan information on the Global Map
	Participate in Clan Wars battles
Soldier	Access restricted clan information on the Global Map
	Participate in Clan Wars battles
Recruit	Participate in Clan Wars battles

Note. The data in this table are from the World of Tanks website. http://worldoftanks.com/en/content/clanwars_guide/clans/positions-and-permissions/

While these roles certainly align with military roles, their responsibilities mirror roles in corporations or other non-military organizations.

Survey methodology. The MLQ is a validated 45 question leadership survey developed by Bruce Avolio and Bernard Bass and available through Mind Garden Inc. The MLQ will be delivered through the Mind Garden Inc. online Transform data collection tool. This tool will

allow for the integration of a demographic questionnaire into the delivery of the Form 5X version, the latest version of the MLQ.

To identify participants, multiple postings will be made in the North American World of Tanks online forums and related websites. Postings will provide background on the study and request study participants. The postings will include a link directly to the survey to facilitate participation.

Wood et al. (2004) have identified a number of advantages to this kind of Internet data collection:

- Is usually accessible to gamers, and they are usually proficient in using it
- Allows for studies to be administered to large scale samples quickly and efficiently
- Can facilitate automated data inputting allowing large scale samples to be administered at a fraction of the cost of pen and paper equivalents
- Has a disinhibiting effect on users and reduces social desirability; this may lead to increased levels of honesty (and therefore higher validity in the case of self-report)
- as a potentially global pool of participants; therefore, researchers are able to study extreme and uncommon behaviors as well as make cross cultural comparisons
- Provides access to socially unskilled individuals who may not have taken part in the research if it were offline
- Can aid participant recruitment through advertising on various bulletin boards and web sites.

In addition to the MLQ questions, subjects will also be asked:

- Their age, gender and nationality
- Length of time playing World of Tanks

- Number of years they have been playing video games
- Number of days and the number of hours per day that they play videogames
- Their 60 day and overall WN7 Rating
- Name of their Clan if they are a member of one
- Their position in the Clan

A composite hours per week variable, will be calculated by multiplying the number of hours per day times the number of days per week spent playing games.

Once the surveys are completed, a Leadership Profile will be established for each participant. These profiles will then be correlated with WN7 scores to look for patterns of behavior that cluster around WN7 levels and Clan positions.

Each of the subjects' scored responses to the MLQ will be computed using the MLQ scoring rubric and a leadership profile will be developed for each respondent. A Q-Q plot will be generated to determine the normalcy of the distribution of these scores.

A correlation coefficient will be run, using the WN7 scores as predictors of the MLQ leadership scores. If deemed appropriate, multiple regression coefficients will be run, with answers from the survey, e.g., number of years played, and number of hours played per week as predictors of the MLQ scores.

A correlation matrix will be conducted among the following variables, age, length of time playing World of Tanks, number of years playing video games, the number of days and the number of hours per day and number of hours per week that they play videogames. The use of the matrix will be used to determine any significant correlations to the leadership profiles. If enough responses are generated, a t-test will be run against the above variables, by gender.

If participants who are members of a Clan are willing to rate the leadership style of their Clan Commander, they will be directed to the Rater portion of the MLQ to complete an evaluation of their Clan Commander. This Clan-based survey will be used to explore the extent to which the Commander and Deputy Commander's individual MLQ scores are reflected in the scores of their Clan mates. This Clan-based MLQ will be used to help validate and provide context for the individual ratings gathered generally.

Data Sources

The participants will be a convenience sample of 500 players of the online game World of Tanks gathered through postings in the World of Tanks North American Online Forum and related websites. Because World of Tanks allows both individual and *Clan* game play, the bulk of the surveys will be with individuals. However, an attempt will be made to identify up to 25 members of a single *Clan* who agree to take both the leader and rater portions of the MLQ instrument.

Human Subjects

In accordance with standard protocols, subjects will be given the opportunity to provide informed consent via a disclaimer in the forum postings and an additional copy at the beginning of the survey itself. Informed consent is sought to ensure participation is voluntary. Each participant has the right to withdraw during any part of the study protocol. There are no known risks to participants. Anonymity will be offered through the use of gamer-tags as participant identifiers (Department of Health and Human Services, 2009).

Data Collection Setting and Procedures

A two-part online survey of the study participants will be administered. The first part will obtain demographic characteristics including nature, duration and extent of online game playing, and the second part will be the leadership inventory.

Multifactor Leadership Questionnaire (MLQ)

The data collection instrument will be the MLQ Form 5X, "a validated form of 45 items for organizational survey and research purposes and for preparation of individual leader reports" (Avolio, Bruce et al., 2004, p. 5). The MLQ, developed by Bruce J. Avolio and Bernard M. Bass (2004), identifies and measures "key leadership and effectiveness behaviors shown in prior research to be strongly linked with both individual and organizational success" (p. 12).

Respondents will answer using a 5 point Likert scale:

0 = Not at all

1 = Once in a while

2 = Sometimes

3 = Fairly often

4 = Frequently, if not always

The leadership survey will be conducted online through the Mind Garden Transform online platform.

The WN7 Rating

The WN rating is a statistically-based ranking tool created by a group of players of World of Tanks to provide a comprehensive picture of the performance of an individual player. WN is short for Weighted and Normalized and is currently in version seven, hence WN7. WN was created using statistical analysis tools, correlation studies and evolutionary algorithms to create a

method for accurately analyzing player performance and measuring player skill while eliminating statistical padding such as playing at a level below one's skill level (Praetor77, 2012).

WN Formula. As the WN formula is open source, the full details of the algorithm are:

(1240-1040/(*MIN*(*TIER*,6))^0.164)**FRAGS*+*DAMAGE**530/(184**e*^(0.24**TIER*)+130) +*SPOT**125**MIN*(*TIER*, 3)/3+*MIN*(*DEF*,2.2)*100 +((185/(0.17+*e*^((*WINRATE*-35)*-0.134)))-500)*0.45 -[(5 - *MIN*(*TIER*,5))*125] / [1 + *e*^((*TIER* - (*GAMESPLAYED*/220)^(3/*TIER*))*1.5)]

Where FRAGS is the number of enemy tanks destroyed, DAMAGE is the amount of damage inflicted by the player, SPOT are points awarded for sighting an enemy tank, WINRATE is the number of games won per games played, MIN(TIER, 5) means the average tier capped at 5, (so player average tier is used if it is less than 5, otherwise 5 is used) and MIN(DEF,2.2) means defense is capped at 2.2 (Praetor77, 2012).

The WN7 uses the rating scale found in Table 3.

Key points of the WN rating. Damage is scaled according to the player's average tier and is the most important stat in the formula. Damage points are carefully tied to the average tier played, so that players can be accurately compared across tiers, despite having very different average damage.

Players with a considerable number of battles who have an average tier lower than 4 are heavily penalized for seal clubbing – or playing a large number of games with players far inferior to their own skill level. New players are not penalized until they achieve a significant number of battles even if they maintain a low average tier played.

Table 3

WN7 Score Ratings

Score	Rating
< 500	Very Bad
500 to 699	Bad
700 to 899	Below Average
900 to 1099	Average
1100 to 1349	Good
1350 to 1499	Very Good
1500 to 1699	Great
1700 to 1999	Unicum
2000 and Above	Super Unicum

Note. The data in this table are from WOTLabs at http://www.wotlabs.net.

Capture points are not counted in the rating as no statistically sound way to include these points in the formula has been established. The data suggests that for the average player the capture points which could be useful in winning a game for a team are offset by the large number of capture points gathered at the end of games already won.

Winrate is used as a proxy to measure intangible stats which are not available on the player profile and counts for 0-10% of final WN rating.

Average Defense points is capped at 2.2 to prevent padding. Defense also proved to be highly correlated to winrate, suggesting players who have map awareness and return to base when needed to stop enemy capture win more often (Praetor77, 2012).

Reliability and Validity of Data Gathering Instruments

Multifactor Leadership Questionnaire (MLQ). The MLQ form 5X is the latest version of the MLQ, updated from the 1999 version, form 5R. The form 5X was validated by Avolio and Bass et al. (2004), through analytical review with a sample size of 4600 leaders and over 27,000 secondary raters in the US alone as well as several thousand around the world. In addition to the validation work from the original 1999 survey work, a second series of analyses were undertaken to "provide a more rigorous test of alternative conceptual models underlying the MLQ 5X scales"(Avolio, Bruce et al., 2004 , p. 47) . They began with the original six-factor model proposed by Bass (1985), and used a larger and more heterogeneous sample which included fourteen separate studies (nine from the original study) with, "data collected from raters asked to evaluate their respective leaders using the latest version of the MLQ (Form 5X), and the incorporation of behaviors and attributions in the same scale" (1999, p. 47).

In addition to the significant confirmatory factor analysis (CFA) validation work undertaken by Avolio and Bass (2004) and numerous other researchers have also worked to validate the MLQ and its multifactor model (Leong et al., 2011; Muenjohn & Armstrong, 2008; Rowold & Heinitz, 2007; Tepper & Percy, 1994) with Muenjohn and Armstrong (2008) noting that their CFA used a data-source of 138 cases, revealed that the "overall fit of the nine-correlated factor model was statistically significant and that indicated that the Full Leadership Model (nine-correlated leadership model) could be the most appropriately and adequately capturing the factor constructs of transformational- transactional leadership" (p. 3).

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Table 1: Descriptions of Samples

Country and Language(s)	Number of Raters	Number of Leaders	Rater Level Percentage (%)
United States			
English	27,285	4,600	Self (13.8), Higher (15.6), Same (19.0), Lower (44.4), Other (7.2)
Europe[a]			
Dutch	749	80	Self (8.9), Higher (11.3), Same (24.8), Lower (47.9), Other (6.9)
English	1,565	150	Self (10.2), Higher (12.1), Same (37.3), Lower (37.6), Other (2.7)
Spanish	623	80	Self (13.3), Higher (17.0), Same (35.8), Lower (29.7), Other (4.2)
Italian	2,382	290	Self (11.8), Higher (17.8), Same (23.3), Lower (38.2), Other (8.9)
Portuguese	1,620	180	Self (11.3), Higher (12.8), Same (31.3), Lower (34.4), Other (10.2)
Turkish	1,084	190	Self (10.8), Higher (19.4), Same (26.4), Lower (43.2), Other (.3)
N-Sample size	8,025	1,070	
Oceania (English)			
Australia	12,340	1,230	Self (9.8), Higher (11.4), Same (32.4), Lower (29.4), Other (17.0)
New Zeland	1,010	76	Self (8.6), Higher (11.0), Same (28.1), Lower (28.1), Other (24.3)
Singapore			
English[b]	495	244	
South Africa[a]			
Industries:			
Banking	406	59	Self (19.2), Higher (9.9), Same (23.2), Lower (34.0), Other (13.8)
Education	884	182	Self (18.0), Higher (18.1), Same (12.8), Lower (34.6), Other (16.5)
Government	3,206	296	Self (15.1), Higher (15.0), Same (18.3), Lower (27.3), Other (24.3)
Health	83	15	Self (13.3), Higher (3.6), Same (19.3), Lower (50.6), Other (13.3)
Manufacturing	483	86	Self (16.4), Higher (11.8), Same (12.0), Lower (37.5), Other (22.4)
Mining	875	169	Self (16.5), Higher (12.0), Same (19.7), Lower (31.6), Other (20.3)
Retail	179	27	Self (14.0), Higher (17.3), Same (14.0), Lower (31.8), Other (22.9)
Others	1,156	184	Self (14.5), Higher (14.3), Same (20.7), Lower (33.0), Other (17.6)
N-Sample size	7,324	1,018	

[a] These variables are from the questionnaires answered by the senior level leaders.

[b] *Note:* All samples used the MLQ 5X short, 45 items, 1995 except which used the MLQ 5X short 36 items.

Figure 3. Description of Samples. From Avolio, B., Bass, B. M., Walumbwa, F., & Zhu, W. (2004). Multifactor leadership questionnaire. [Measurement Instrument], Mind Garden, Inc. p. 45. Copyright 1995, 2000, 2004 by Bernard Bass and Bruce Avolio. All rights reserved. Reprinted with Permission.

The nine samples (N =2,154) used by Avolio and Bass in their original confirmatory factor analyses are reproduced in Figure 3. The first and second set of samples were used to

conduct an initial and cross-validation examination of the MLQ 5X Survey (Avolio, Bruce et al., 2004).

Descriptive statistics and reliabilities for the MLQ form 5X are shown in Figure 4 for all items in each scale for the initial sample set. According to Avolio and Bass (2004), "these scale scores are based on ratings by others evaluating a target leader from the initial set of nine samples (N = 2,154) reported in the 1995 MLQ Technical Report. No self-ratings are included. Reliabilities for the total items and for each leadership factor scale ranged from .74 to .94. All of the scales' reliabilities were generally high, exceeding standard cut-offs for internal consistency recommended in the literature. Figure 4 also presents the reliabilities for each leadership factor broken down for each individual sample. Since some of data sets did not include all MLQ 5X scales, reliabilities for some of the scales were not available. The reliabilities within each data set generally indicated that the MLQ 5X was reliably measuring each of the leadership factors across the initial nine data sets included in this report, with some minor deviations" (Avolio, Bruce et al., 2004, p. 46)

> As Avolio and Bass (2004) further note, Figure 4,
>
> presents the fit indices, as well as a summary of the chi-square difference test results comparing each of the respective models. All of the subsequent models were nested in previous models. The six-factor model produced fit indices exceeding the minimum cut-offs recommended in the literature, and represented the best absolute fit as compared with the other alternative models based on the results of the chi-square difference tests. Specifically, there was a significant improvement ($P < .001$) in the chi-square value for the six-factor model as compared to each previous model. There was also no difference found between the six, seven or nine-factor models (Avolio, Bruce et al., 2004, p. 52).

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Table 2. 1999 Normative Samples Summary of CFA Results for each of eight models[1, 2]

Model	1 Factor	2 Factors: Active vs. Passive	2 Factors: Transformational vs. Non Transformational	3 Factors	4 Factors	5 Factors	6 Factors	7. Factors
Chi-square	5674	3509	5260	3528	2907	2790	2509	2497
	(6859)/594	(3676)/593	(5509)/593	(4229)/591	(3188)/588	(3178)/584	(2788)/579	(2769)/573
GFI	75 (67)	86 (85)	77 (77)	86 (82)	89 (88)	89 (88)	91 (91)	90 (91)
AGFI	72 (63)	84 (84)	74 (75)	84 (80)	87 (86)	87 (86)	90 (89)	90 (89)
RMSR	07 (09)	05 (06)	08 (11)	05 (07)	04 (06)	04 (06)	04 (05)	04 (05)
NFI	80 (75)	87 (87)	81 (80)	87 (85)	90 (88)	90 (88)	91 (90)	91 (90)
TLI	79 (73)	87 (73)	80 (79)	87 (83)	89 (87)	88 (87)	89 (88)	89 (88)

Note 1: We have not presented the results of the null model, which produced a suboptimal fit. All CFAs were conducted using the 36-item MLQ Form 5X survey. Values in parenthesis are for the replication sample.

Note 2: Chi-square difference tests were performed comparing each subsequent model to the previous one, as well as comparing each model to the target 6 factor model, producing the following significant results in both sample sets. There was a significant decrease (p .001) or improvement in Chi-square value for all model comparisons except for the two alternative two-factor models, and for the comparison between the six and seven factor models.

Figure 4. 1999 Normative Samples Summary of CFA results for each of eight models. From Avolio, B., Bass, B. M., Walumbwa, F., & Zhu, W. (2004). Multifactor leadership questionnaire. [Measurement Instrument], Mind Garden, Inc. p. 53. Copyright 1995, 2000, 2004 by Bernard Bass and Bruce Avolio. All rights reserved. Published by Mind Garden, Inc. Reprinted with Permission.

Finally, for further confirmation, Avolio and Bass (2004) note that Figure 5, contains factor loadings for each individual item contained in the MLQ 5X Survey. Results are presented for the original 80-item survey based on initial validation results using a nine-factor model, which produced satisfactory fit indices as reported in our 1995 MLQ Technical Report.

The replication set of samples, included 1,706 cases (N = 1,498 after list-wise deletion). With this sample set, the six-factor model generally produced a better fit on all of the indices reported (see Figure 4). Although there was some minor shrinkage in the level of fit for the six-factor model on several fit indices, the six-factor solution produced the best fit over all alternative models based on results of the chi-square difference tests.

The six-factor model produced a more optimal fit. However, an inspection of Figure 5 revealed that in both samples, the reliabilities were generally adequate for all six scales, except for Active Management-by-Exception. Moreover, although the Contingent Reward scale was less correlated with each transformational scale, as compared to the transformational scales

correlations with each other, it appeared that problems still existed with the discriminant validity (p. 55).

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Table 3. 1999 Normative Samples: Factor Loadings of Indicators for the Initial and the Replication Set of Samples

Scale		CH	IS	IC	CR	MA	P/A
CH1	...proud of him/her...	.71(.63)					
CH2	...goes beyond self-interest...	.70(.74)					
CH3	...has my respect...	.81(.75)					
CH4	...displays power and confidence...	.63(.60)					
CH5	...talks of values...	.62(.62)					
CH6	...models ethical standards...	.75(.72)					
CH7	...considers the moral/ethical	.70(.70)					
CH8	...emphasizes the collective mission...	.71(.77)					
CH9	...talks optimistically	.68(.69)					
CH10	...expresses confidence	68(.72)					
CH11	...talks enthusiastically...	.78(.79)					
CH12	...arouses awareness about important issues...	.77(.75)					
IS1	...reexamines assumptions...		.71(.59)				
IS2	...seeks different views...		.74(.68)				
IS3	...suggests new ways...		.79(.72)				
IS4	...suggests different angles...		.81(.79)				
IC1	...individualizes attention...			.59(.61)			
IC2	...focuses your strengths...			.82(.78)			
IC3	...teaches and coaches...			.78(.68)			
IC4	...differentiates among us...			.73(.70)			
CR1	...clarifies rewards...				.66(.75)		
CR2	...assists based on effort...				.65(.55)		
CR3	...rewards your achievement...				.69(.58)		
CR4	...recognizes your achievement...				.78(.64)		
MA1	...focuses on your mistakes...					.58(.49)	
MA2	...puts out fires...					.58(.57)	
MA3	...tracks your mistakes...					.60(.66)	
MA4	...concentrates on failures...					.65(.68)	
P/A1	...reacts to problems, if serious...						.73(.73)
P/A2	...reacts to failure...						.82(.74)
P/A3	...if not broke, don't fix...						.57(.55)
P/A4	...reacts to problems, if chronic...						.86(.82)
P/A5	...avoids involvement...						.53(.58)
P/A6	...absent when needed...						.57(.67)
P/A7	...avoids deciding...						.64(.74)
P/A8	...delays responding...						.62(.72)

Legend. CH: Charisma/Inspirational; IS: Intellectual Stimulation; IC: Individualized Consideration; CR: Contingent Rewards; MA: Management-by-Exception-Active; P/A: Passive/Avoidant

Figure 5. 1999 Normative samples: factor loadings of indicators for the initial and the replication set of samples. From Avolio, B., Bass, B. M., Walumbwa, F., & Zhu, W. (2004). Multifactor leadership questionnaire. [Measurement Instrument], Mind Garden, Inc. p. 54. Copyright 1995, 2000, 2004 by Bernard Bass and Bruce Avolio. All rights reserved. Published by Mind Garden, Inc. Reprinted with Permission.

WN7 rating. As WN7 is an open source project, there are a number of individuals who have collaborated on its development and its evolution and the formulaic underpinnings are very well documented. Because of its widely available documentation, WN7 has become the preferred rating formula for many thousands of players as well as the formula of choice for player support sites such as WOTLabs (http://wotlabs.net/na/sort/wn), vBAddict

(http://www.vbaddict.net/wot.php), mywotstas.com (http://mywotstats.com), and WOT Statistics (http://www.wotstatistics.net/index.html).

The elements of the WN7 formula have been calculated only using data that is available during the game and adjusted using a range of traditional analytical techniques to account for a range of variables embedded in the game play. Their analysis suggested that 75-80% of total scores should be assigned to frags+damage, 10-15% to spots and 5-10% to defense points (Praetor77, 2012).

For Frags or killing enemy tanks, the tier at which the player is playing is accounted for by taking either the tier being played or 6 whichever is lower. This is designed to enable the calculation of relative player skill. In analyzing the data, Praetor et al. found that while frags/game is the best predictor of player skill, damage and frags are not wholly independent variables. Therefore, to avoid *kill farming* or only attacking weak or damaged tanks to increase ones kill percentage, frags and damage were given equal weights in the formula (Praetor77, 2012).

The WN Scale is bounded only by the amount of damage available in a game. It can run from the negatives into over 3000 points. As a consequence, coefficients (1240, 1040, 0.164, *e*, etc.) are employed to help conform scores into a normal distribution (Praetor77, 2012).

Damage is normalized using the mathematical constant *e*. Tier is also taken into account, as are the other constants to normalize damage relative to the other components of the score (Praetor77, 2012).

Since every game includes 15 opponents per side, Spots are worth the same at tier one as tier 10 so no tier factor is included in this portion of the formula (Praetor77, 2012).

Defense points are capped at 2.2 per game times 100 and are worth the same at tier 1 and tier 10, so no tier factor is included. Defense points tend to rise with player skills. Very poor players will have below 0.5 per game, while better players will see 1.5 or more (up to and over 2) (Praetor77, 2012).

The average game Winrate hovers around 48%. Therefore the formula for Winrate is an S-curve that returns a 0 for anything below 48%. As Winrate exceeds 48% a bonus is awarded until the curve plateaus. Winrate is used as a proxy for a range of intangible non-quantifiable variables such as map awareness, knowing when to track tanks which lead to team kills, protecting artillery from scouts, etc. All these elements are components in team wins but are not quantified in any other variable and account for 0-10% of the total WN7 score. (Praetor77, 2012).

A low tier penalty is included in the formula to discourage *seal clubbers* or veteran players who have high kill and win ratios because they only play in games where they show more skill relative to their peers, because their peers are worse than World of Tanks players in general. If a player's minimum tier is five or greater, this value is zero as an average player should be showing above tier five by around 2000 games played. For an average tier lower than five the penalty increases up to 500 points. The penalty does take in to account the number of games played and for players with only a few games, this penalty also tends to zero (Praetor77, 2012).

Analytical Techniques

Each of the subjects' scored responses to the MLQ will be computed using the MLQ scoring rubric and a leadership profile will be developed for each respondent. A *Q-Q* plot will be generated to determine the normalcy of the distribution of these scores.

A correlation coefficient will be run, using the WN7 scores as predictors of the MLQ leadership scores. If deemed appropriate, a multiple regression coefficient, or possible a series of multiple regression coefficients, will be run, with answers from the survey, e.g., number of years played and number of hours played per week as predictors of the MLQ scores.

A correlation matrix will be conducted among the following variables: age, length of time playing World of Tanks, number of years playing video games, the number of days and the number of hours per day and number of hours per week that they play videogames. The matrix will be used to determine any significant correlations to the leadership profiles. If enough responses are generated, a *t*-test will be run against the above variables, by gender.

If participants who are members of a *Clan* are willing to rate the leadership style of their *Clan Commander*, they will be directed to the Rater portion of the MLQ to complete an evaluation their *Clan Commander*. This *Clan* based survey will be used to explore the extent to which the *Commander* and *Deputy Commander*'s individual MLQ scores are reflected in the scores of their clanmates. This *Clan* based MLQ will be used to help validate and provide context for the individual ratings gathered generally.

Summary

Using the multiplayer online strategy game World of Tanks, and the MLQ, this will be a quantitative correlational study involving a discovery approach from a quantitative primary, quantitative first perspective. The research will include Internet-based survey in which participants will complete a demographic and leadership questionnaire to create a leadership profile.

The leadership profiles will be correlated with their game-based performance using the WN7 ranking scale, their attainment of leadership positions in a *Clan*, and demographic

characteristics to explore the extent to which traditional leadership styles are linked to successful achievement in collaborative online games and whether there are consistent leadership style profiles associated with tiers of game performance rankings.

Chapter 4: Results

The purpose of this study was to explore the extent to which player performance in the multiplayer online video game World of Tanks is correlated with individual leadership styles, as measured by the MLQ. The goal of the research was to evaluate a range of demographic characteristics and game performance metrics to determine the extent to which they correlated with MLQ measured player leadership styles.

This chapter describes the results of the systematic analysis of the findings of World of Tanks players' responses to an online version of the MLQ and comparisons with a range of player performance data drawn from both player reports and publicly available player performance data gleaned from the World of Tanks website.

While the research questions were addressed using the anticipated available data, there were additional, unanticipated data findings which were also relevant and consequently evaluated as well. In advance of the presentation of the findings, the research questions will be restated, an overview of the data collection process presented, and the study participants described.

Restatement of the Research Questions

The research questions for this study are:

1. To what extent are traditional leadership styles linked to successful achievement in collaborative online games as measured by the MLQ?
2. Are there consistent leadership style profiles as measured by MLQ associated with tiers of game performance rankings, as measured by the WN7 scale?

Description of the Data Gathering Process

Survey data gathering process. A custom version of the Multifactor Leadership Questionnaire was created online using the Mindgarden Transform survey tool. The custom form included 13 demographic questions including age, gender, level of education, and experience playing online games, as well as a range of questions about player performance in the game World of Tanks. A full copy of the questionnaire is included in Appendix A.

To recruit participants, a forum message was created and posted to the World of Tanks North American Online Forum. The forum posting included a summary of the study, as well as the letter of informed consent. A link directly to the survey was provided in the posting.

While the initial forum post generated about 30 responses, it became clear after several hours that due to the volume of posts regularly generated on this forum, the request for participation was going to be buried and quickly become stale. Although several attempts were made to *bump* or update the post, after the initial flurry of interest, the pace of participation trailed off dramatically.

As a result, over the next several weeks direct messages were also sent to several hundred players using the public player messaging feature on the World of Tanks site. Direct messages generated more participants, but the volume was never strong. In a further effort to increase participation, after several more weeks, additional posts were made on the World of Tanks Asia/Pacific and European Online Forums as well. These posts also generated some initial bursts of interest, but also became stale quickly. Requests were also made to *Clan Commanders* and Deputy Commanders to encourage members of their *Clans* to also take the survey. Commanders and Deputy Commanders contacted represented almost 8000 potential respondents in their *Clans*.

Approximately 750 total direct messages were sent along with multiple postings in three online forums. In addition, a number of *Clan Commanders* also requested that their *Clan* members complete the survey. Ultimately, a total of 620 individuals visited the survey website and began the survey but only 226 respondents completed it. Of the 226 completions 4 responses were either nonsensical or clearly insincere, leaving 222 responses used for analysis.

Description of the Respondents

The 222 respondents represented 27 countries, with 61% drawn from the United States. Respondents were overwhelmingly male with only 6 of 222, or 3%, female. However all but two of the female respondents held leadership positions with one female serving as a *Clan Commander*, one a *Deputy Commander* and two as *Company Commanders*.

Participants represented a wide range of individuals encompassing 90 different job types from CEOs and accountants to civil servants, computer programmers, engineers, geologists, landscapers, legal assistants, lawyers, millwrights, music teachers, paramedics, plumbers, receptionists, sales professionals, retirees, unemployed individuals and disabled veterans among others.

There was healthy distribution by age with thirty-seven percent falling in the 41-55 range and twenty-five percent in the 25-40 range, twenty-one percent in the 18-24 range,11% in the 55+ ranges, rounded out by fewer than five percent in the 18 or under range.

Almost 30% possessed a bachelor's degree while 15% possessed either a masters or doctorate degree. Almost 40% responded with high school as their highest level of education while 18% had earned an Associate's degree. For the United States, this appears to be a slightly more educated population than the population at large. Table 4 compares educational attainment of male respondents from the United States with the male data from the detailed tables from the

Educational Attainment in the United States: 2013 (United States Census Bureau, 2013). Male data were used as only three respondents from the United States were female.

Table 4

Educational Attainment of Survey Respondents

Highest Educational Attainment	Survey Respondents		US
	Number	Percentage	Population
Secondary (High) School	50	39%	30%
Associates Degree	24	19%	8%
Bachelor's Degree	36	28%	18%
Master's Degree	15	12%	7%
Doctorate	2	2%	2%
Total	127		

Participants represented 130 different *Clans*. Of the total requests from *Clan Commanders*, one clan had a total of 11 participants and one clan each had five, four and three additional participants. A total of 61 participants completed the rater survey, rating 42 separate *Commanders*. Of the 42 *Commanders* rated, only nine completed the self-rating which allowed for a comparison of their scores with *Clan* member ratings. A full demographic breakdown is included in Table 5.

Inclusion of Additional Data Elements

During gameplay, World of Tanks collects a large amount of individual player data from the macro wins and losses down to the micro level of shots fired, hits, misses, etc. World of Tanks displays a small fraction of this data in aggregate form for each player on a page available both to the player as well as to anyone with the player's gamer tag or username (see Figure 6).

During the course of the data collection phase, player-created web browser scripts were discovered that enabled the researcher to gather a host of additional data elements from this

Table 5

Demographic breakdown of survey respondents

Participants	Count
Started Survey	620
Completed Individual Survey	226
Completed Rater Survey	61

Gender	Count
Male	216
Female	6

Age	Count
<18	14
18-24	46
25-40	56
41-55	24
55+	24

Education	Count
Secondary (High) School	83
Associates Degree	39
Bachelor's Degree	62
Master's Degree	25
Doctorate	6

Countries	27
Australia	7
Brasil	2
Canada	26
China	2
Czech Republic	1
England	3
Finland	2
France	2
Germany	3
Hungary	2
Ireland	1
Japan	1
Lithuania	1
Malaysia	2
Netherlands	1
New Zealand	7
Norway	1
Philippines	2
Poland	2
Russia	1
Serbia	1
Singapore	5
Switzerland	1
Taiwan	1
The Netherlands	1
United Kingdom	4
USA	136

Clan Participant	Count
Yes	183
No	39

Clan Position	Count
Commander	26
Deputy Commander	31
Company Commander	19
Diplomat	3
Treasurer	1
Recruiter	12
Soldier	84
Recruit	7

Years Playing W.O.T.	Years
< 1 Year	19
1 Year	29
2 Years	60
3 Years	88
4 Years	14
> 4 Years	10

Years Playing MMO	Years
< 1 Year	5
1-3 Years	39
4-6 Years	41
7-10 Years	37
> 10 Years	95

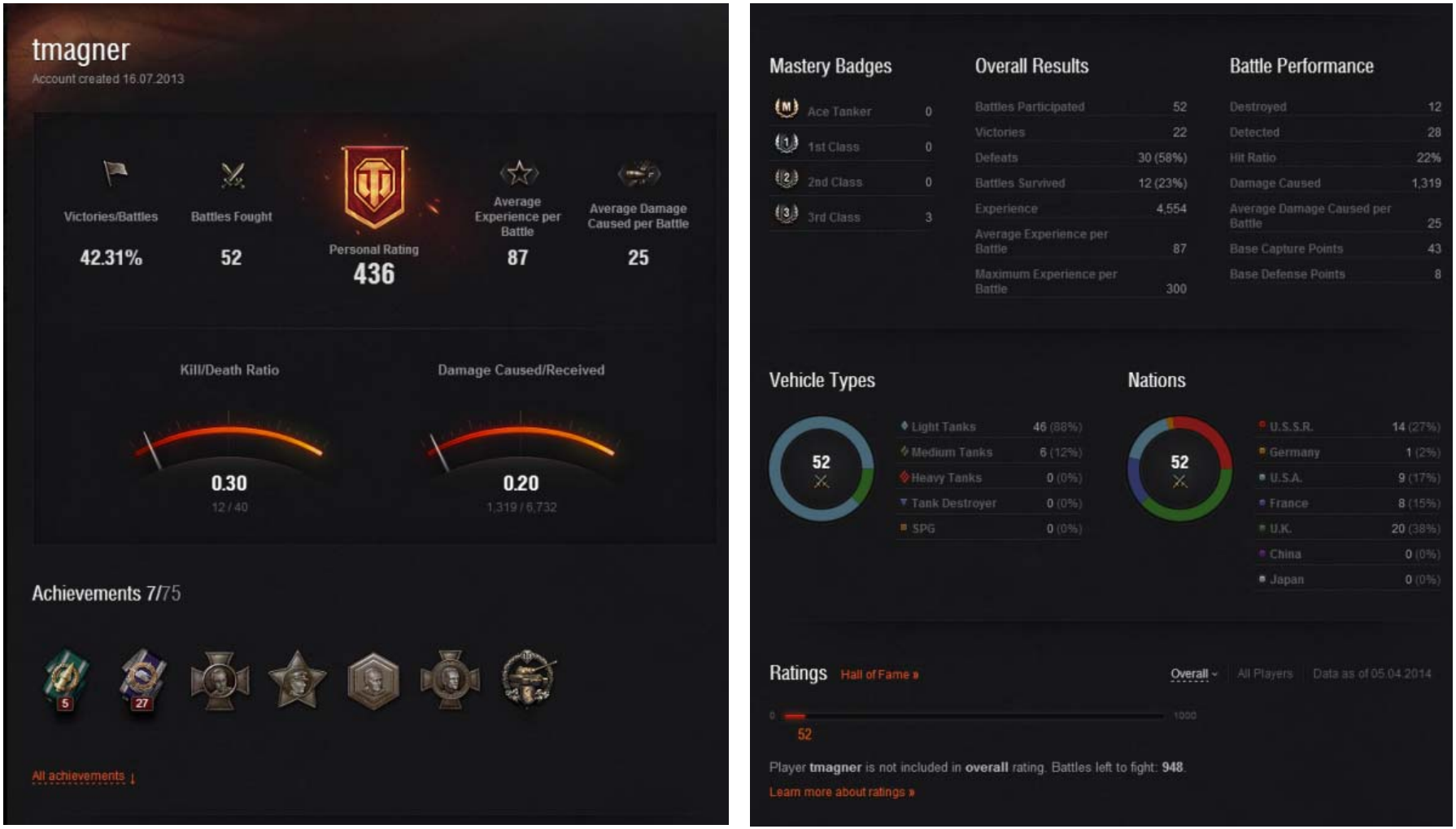
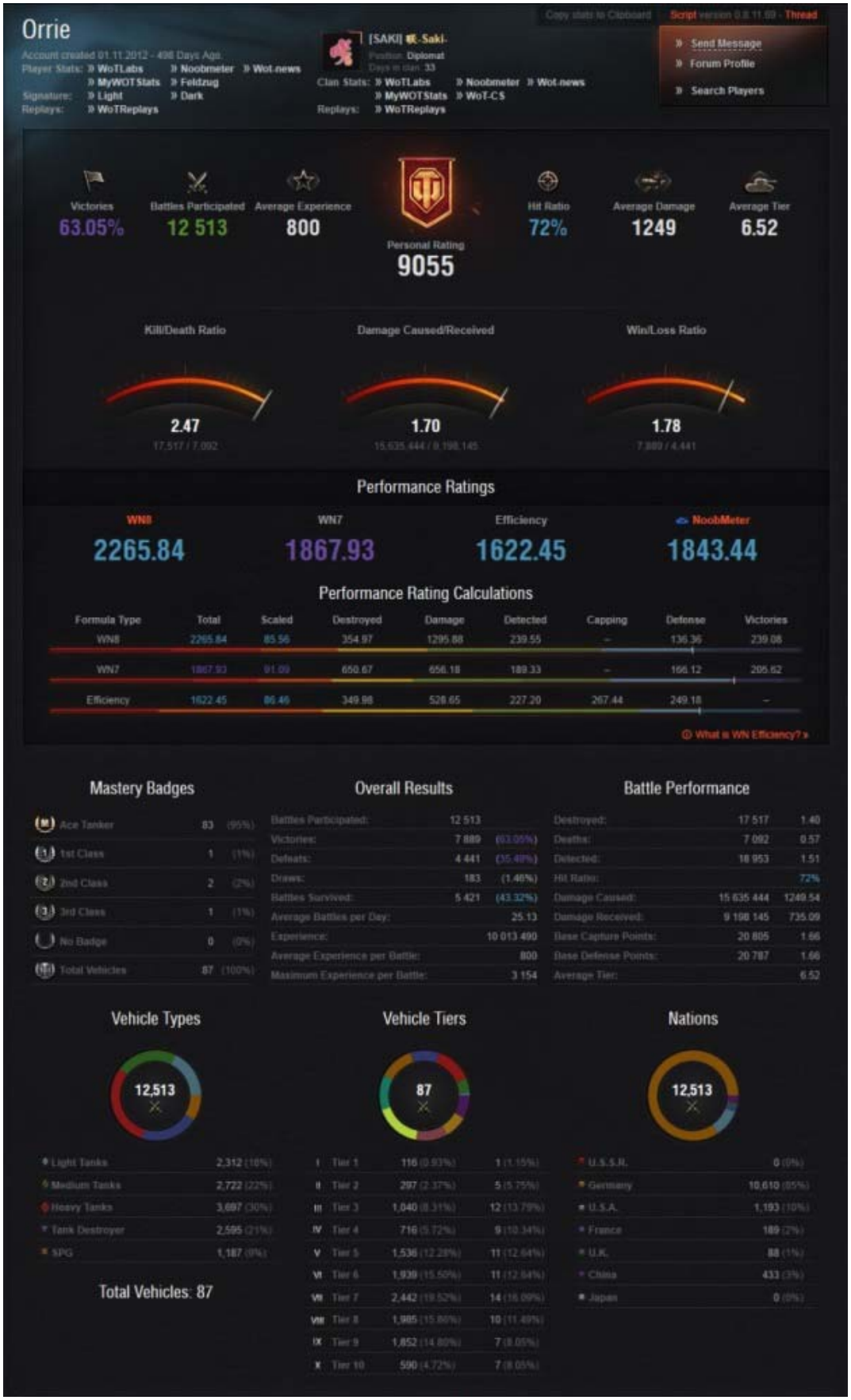


Figure 6. World of Tanks standard player performance screen. From World of Tanks, http://worldoftanks.com. Copyright 2010–2014 Wargaming.net All Rights Reserved.


Orrie
Account created 01.11.2012 - 406 Days Ago.
Player Stats: » WoTLabs » Noobmeter » Wot.news
» MyWOTStats » Feldzug
Signature: » Light » Dark
Replays: » WoTReplays
[SAKI] -Saki-
Position: Diplomat
Days in clan: 33
Clan Stats: » WoTLabs » Noobmeter » Wot.news
» MyWOTStats » WoT-CS
Replays: » WoTReplays
» Send Message
» Forum Profile
» Search Players
Victories
63.05%
Battles Participated
12 513
Average Experience
800
Personal Rating
9055
Hit Ratio
72%
Average Damage
1249
Average Tier
6.52
Kill/Death Ratio
2.47
17,517 / 7,092
Damage Caused/Received
1.70
15,635,444 / 9,198,145
Win/Loss Ratio
1.78
7,889 / 4,441
Performance Ratings
WN8
2265.84
WN7
1867.93
Efficiency
1622.45
NoobMeter
1843.44
Performance Rating Calculations
Formula Type Total Scaled Destroyed Damage Detected Capping Defense Victories
WN8 2265.84 85.56 354.97 1295.88 239.55 – 136.36 239.08
WN7 1867.93 91.09 650.67 656.18 189.33 – 166.12 205.62
Efficiency 1622.45 86.46 349.98 528.65 227.20 267.44 249.18 –
What is WN Efficiency? »
Mastery Badges
Ace Tanker 83 (95%)
1st Class 1 (1%)
2nd Class 2 (2%)
3rd Class 1 (1%)
No Badge 0 (0%)
Total Vehicles 87 (100%)
Overall Results
Battles Participated: 12 513
Victories: 7 889 (63.05%)
Defeats: 4 441 (35.49%)
Draws: 183 (1.46%)
Battles Survived: 5 421 (43.32%)
Average Battles per Day: 25.13
Experience: 10 013 490
Average Experience per Battle: 800
Maximum Experience per Battle: 3 154
Battle Performance
Destroyed: 17 517 1.40
Deaths: 7 092 0.57
Detected: 18 953 1.51
Hit Ratio: 72%
Damage Caused: 15 635 444 1249.54
Damage Received: 9 198 145 735.09
Base Capture Points: 20 805 1.66
Base Defense Points: 20 787 1.66
Average Tier: 6.52
Vehicle Types
12,513
Light Tanks 2,312 (18%)
Medium Tanks 2,722 (22%)
Heavy Tanks 3,697 (30%)
Tank Destroyer 2,595 (21%)
SPG 1,187 (9%)
Total Vehicles: 87
Vehicle Tiers
87
I Tier 1 116 (0.93%) 1 (1.15%)
II Tier 2 297 (2.37%) 5 (5.75%)
III Tier 3 1,040 (8.31%) 12 (13.79%)
IV Tier 4 716 (5.72%) 9 (10.34%)
V Tier 5 1,536 (12.28%) 11 (12.64%)
VI Tier 6 1,939 (15.50%) 11 (12.64%)
VII Tier 7 2,442 (19.52%) 14 (16.09%)
VIII Tier 8 1,985 (15.86%) 10 (11.49%)
IX Tier 9 1,852 (14.80%) 7 (8.05%)
X Tier 10 590 (4.72%) 7 (8.05%)
Nations
12,513
U.S.S.R. 0 (0%)
Germany 10,610 (85%)
U.S.A. 1,193 (10%)
France 189 (2%)
U.K. 88 (1%)
China 433 (3%)
Japan 0 (0%)

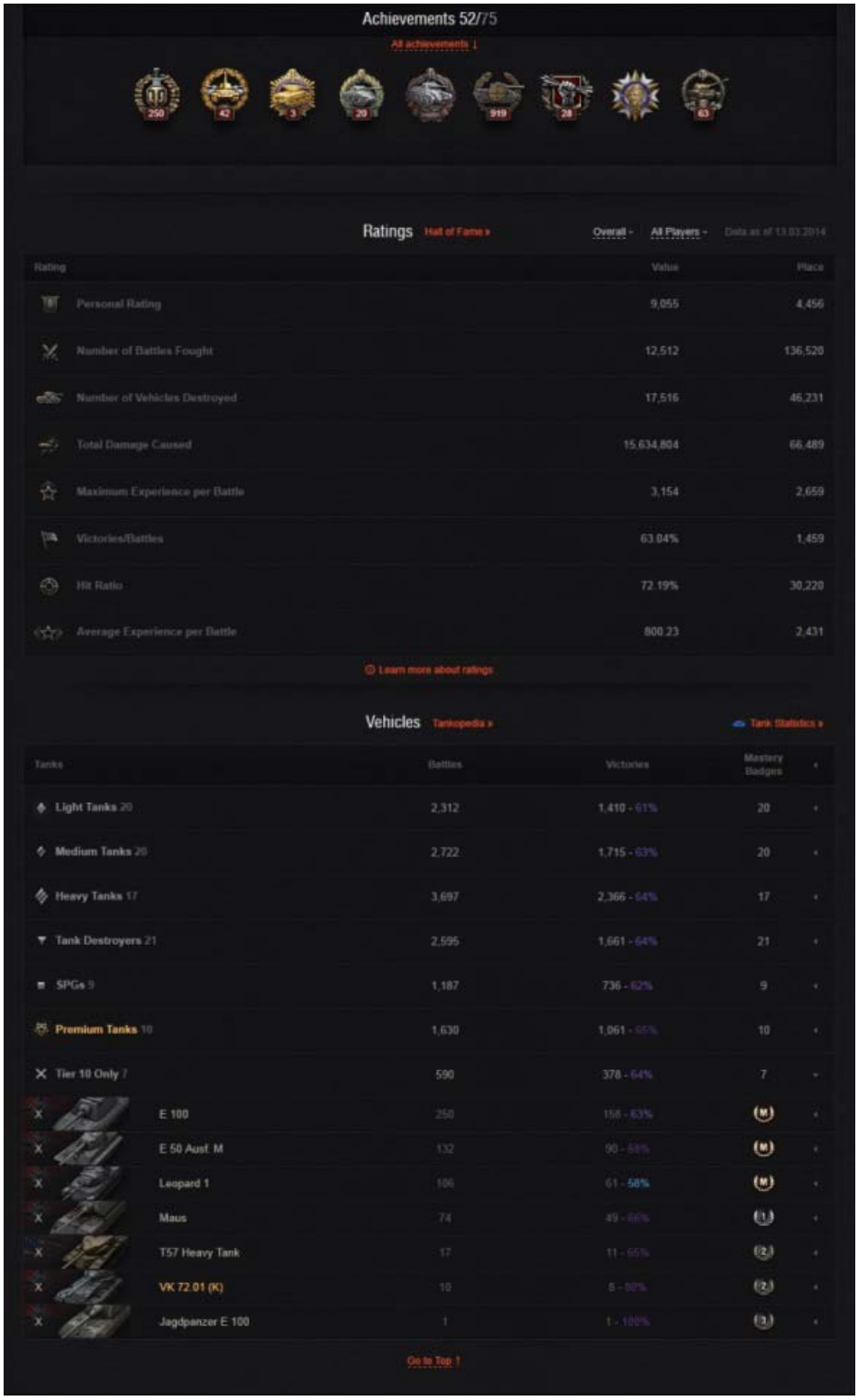


Figure 7. Enhanced World of Tanks player performance screen. From World of Tanks http://worldoftanks.com. Copyright 2010–2014 Wargaming.net. All Rights Reserved.

publicly available individual game data. In much the same way that World of Tanks users created the WN7 scoring methodology, a mechanism called WoTStatScript was created by Orrie (2013) to enable viewing of significantly more of a player's vital statistics that are collected by the game and made available through the game's application programming interface (API).

Orrie's script allows a much richer view of a player's performance statistics (see Figure 7). As this page was accessible to the researcher, additional data such as WN8 scores, Number of Battles played and the date the player joined World of Tanks were collected and included in the analysis. The updated WN8 score is an evolution of the WN7 scoring methodology and sought to improve on the WN7 in a number of ways (Praetor77 et al., 2014). Because WN7 and WN8 are similar but distinct, both were included in the analysis.

Overview of Data in Response to Research Question 1

The first research question was: to what extent are traditional leadership styles linked to successful achievement in collaborative online games as measured by the MLQ? This question was answered by a correlational analysis of demographic factors drawn from the demographic questionnaire, indicators of game performance drawn from the available game data and answers to the MLQ from responses to the online questionnaire.

From the initial analysis there were a number of significant correlations at the $p < .01$ and .05 levels between *Clan* Position (the role an individual plays in their game group, called a *Clan*) and the 5I's of Transformational Leadership ($r = -.224$, $n = 179$, $p = .001$) including three of its constituent components; Idealized Influence Attributes ($r = r = -.239$, $n = 178$, $p = .001$), Idealized Influence Behaviors ($r = -.171$, $n = 179$, $p = .022$), and Inspirational Motivation ($r = -.232$, $n = 179$, $p = .002$). *Clan* Position was also correlated with Contingent Reward ($r = -.184$, $n = 179$, $p = .013$), and Satisfaction with the Leadership ($r = -.171$, $n = 178$, $p = .023$) and negatively

correlated with Laissez Faire leadership style (r =.157, n =179, p =.036). (See Table of Critical Values in Table 6)

The demographic characteristic of Age was significantly correlated with one of the 5I's, Individual Consideration (r =.250, n =217, p =.010), while level of Education was significantly correlated with two of the 5I's; Intellectual Stimulation (r =.206, n =211 p =.003) and Individual Consideration (r =.141, n =211, p =.04). None of the other game related performance attributes such as WN7 scores were significantly correlated with any leadership style components. Number of Battles played was negatively correlated with the Management by Exception: Passive (r =-.211, n =217, p =.002) and Laissez-Faire (r =.157, n =179, p =.036) leaderships styles while Age was negatively correlated with the Management by Exception: Passive (r =-.203, n =217, p =.003) and Laissez-Faire (r =-.192, n =217, p =.005) leadership styles indicating that younger and less experienced players tended toward these leadership styles. Number of Battles was also positively correlated with the component Extra Effort (r =-.143, n =214, p =.037).

Despite the inclusion of the additional data elements, none of the other game related performance attributes such as WN7, WN8 scores, Efficiency or WinRate were significantly correlated with any of the composite leadership styles.

However, all of the data elements were significantly correlated with at least one or more of the component questions. In addition, several questions significantly correlated with multiple data elements. Of the 45 questions in the self-survey, 73% were significantly correlated with at least one data point.

Results in Answer to Research Question 1

An initial bi-variate Pearson Correlation was undertaken (see Appendix C). The Likert scale used in the data collection for the clan roles was in ascending order of leadership position

Table 6

Pearson Product-Moment Correlation Coefficient Table of Critical Values

df = n – 2	Level of significance for two-tailed test		
n = # of pairs of data	0.1	0.05	0.01
1	0.988	0.997	0.9999
2	0.9	0.95	0.99
3	0.805	0.878	0.959
4	0.729	0.811	0.917
5	0.669	0.754	0.874
6	0.622	0.707	0.834
7	0.582	0.666	0.798
8	0.549	0.632	0.765
9	0.521	0.602	0.735
10	0.497	0.576	0.708
11	0.476	0.553	0.684
12	0.458	0.532	0.661
13	0.441	0.514	0.641
14	0.426	0.497	0.628
15	0.412	0.482	0.606
16	0.4	0.468	0.59
17	0.389	0.456	0.575
18	0.378	0.444	0.561
19	0.369	0.433	0.549
20	0.36	0.423	0.537
25	0.323	0.381	0.487
30	0.296	0.349	0.449
35	0.275	0.325	0.418
40	0.257	0.304	0.393
45	0.243	0.288	0.372
50	0.231	0.273	0.354
60	0.211	0.25	0.325
70	0.195	0.232	0.302
80	0.183	0.217	0.284
90	0.173	0.205	0.267
100	0.164	0.195	0.254
120	0.15	0.178	0.232
150	0.134	0.159	0.208
200	0.117	0.139	0.182
300	0.095	0.113	0.148
∞	0.073	0.087	0.146

(e.g. 1 = Clan Commander , 2 = Deputy Commander…to… 8 = Recruit) while the MLQ scale was on a 0-4 scale with 4 being the highest. Consequently the negative correlational data indicates that there is a positive relationship between higher leadership roles such as *Clan Commanders* (lower numbers) and higher scores in the 5I's of Transformational Leadership (higher numbers). As such, going forward, correlations between *Clan* Position and MLQ responses will be positive correlations unless otherwise stated.

5I's of Transformational Leadership. The 5I's of Transformational Leadership are Idealized Influence Attributes (IIA), Idealized Influence Behaviors (IIB), Inspirational Motivation (IM), Intellectual Stimulation (IS) and Individual Consideration (IC).

From the initial analysis there were a number of significant correlations between *Clan* Position (the role an individual plays in their game group, called a *Clan*) and the 5I's of Transformational Leadership (r =-.224, n =179, p =.001) as well as with three of its constituent components: Idealized Influence Attributes (IIA) (r =-.239, n =178, p =.001), Idealized Influence Behaviors (IIB) (r =-.171, n =179, p =.022), and Inspirational Motivation (IM) (r =-.232, n =179, p =.002).

The MLQ identifies five attributes (known as the 5I's) which are characteristic of the transformational leader, included are indications of significant correlations between *Clan* Position and the component questions for each of the 5I's:

Idealized Influence (Attributes and Behaviors): Bass and Avolio (2004) indicate that these leaders are admired, respected, and trusted and that these leaders earn credit with their followers by considering the needs of their followers over their own needs. These leaders share risks with followers and demonstrate consistency in conduct with ethics, principles, and values.

1. Idealized Attributes (IA): These correlations indicate that those with greater leadership positions were more likely to report that they instilled pride in others (r =-.165, n =154, p =.041), went beyond self-interest (r =-.151, n =178, p =.045), and displayed power and confidence (r =-.220, n =172, p =.004).

2. Idealized Behaviors (IB): The correlation with Idealized Influence Behaviors (IIB) was significant (r =-.171, n =179, p =.022). With IIB, those with greater leadership positions indicated that they had a strong sense of purpose (r =-.152, n =178, p =.043) as well as a collective sense of mission (r =-.229, n =173, p =.002).

3. Inspirational Motivation (IM): Bass and Avolio (2004) indicate that these leaders behave in ways that motivate those around them by providing meaning and challenge, they arouse individual and team spirit and display enthusiasm and optimism. The leader offers a compelling vision of the future that they encourage followers to embrace.

For Inspirational Motivation, that those with greater leadership positions tended to report that were more optimistic about the future (r =-.264, n =178, p =.000), enthusiastic about the task to be performed (r =-.251, n =177, p =.001) and confident that the stated goals would be met (r =-.197, n =177, p =.009).

4. Intellectual Stimulation (IS): For Bass and Avolio (2004) these leaders stimulate innovation and creativity among their followers by questioning assumptions, reframing problems, and approaching old situations in new ways. Individuals are included in problem solving, and their contributions are encouraged and valued.

Although those in higher leadership positions tended to seek differing perspectives when solving problems (r =-.160, n =177, p =.033), the correlation was at the p >.05 level, and

because none of the other elements was significantly correlated, there was not a significant correlation between the Intellectual Stimulation component and *Clan* Position.

5. Individual Consideration (IC): Bass and Avolio (2004) indicate that these leaders act as a coach or mentor focusing on developing the potential of each individual by creating new learning opportunities and creating a supportive climate in which individual differences are recognized. The analysis indicated that those with greater leadership roles reported teaching or coaching followers (r =-.226, n =179, p =.002), but the data did not correlate with the other elements of IC and so the Individual Consideration group was not correlated with *Clan* Position.

The MLQ also identifies four transactional leadership styles: Contingent Reward, Manage by Exception: Active (MBEA), Manage by Exception: Passive (MBEP), and Laissez Faire (LF). There were no significant correlations between *Clan* Position and either Manage by Exception leadership style.

Clan Position was correlated with the component of transactional leadership Contingent Reward (r =-.184, n =179, p =.013) and with two of the four elements

1. Contingent Reward (CR): According to Bass And Avolio (2004) contingent reward leadership clarifies expectations and offers recognition when goals are achieved. This clarification and recognition should result in individuals and groups achieving expected levels of performance.

These results indicate that those with higher leadership positions tended to make a clear connection between performance and rewards (r =-.170, n =172, p =.026) and to express satisfaction when expectations were met (r =-.236, n =179, p =.001). As World of Tanks includes a reward-based framework of points, achievements and gold, it is not surprising that leaders would exhibit some of the elements of this transactional leadership style.

Clan Position was positively correlated (in this case meaning a negative relationship) with Laissez Faire (r =.157, n =179, p =.036). The result indicates that those in those in higher leadership positions were more likely to make decisions while those in lower leadership positions were more likely to avoid making them (r =.245, n =175, p =.001). Especially in the fast paced game environment of World of Tanks, quick and decisive decision making is a key success factor.

Clan Position was also significantly correlated with all three of the outcomes of leadership, Extra Effort, Effectiveness and Satisfaction with the Leadership.

1. Extra Effort (EE): For EE those in higher leadership positions tended to report increasing the desire to succeed in their followers (r =-.202, n =170, p =.008).

2. Effectiveness (EF): For EF, those with greater leadership positions reported their effectiveness as a group representative (r =-.188, n =167, p =.015) and overall indicated that their group was effective (r =-.214, n =172, p =.005).

3. Satisfaction with the Leadership (SAT): For SAT leaders indicated a belief that their leadership style was satisfying to their followers (r =-.221, n =161, p =.005).

Taken together these significant correlations indicate that *Clan* leaders were more likely to identify with the components of Transformational Leadership rather than Transactional Leadership. That *Clan* leaders saw themselves as providing vision, empowerment, and active intervention, as well as holding members accountable for expectations, provides an initial connection between real-world leadership constructs and the desire to lead in an online context. This is significant because only a few of those in *Clan* leadership positions indicated that they held a traditional leadership position in their job in the real world.

The data also indicated a positive correlation between the variable Number of Battles and the transactional leadership styles Management by Exception: Passive (r =-.211, n =215, p =.002) and Laissez Faire (r =-.168, n =215, p =.014).

For Management-by-Exception: Passive (MBEP) those with more battles correlated with delaying involvement until serious problems arise (r =-.197, n =212, p =.004) and until things go wrong (r =-.256, n =215, p =.000). This indicates that players with more battles tended to exhibit a more passive approach to problem solving and generally delay their involvement until a situation becomes serious. In the case of the game World of Tanks, surviving a tank battle often requires a combination of stealth, camouflage and the use of buildings and other obstructions to hide the tank. It could be that these correlations with delayed response are in fact a consequence of the patience necessary to be successful in the game context.

Number of Battles is also significantly correlated with the component Extra Effort (r =.143, n =214, p =.037) which indicates that those with greater battle experience reported that they got others to do more than expected and encouraged them to achieve higher levels of success.

The Number of Battles was significantly correlated with the demographic variable Hours Per Week spent playing video games (r =.275, n =211, p =.000) which is unsurprising given that it would take a significant number of hours per week to complete a large number of battles. Just as with Number of Battles, Hours Per Week was also correlated with Extra Effort (r =.147, n =217, p =.031) indicating that those with greater time playing got others to do more than expected.

The demographic variable Age was significantly correlated with a number of factors including Individual Consideration (r =-.250, n =217, p =.000), Management by Exception:

Active (r =-.227, n =217, p =.001), Management by Exception: Passive (r =-.203, n =217, p =.003) and Laissez Faire (r =-.192, n =217, p =.005). Age was positively correlated with Individual Consideration indicating that older players were more likely than younger players to report spending time teaching and coaching (r =.259, n =217, p =.000); were more likely to consider the needs and abilities of each individual (r =.175, n =216, p =.010) and/or were more likely to report helping others to develop their strengths (r =.142, n =213, p =.038).

Age was negatively correlated with Management by Exception: Active (r =-.227, n =217, p =.001), Management by Exception: Passive (r =-.203, n =217, p =.003) and Laissez Faire (r =-.192, n =217, p =.005) indicating that younger players were more likely to report behaviors aligned with more transactional leadership styles than did older players. For Management by Exception: Active, younger players indicated more often that they focused on their mistakes and failures (r =-.189, n =215, p =.005) and on not meeting the standards that were set (r =-.204, n =214, p =.003).

For Management by Exception: Passive, younger players tended to indicate more often that they waited until problems became serious (r =-.178, n =214, p =.009) or for things to go wrong before getting involved (r =-.246, n =217, p =.000) and reported that they also waited for problems to become chronic before they did so (r =-.238, n =211, p =.000). Further supporting the contention that patience and delay may be useful to success in World of Tanks, younger players tended to score higher than older players as discussed below.

For the Laissez Faire (LF) leadership style, younger players more often indicated that they were more likely to be absent when they were needed (r =-.158, n =212, p =.021) and that they delayed responding to pressing questions (r =-.184, n =214, p =.007).

Level of Education was strongly correlated (r =.206, n =211, p =.003) with one of the elements of the 5I's, Intellectual Stimulation (IS), indicating that those with higher levels of education reported that they were more likely to question their assumptions (r =.171, n =206, p =.014) and reported that they suggested new approaches for task completion (r =.218, n =208, p =.002). Each of these responses would be consistent with the skill sets such as continual questioning and divergent thinking, often associated with further education.

For the leadership element Effectiveness, those with greater educational attainment were more likely to indicate that they met others' job-related needs (r =.141, n =198, p =.088) and that the group they led was effective (r =.152, n =200, p =.054).

Despite the inclusion of the additional data elements, none of the other game-related performance attributes such as WN7, WN8 scores, Efficiency or WinRate were significantly correlated with any of the composite leadership styles.

Multiple regressions, including block-based regressions were run against all of the leadership styles and constituent leadership components but did not yield any additional significant correlations.

However, all of the data elements were significantly correlated with at least one or more of the component questions. *Clan* Position was significantly correlated with eighteen individual questions, Age with twelve, Number of Battles with seven, Education with five, and Years Playing World of Tanks with four. WN7, Average Win Rate, Average Efficiency, Years Playing Video Games, Hours Per Day and Hours Per Week playing Video Games were all significantly correlated with three questions each. (See Appendix D).

In addition, several questions significantly correlated with multiple data elements. Of the 45 questions in the self-survey, two questions correlated with five and four data points

respectively, seven questions correlated with three data points, nine questions correlated with two data points, thirteen questions correlated with one data point and eleven questions did not correlate with a single data point.

Clan Position (r =-.151, n =178, p =.045), Age (r =.170, n =216, p =.013), Years Playing World of Tanks (r =166, n =215, p =.015), Years Playing Video Games (r =-.142, n =212, p =.048) and Days Per Week spent playing video games (r =.135, n =216, p =.048) were significantly correlated with going beyond self-interest, indicating that *Clan* Leaders and those with more years of playing video games saw themselves putting the needs of the group first.

Clan Position (r =-.229, n =173, p =.002) was significantly negatively correlated, while WN8 (r =-.215, n =207, p =.002), WN7 (r =-.196, n =210, p =.004), Average WinRate (r =-.178, n =210, p =.010) and Average Efficiency (r =-.167, n =210, p =.015) were significantly correlated with having a collective sense of mission, indicating that while *Clan* Leaders tended to emphasize the importance of the collective mission, those with higher performance scores did not. In this instance, although it is possible to participate in a pre-set group in World of Tanks, the default mode puts players randomly on a team. As such, while team victory does accrue points to individual players, the WN8 and WN7 scores include substantially more individual performance elements, making a *collective sense of mission* something that *Clan* leaders would stress but that individual players would not necessarily be incentivized to do.

WN8 (r =-.172, n =209, p =.013), WN7 (r =-.171, n =212, p =.012), Average Efficiency (r =-.188, n =212, p =.006) and Years Playing Video Games (r =-.153, n =207, p =.028) were significantly negatively correlated with the idea of *If it ain't broke don't fix it* indicating that those with lower scores and fewer years playing games were more likely to delay response to solving problems. Similarly, Number of Battles (r =-.256, n =215, p =.000), Age (r =-.246, n

=217, *p* =.000), Hours Per Day (*r* =-.145, *n* =214, *p* =.033) and Hours Per Week (*r* =-.147, *n* =218, *p* =.030) spent playing video games were all significant negatively correlated with the idea of waiting for things to go wrong before getting involved, indicating that younger and less experienced players tend to delay taking action. Taken together, these patterns indicate that older, more experienced and more successful players were less likely to report being passive and more likely to be active in addressing challenges.

In looking at the questions that correlated with three data points each, younger, less experienced and players of lower rank were more likely to avoid making decisions (*Clan* Position [*r* =.245, *n* =175, *p* =.001], Battles [*r* =-.205, *n* =211, *p* =.003], Age [*r* =-.180, *n* =212, *p* =.008]) while older more experienced leaders tended to report that they spent time coaching and teaching others (*Clan* Position [*r* =-.226, *n* =179, *p* =.002], Battles [*r* =.160, *n* =215, *p* =.019], Age [*r* =-.259, *n* =217, *p* =.000]). Similarly, those in leadership positions who spent more time playing video games tended to see themselves as using satisfying leadership methods (*Clan* Position [*r* =-.221, *n* =161, *p* =.005] Hours Per Day [*r* =.163, *n* =192, *p* =.024] and Hours Per Week [*r* =.166, *n* =196, *p* =.020] spent playing video games) and heightening follower's desire to succeed (*Clan* Position [*r* =-.202, *n* =170, *p* =.008], Number of Battles [*r* =.140, *n* =201, *p* =.048], Hours Per Day [*r* =.217, *n* =201, *p* =.002] and Hours Per Week [*r* =.206, *n* =204, *p* =.003] spent playing video games). Those in leadership positions with higher performance scores also tended to see themselves as leading an effective group (*Clan* Position [*r* =-.214, *n* =171, *p* =.005], WN7 [*r* =.146, *n* =207, *p* =.036], Average Efficiency [*r* =.151, *n* =207, *p* =.030]). Younger, less experienced players tended to focusing on their mistakes and failures (Age [*r* =-.285, *n* =216, *p* =.000], Battles [*r* =-.225, *n* =214, *p* =.001], Years Playing World of Tanks [*r* =-.189, *n* =215, *p* =.005]).

Age was also significantly correlated with eight of the other demographic variables. It was positively correlated with Number of Battles (r =.507, n =214, p =.000), and the number of years spent playing World of Tanks (r =.139, n =215, p =.042) and video games (r =.169, n =212, p =.014), as well as the number of Days per Week playing video games, indicating that older players had been playing longer and playing more. However, Age was negatively correlated with the player performance elements WN7 (r =-.261, n =217, p =.000), WN8 (r =-.273, n =214, p =.000), and WinRate (r =-.271, n =217, p =.000), indicating that younger players tended to be more successful at the game (See Appendix G). This finding correlates with Thompson et al.'s (2014) findings that age-related slowing of within-game response times begins at 24 years of age. While, Thompson et al. (2014) found that expertise and heightened skill levels did not make up for this decline, the World of Tanks data does show that more years playing both video games in general and World of Tanks specifically, were positively correlated with higher WN8, and in the case of video games in general with higher WN7 scores. While these age and performance correlations are at the p =.05 level, the direct correlations between Age and WN7 and WN8 performance scores are at the more significant p =.01 level.

Taken together, these data indicate that while younger players tended to outperform older ones, younger players tended to be more passive, less decisive and to focus on mistakes and failures while older and more experienced players tended to focus on helping others develop strengths, teaching and coaching, going beyond self-interest and focusing on individuals' needs, abilities and aspirations.

Interestingly, there was no significant correlation between Age and *Clan* Position the implications of which are discussed below.

Data in Response to Research Question 2

The second research question was: are there consistent leadership style profiles as measured by MLQ associated with tiers of game performance rankings, as measured by the WN7 scale? While there were similar patterns in responses across all player ranges, there were no consistent leadership styles linked to player performance rankings evident from the data collected (See Appendix E).

If they were members of a *Clan*, respondents were also offered the opportunity to rate their *Clan Commander* or *Deputy Commander*. Sixty-one participants completed the rater portion of the survey rating 27 separate *Commanders* and 15 *Deputy Commanders*. Nine of the rated *Commanders* or *Deputy Commanders* also completed the individual survey. On average those completing the rater portion of the survey rated their Commander or Deputy Commander's leadership style more favorably than the Commander or Deputy Commander rated himself or herself.

Results in Answer to Research Question 2

Data were examined to determine whether there were consistent leadership style profiles as measured by MLQ associated with tiers of game performance rankings, as measured by the WN7 scale.

Because the cut off ranges in the MLQ are not consistent across the scale (for example, the 50% range for IIA is 3.0 on a 4.0 point scale, while for LF it is .5 on a 4.0 point scale) individual scores were normalized as percentages so that comparisons could be undertaken.

Scores were analyzed by Age, by *Clan* Position and by WN8 and WN7 Scores, but while there were similar patterns in responses across all player ranges, there were no consistent

leadership styles linked to player performance rankings evident from the data collected. (See Appendix E and F)

Commander and Deputy Commander Leadership Ratings

All participants in the study who were members of a *Clan* were offered the opportunity to complete the rater version of the MLQ to rate the leadership style of their Commander or Deputy Commander. Sixty-one participants completed the rater portion for 27 Commanders and 15 Deputy Commanders. Nine Commanders also completed the Individual portion of the survey allowing a comparison of the individual and rater ratings.

Of the nine Commanders, five had one *Clan* member rate them, while the other four had three, four, five and eleven raters respectively. On average, their *Clan* subordinates rated their Commander's leadership skills slightly more favorably than did the Commanders themselves, and those with the larger number of raters showing the largest gap in favorable ratings. There was no particular pattern or specific leadership style or style component in which Commanders were consistently either under or over scored by their raters.

Elements of *Clan* Position

Because of the links between *Clan* Position and leadership styles, additional analysis was undertaken to explore whether there were game performance factors that contributed to the attainment of *Clan* Position. World of Tanks does not place any game-related performance or longevity requirements on starting or participating in a *Clan*, although *Clans* may develop their own requirements and many do.

Bi-variate correlations and multiple regressions were run with *Clan* Position as the dependent variable, but there were no statistically significant correlations among any of the demographic and game-related variables. Because *Clan* Position appears unrelated to game

performance, longevity of participation or other factors, it appears that it is more likely linked to leadership traits developed outside of the game world.

Global Participation

World of Tanks operates on five different sets of servers worldwide: North America, Europe, Asia-Pacific, Russia and Korea. There are no links between the servers, and individuals need a separate account for each server. This study was initiated on the North American Server. Based on recommendations discussed below, research was also carried out on the European and Asia-Pacific servers. Altogether the European server accounted for 7% of participants while Asia-Pacific accounted for 9%.

While participants on the European and Asia-Pacific Servers were younger on average than the North American participants, there were no significant differences among the MLQ responses across the servers with regard to leadership styles. Analyzing the data using only North American responses had no effect on the existence or significance of any correlations.

Participants on the European Server tended to score consistently slightly higher on the transactional leadership styles of Contingent Reward, and Management by Exception Passive and Active, but not to a significant degree. The only two questions in which there were wide differences in responses that approached one standard deviation from the mean involved re-examining critical assumptions and treating followers as individuals. In both cases the European Server participants' scores were higher than those on the other servers.

Summary of Results

A series of correlational analyses of demographic factors, indicators of game performance and answers to the MLQ were undertaken to answer the first research question: to what extent is successful achievement in collaborative online games linked to traditional

leadership styles as measured by the MLQ? A number of significant correlations were found between *Clan* Position the 5I's leadership style and three of its constituent components: Idealized Influence Attributes, Idealized Influence Behaviors, and Inspirational Motivation and the three outcomes of leadership: Extra Effort, Effectiveness and Satisfaction with the Leadership. *Clan* Position was also correlated with the Transactional Leadership Style, Contingent Reward, and the component Satisfaction with Leadership. *Clan* Position was also negatively correlated with the Laissez Faire leadership style.

The demographic characteristic of Age was significantly correlated with one of the 5I's, Individual Consideration, while level of Education was significantly correlated with two of the 5I's; Intellectual Stimulation and Individual Consideration. None of the other game-related performance attributes such as WN8 or WN7 scores were significantly correlated with any of the 5I's or the Transactional leadership styles.

Both the Number of Battles performance characteristic and the Age demographic characteristic were negatively correlated with the Management by Exception: Passive and Laissez-Faire leadership styles. Number of Battles was also positively correlated with the component Extra Effort.

Despite the inclusion of the additional data elements such as the WN8 score, none of the other game related performance attributes such as WN7, Efficiency or WinRate were significantly correlated with any of the composite leadership styles or their components.

However, all of the data elements were significantly correlated with at least one or more of the component questions. In addition, several questions significantly correlated with multiple data elements. Of the 45 questions in the self-survey, 73% were significantly correlated with at least one data point.

The second research question was: are there consistent leadership style profiles as measured by MLQ associated with tiers of game performance rankings, as measured by the WN7 scale? While there were similar patterns in responses across all player ranges, there were no consistent leadership styles linked to player performance rankings evident from the data collected.

Sixty-one individual *Clan* members also rated their Commander or Deputy Commanders and while raters on average rated their leaders more favorably than the leaders did themselves, there was no consistent pattern to the amount of over or under scoring.

No demographic or game-related variables appeared to influence individual progression up the *Clan* leadership hierarchy.

Chapter 5: Conclusions and Suggestions for Further Research

The purpose of this study was to explore the existence of relationships between player performance in multiplayer online video games as measured by available player performance metrics and traditional leadership styles as measured by the Multifactor Leadership Questionnaire.

In the study, the following research questions were considered:

1. To what extent are traditional leadership styles linked to successful achievement in collaborative online games as measured by the MLQ?
2. Are there consistent leadership style profiles as measured by MLQ associated with tiers of game performance rankings, as measured by the WN7 scale?

The results from this study did not demonstrate an unambiguous connection between performance in the online game World of Tanks and leadership styles but did point to a link between the attainment of leadership positions in the online gaming world and traditional leadership styles, suggesting numerous areas for future research.

This chapter compares what was found in the data with the literature, draws conclusions and identifies areas for further research. The research process also highlighted a number of advantages and challenges in pursuing Internet-based research, and provided some fresh insights into the significant amounts of publicly available gamer data as well as the importance of in-game participation to build credibility.

Brief Restatement of the Findings

Chapter Four found that there were a number of significant correlations between the characteristic *Clan* Position, the 5I's leadership style and three of its constituent components: Idealized Influence Attributes, Idealized Influence Behaviors, and Inspirational Motivation and

the three outcomes of leadership: Extra Effort, Effectiveness and Satisfaction with the Leadership. *Clan* Position was also correlated with the Transactional Leadership Style Contingent Reward. *Clan* Position was also negatively correlated with the Laissez Faire leadership style.

Several demographic characteristics including Age and Level of Education were significantly correlated with components of the 5I's Leadership Style. However, none of the other game related performance attributes such as WN8 or WN7 scores were significantly correlated with any of the 5I's or the Transactional leadership styles. Several characteristics including Number of Battles and Age were also significantly correlated with Transactional Leadership Styles, although age was negatively correlated. All of the data elements were significantly correlated with at least one or more of the 45 component questions from the survey, and most were significantly correlated with at least one variable. However, there were no consistent leadership styles found to be linked to player performance rankings in response to the second research question.

Chapter 4 also examined those participants who also rated their *Clan* leadership and found that raters on average rated their leaders more favorably than the leaders did themselves, but that no demographic or game-related variables appeared to influence individual progression up the *Clan* leadership hierarchy.

Significance of the Findings

While direct links between player performance scores and leadership styles were not found, the significant correlations between *Clan* Position and the 5I's Leadership Style and its component parts adds to the growing literature that demonstrates the connection between gaming and leadership in both the real and virtual worlds.

The number of and frequency of connections between both the demographic and performance data elements and the constituent questions provides an interesting base for further exploration concerning the exact nature of leadership in an online context as well as a baseline for continued examination of the elements of leadership that may manifest themselves in the context of a specific game.

Similarly, the data collection process enabled the collection of both individual data in the context of a group performance task, as well as group performance data. Such data collection is methodologically rare.

As highlighted earlier, the nature of a tank battle is more like *hide and seek* or *cat and mouse* than one of frontal assault. As a consequence, the game may in fact reward more cautious players or behavior that in another context may be seen as passive or prone to delay. It may be, as Thompson et al. (2014) and others have shown, that for certain games, twitch speed or the rapidity of decision–making are paramount, but for others, different behavioral patterns or certain elements of leadership are more valuable.

Lessons from Online Data Collection

This research also used significant amounts of publicly available player performance data and one of the most interesting and challenging aspects of this research was the online data collection process. The capability of computer technology to collect every input and output coupled with the culture of broad public access to information which has proliferated on the Internet, has created an explosion of incremental data points that, when aggregated and analyzed, can be used for performance evaluation, performance documentation and even predictive analytics.

In addition, the Internet itself has become not only a source of data, but a platform to collect data both directly and indirectly about a host of interactions within the confines of cyberspace. Never before has an environment been both the source of the experience and the source of the data about that experience to the extent that the Internet has become. From playing the game online, to recruiting study participants online, to surveying them online, to communicating with them online, to uncovering additional data about them online, the totality of this study relies on the proliferation and ubiquity of not just the Internet itself, but of the cultural constructs that the Internet has fostered.

As such, the implications and inferences of the data collection process discussed below may prove useful to future researchers as they explore not only game-based research, but all research wholly contained in cyberspace.

Advantages. The study benefited from a number of the advantages of Internet data collection outlined by Wood et al. (2004) including: the accessibility to gamers, and their proficiency in using the Internet; the ability the study to be administered to large scale sample quickly and efficiently; the facilitation of automated data inputting allowing large scale samples to be administered at a fraction of the cost of *pen and paper* equivalents; and a global pool of participants.

The use of an online survey provided the opportunity to reach a significant number of players who would have been inaccessible without the Internet. In addition, using the online survey tool allowed for daily access to the data to evaluate participation rates in real time. Online data collection also allowed a compiled version of all data to be available as soon as an appropriate number of responses was received. The fact that the data were natively digital meant

that it could be introduced into analytical tools immediately. The impact of the global pool of participants will be discussed below.

As recommended by Wood et al. (2004) the researcher also sought to "maximize the number of gamers who are likely to take part…by explaining in detail who the researchers are and why they are doing the research," (p. 512), including indicating that the researcher was associated with an established institution, due to Wood's observation that "researchers from established institutions have the advantage here in that they are usually identifiable and are more likely to follow a set of ethical guidelines than an individual working independently "(p. 513).

As Wood et al. (2004) observed, the researcher also found that "non-genuine responses become apparent at the analysis stage and tend to be in the form of exaggerated answers" and that "non-genuine responses tend to be inconsistent" (p. 513). For this study there were only three responses that were clearly non-genuine and easily excluded.

Challenges. The study was hampered by the challenges inherent in online data collection, particularly the reliance on the willingness of individuals to voluntarily participate as well as the tendency of individuals to abandon participation without a significant incentive or compelling reason to complete. The abandonment rate for this study, when participants begin but do not complete or submit the survey, was within an acceptable range, about 3:1, with 620 starting the survey but only 226 completing it.

Significant effort was expended over the course of more than thirty days to reach out to groups through World of Tanks Online Forum postings and to individuals directly using the World of Tanks private message feature, as well as by encouraging those who had completed the survey to reach out and recruit others, especially *Clan Commanders*.

The initial design for recruiting respondents called for posting participation requests in the World of Tanks Forum. However, this proved unexpectedly challenging due to the sheer number of Forum postings that occur in a given day. The Forum is an open threaded messaging board that enables players to communicate with one another through a public chat. The topics range from game related to just about anything. While there is a set of rules and the forums are loosely moderated by volunteers to enforce etiquette, the level of adhesion to the rules varies.

The World of Tanks Forum, like many open messaging boards on the Internet, is a robust mix of pleasant and helpful individuals alongside others who are angry, vulgar or generally spoiling for an argument. The number of respondents to a post keeps it closer to the top of the Forum, and given the number of new posts generated each day, the average amount of time a post will stay on the home page is usually measured in single hours. Because users are more likely to post to new or *fresh* posts, this constant movement means that it is very easy for a post to become *stale* or to be overlooked by players just logging in. *Bumping* or continuing to reply or respond in the post can keep it *hot* on the front page, but because the post is only considered *hot* if individuals other than the originator are commenting, it is difficult for a single individual to keep a post fresh. Support from the Forum moderators could have been helpful in *pinning* the post to the front page, but no such help was forthcoming despite repeated requests. This challenge necessitated alternative approaches to participant outreach discussed below.

Several participants also commented on the length of the survey instrument which likely also contributed to the abandonment rate.

Publicly Available Gamer Data

While the process of acquiring participants was challenging, the wealth of publicly available online data about each game participant allowed for the inclusion of a number of additional game-related variables unanticipated in the original design.

World of Tanks, like numerous other online games, generates massive amounts of player performance data. For many players, the collection of awards, medals and achievements, as well as game-related records such as battles fought, damage inflicted, tanks killed, percentage of battles survived, etc., is a key part of the allure of the game. The ability to compare oneself to other players across this range of metrics adds an additional level of competition as it allows individuals to *battle* each other numerically even if they have never competed on the field of play.

In World of Tanks, each player can see a basic range of his or her own statistics simply by searching his or her name on the World of Tanks website. Anyone can also see the basic statistics of any other player in the entire game world by simply typing their gamertag or username into the search field on the Players section of the Community site. Evaluating another player's performance is an important part of the *offline* competition among players and also serves as a ready reference for *Clan* members seeking to evaluate or validate a player interested in joining their *Clan*.

Many *Clans*, in fact, place certain performance metrics or achievement levels on those wishing to join their *Clan* (see Figure 14 for an example). This player performance search tool allows that validation to take place.

World of Tanks also makes all of these performance data freely available through their application programing interface (API). The API allows individuals to write scripts or programs

that collect and display even more data than the game company itself chooses to display. The WotStatScript created by Orrie (2013) , mentioned above, provides a huge variety of additional metrics for all players that can be viewed simply by adding the script to one's Internet browser. The difference between the standard view in Figure 6 and the enhanced view in Figure 7 above provides an interesting contrast. Not only is there substantially more data, but the representation is visually more compelling through the use of color bands.

In addition, there are many other ways in which statistics are publicized including websites dedicated to WoT statistics as well as numerous scripts that are available to add one's current stats profile to the signature in a forum post as in Figure 8.

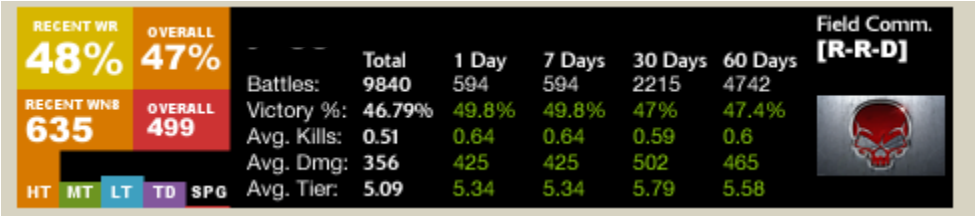


Figure 8. Player signature block with performance data. From http://forum.worldoftanks.com. Copyright 2010–2014 Wargaming.net. All rights reserved.

Unanticipated Outcomes

The importance of screen-cred. Each post in the World of Tanks online Forum includes the gamertag or username of the player posting the message but also includes some basic data about the player such as when they joined World of Tanks, the number of battles they have completed, the number of personal messages they have received and the number of warning points they have received from the moderators for infractions of the Forum rules (See Figure 9).

Figure 9. Forum post with embedded player data.From http://forum.worldoftanks.com. Copyright 2010–2014 Wargaming.net. All rights reserved.

Soon after posting the initial participant recruitment request, a number of respondents began to question the veracity of the request and the intentions of the researcher. Several participants who were interested in the research reached out directly to the researcher and began a series of private messaging threads. In several of these conversations it was suggested that individuals may be reluctant to participate in the survey because the researcher had not gained sufficient standing in the community by playing a sufficient number of games – all of which was apparent in the data included in the thread posting (See Figure 9).

Particularly because each individual's statistics are also publicly available, as discussed above, any potential respondent who wished was able to view the researcher's full performance and participation metrics simply by searching their gamertag. It was suggested that the researcher's lack of online credibility, or what the researcher terms *screen-cred*, could be a significant factor in reducing response rates. This confirmed an observation by Wood et al. (2004) that, "gamers may be suspicious of a researcher's motives and are likely to be reassured if

they are aware that the researcher is also a participant and has an understanding, and perhaps an appreciation, of what they are studying" (p. 514).

Subsequent to these conversations the researcher participated in over one hundred and fifty games across each of three servers to help establish a modicum of screen-cred for the community. Responses to the survey did improve subsequent to this uptick in game participation.

Efforts to improve participation. In the first few days after the first forum posting, there was an initial burst of participation with about 50 individuals completing the survey. Despite occasional *bumping*, as the post became stale, participation dropped of precipitously. In addition, the survey abandonment rate began to rise settling in at a rate of close to 3:1, within an acceptable the response range.

After several days of minimal participation, the researcher began looking for other ways to reach potential participants and recognized that it was possible to directly message individual players through the *Find a Player* feature on the website, mentioned above. In addition, the site also lists a *Hall of Fame* which ranks the top 1000 players in the game by a variety of metrics (see Figure 10). The list links directly to the stats page of each player, providing a detailed overview of their performance as well as the means to private message them. The site also provides a list of *Clans* along with a link to the player page of each *Clan* leader. It should be noted that players wishing to avoid receiving private messages can turn this feature off in their profile.

Using the Hall of Fame list, the *Clan Commander* list, as well as random searches of individual player names, the researcher privately messaged over 750 individuals directly

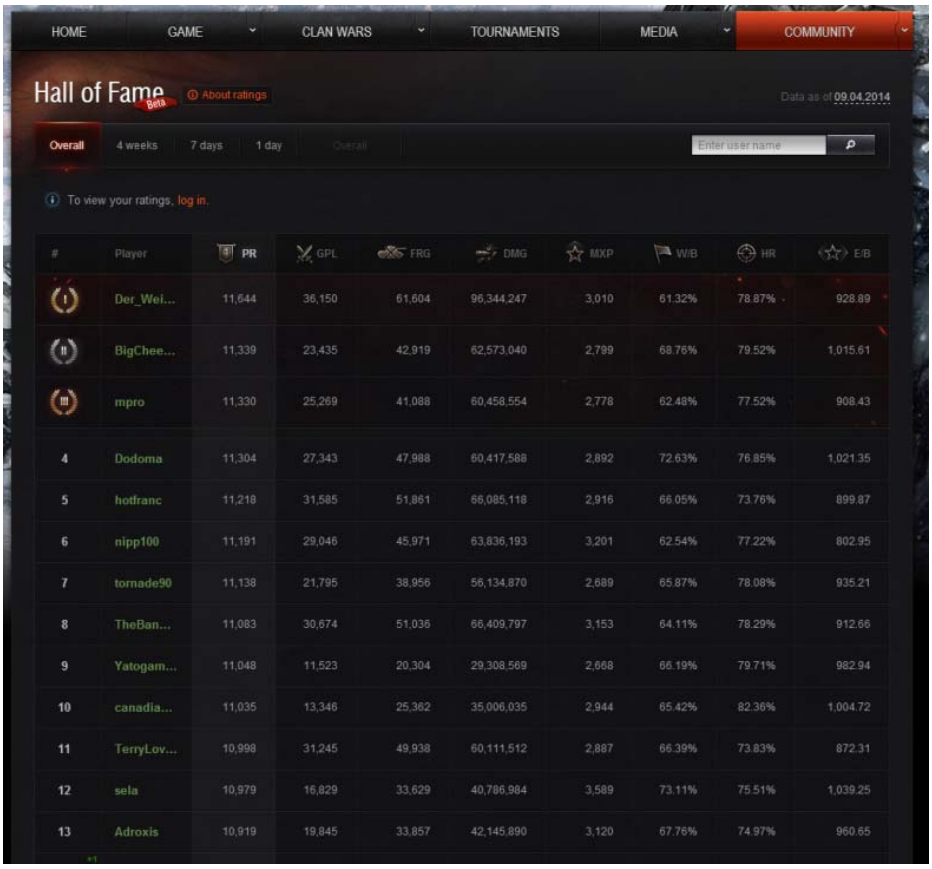


Figure 10. World of Tanks Hall of Fame listing. From http://www.worldoftanks.com. Copyright 2010–2014 Wargaming.net. All rights reserved.

requesting their participation in the survey. This significantly increased the number of participants, but did not reduce the abandonment rate, which remained close to 3:1.

Global participation. World of Tanks operates on five different sets of servers worldwide: North America, Europe, Asia-Pacific, Russia and Korea. There are no links between the servers, and individuals need a separate account for each server. This study was initiated on the North American Server. One of the North American respondents, who plays on multiple servers, suggested that it might help improve participation to reach out to players on other servers. He also indicated that he would reach out to the leadership of that server to seek their support for the research effort. Based on the earlier recommendations concerning screen-cred

above, after creating accounts on each of two servers, the European and Asia-Pacific servers, the researcher undertook to play over 50 games on each one, prior to posting any messages.

In both instances initial postings provided a rush of individuals who completed the questionnaire. As mentioned above, the European server accounted for 7% of participants while Asia-Pacific accounted for 9% and while the European and Asia-Pacific Servers were younger on average than the North American participants, analyzing the data using only North American responses had no effect on the existence or significance of any correlations.

As mentioned above, there are a set of rules that govern participation in the Forums, although the rules appear to be loosely and somewhat inconsistently applied both within and across servers. There is nothing in the Forum rules concerning or prohibiting posting survey or research requests, and there are an ongoing proliferation of Forum postings concerning participating in polls or answering questionnaires. In fact there is a polling feature built into the Forum mechanism itself to allow users to create ad hoc polls for one another.

The response of the moderators was very different across the servers. The North American moderators made no comment concerning the Forum postings. The researcher did receive a generic *educational warning* from a moderator but there was no specific indication in the warning about what the issue was. Despite a response to the moderator asking for additional information, no other communication was forthcoming.

The Asia-Pacific moderators took no action, but also did not provide the hoped for assistance. The European Server moderators temporarily hid the posting pending a review of their Community Support Team concerning the appropriateness of the posting. After a short deliberation, they restored the posting, deciding that the survey was an appropriate use of the

Forum. Despite several attempts to reach out to moderators or others associated with the game or Forums on all three servers, no responses were received.

Mentoring and leadership. Although game performance data were not shown to be correlated with leadership styles, the fact that *Clan* Position was significantly correlated seems to indicate a link between in-game and real-world leadership.

In several instances, this was borne out through individual discussion with *Clan* Commanders who were sufficiently interested in the subject of this research to reach out and offer assistance through online messaging and voice chats. In multiple instances, these *Clan* leaders enjoyed the opportunities for mentoring newer players and reported their anecdotal experience that game participation had indeed had a positive impact on the leadership development of newer players.

One Commander in particular had developed an entire course of study for new recruits in his *Clan* that included numerous PowerPoint presentations dedicated to the strategy and tactics of tank battles several running to over 100 pages each.

His thoroughness was likely a result of his military career as an actual tank commander, but his willingness to share his expertise and apply his experiences from the real world and then transform them to the game was admirable. He spent several hours walking the researcher through the initial strategy overview that he provides to new recruits. This experience was especially useful in helping to understand the differences between the knowledge and skills of novice and expert players.

This individual also suffers from a physical disability which ironically limits his ability to operate the keyboard and mouse with the rapidity necessary to play the game at a high level. His score profile, therefore, was clearly at odds with his knowledge and understanding of the game

strategy as the score metrics are a byproduct of the mastery of the gameplay mechanics and their application in a strategic fashion. Several of the other respondents indicated they possessed a physical disability, but it was not possible to determine any relevance to the current data analysis.

Several other *Clan Commanders* were also very interested in the topic of this research and were especially generous with their time in providing feedback and working to get members of their *clans* to participate in the study. It should be noted that several of the most helpful *Clan Commanders* were more highly rated by their raters than the rating they gave themselves, indicating a favorable view of their leadership capabilities by their *clan* subordinates.

Final Thoughts about the Literature

Leadership. Throughout history, the concept of leadership has evolved over time to accommodate changes in the dynamics and structures of social interaction and advances in business and technology (Bass & Stogdill, 1990). The constructs of Transformational Leadership and the version of the MLQ utilized in this study were in fact developed by Avolio and Bass (2004) in response to "the need to explore a broader range of leadership styles suited for these new environments" (p. 1). Building on that evolution, Yee (2002), Beck and Wade (2006) and Reeves et al. (2007) among others have begun to define the elements and constructs of leadership that manifest themselves in online games. The results of this research continue that evolution by connecting a new type of game experience to traditional leadership in ways that both link to earlier research, but also indicate that perhaps new leadership constructs might need to be developed to both recognize the components that are unique to leadership in online gaming, and to identify those elements that connect most strongly to traditional leadership approaches.

For example, aligning the data collected in this study to the cross-walk between the Sloan Leadership Model and the MLQ cited in Chapter 2 demonstrates that many of the current data elements are also linked with statistically significant correlations to components of the Sloan Model. *Clan* Position is linked with multiple elements of Sensemaking, Relationships and Visioning while the Education data element is liked with multiple components of Invention. (See Table 6 for full details of the links).

This study also found evidence of the same elements which the IBM (2007) study cited as ways in which online games facilitate adult leadership including:

1. Project-oriented organization – the tank battles in World of Tanks are task focused with specific sets of goals and objectives.
2. Multiple real-time sources of information upon which to make decisions – World of Tanks includes twelve different sources of data including multiple maps, heads-up displays, resource monitors and indications of other players (See Figure 11)
3. Transparent skills and competencies among co-players – Player tank rankings are included as part of the game data display (see item 6 in Figure 11), as well as the ability to search and display the full complement of player performance data in the Community section of the World of Tanks website cited earlier.
4. Transparent incentive systems – World of Tanks' use of experience points, awards and achievements as well as purchases of gold to acquire enhancements to improve tank performance as well as upgrade and access more powerful tanks (see Figure 12)

Table 7

Comparison of Results Alignment Between Sloan Model and MLQ

	Sloan Model	MLQ	Sig. Corr.	Data Elements				
Sensemaking	Getting data from multiple sources	…problems from many different angles…	0					
	Involving others in one's sensemaking	…important values and beliefs	0					
		…differing perspectives…	1	Clan Position				
	Using early observations to create an iterative experimental loop	…re-examine critical assumptions…	1	Education				
	Keeping oneself open to new possibilities	…differing perspectives…	1	Clan Position				
Relationships	Spending time understanding others' perspectives	…differing perspectives…	1	Clan Position				
		…different needs, abilities…	2	Winrate	Age			
	Encourage others to voice their opinions	…get others to look at problems…	0					
	Try to anticipate how others will react to your ideas	…that are satisfying	3	Clan Position	Hrs P/Day	Hrs P/Wk		
		…go beyond self-interest…	5	Clan Position	Age	Played WOT	Played Games	Days/ Wk
	Assess how well you relate to others	…treat others as individuals…	0					
		…others' respect for me	0					
Visioning	Practice creating a vision in many arenas	…compelling vision…	0					
	Develop a vision about something that you are enthusiastic about	…talk enthusiastically…	1	Clan Position				
		…talk optimistically…	1	Clan Position				
	Explain why people should care about your vision	…sense of purpose	1	Clan Position				
	The emphasis is on the vision, not the details of execution	… collective sense of mission	5	Clan Position	Win Rate	WN8	WN7	FF
	Use images, metaphors and stories to covey complex situations	None	0					
Invention	Don't assume the way things are is always the best way	…from many different angles	0					
		…new ways of looking…	2	Education	Gender*			
	Encourage creative approaches to problem solving	…from many different angles	0					
	Experiment with different ways of organizing work	…new ways of looking…	2	Education	Gender*			
	Explore other options	…new ways of looking…	2	Education	Gender*			

*Excluded from consideration due to small N

Figure 11. Overview of World of Tanks player screen. From http://www.worldoftanks.com. Copyright 2010–2014 Wargaming.net. All rights reserved.

Figure 12. Overview of World of Tanks garage screen. From http://www.worldoftanks.com. Copyright 2010–2014 Wargaming.net. All rights reserved.

5. Multiple and purpose-specific communications mediums - in addition to text-based *Battle Chat* (Item 9 in Figure 11) which allows written communications among teams, there are a number of audio applications such as TeamSpeak that allow pairs and teams of players to participate in real-time audio conversations while playing the game as well.

Player types. Echoing Craighead (2009), conversations with several players indicated the value of team training in particular on communications and achieving group objectives. It was also evident that in a similar fashion to what Nuangjumnonga and Mitomo (2012) identified, there are a range of different player types and player roles in World of Tanks. Certain players, known sometimes pejoratively as *campers*, hang back and hide close to their own base. They lie in wait for the enemy to reach the base and then ambush them as they arrive. Others venture out aggressively and attack quickly, while others take circuitous routes along the edges of the map to out flank opponents. While each *style* of play has its own components, each one can become critically important at certain stages in the game, just as Nuangjumnonga and Mitomo (2012) reported in their research.

Social constructs. While World of Tanks lacks the immersive social components that games like World of Warcraft or Eve Online provide, the *Clan Wars* component of World of Tanks allows teams to develop and engage in long form play over many weeks and months. The online text and audio chatting can certainly enable the development of a social community built around the game. In addition, many of the *Clans* provide distinctive descriptions of themselves online to recruit players of a certain type or with a particular approach to game playing, from those seeking technically skilled players with admonitions such as in Figure 13 to other *Clans*

which take a more assertive approach, looking for specific types of players such as in Figure 14.

To *clans* that take a less serious approach such as the *Clan* in Figure 15.

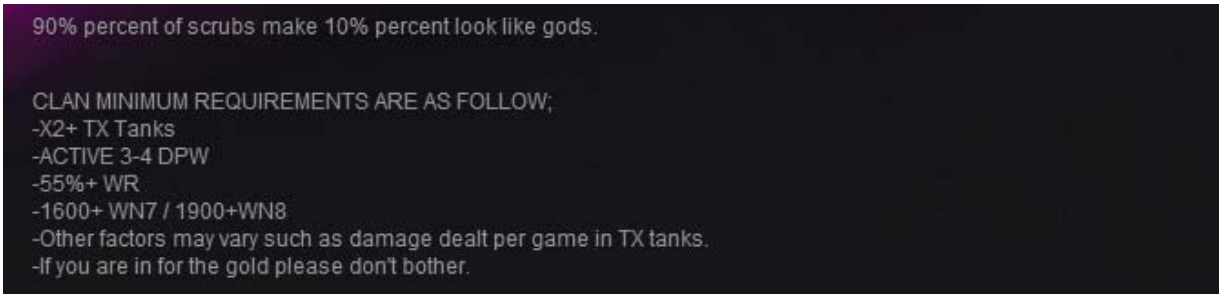


Figure 13. Example 1 of clan recruiting. From http://www.worldoftanks.com. Copyright 2010–2014 Wargaming.net. All rights reserved.

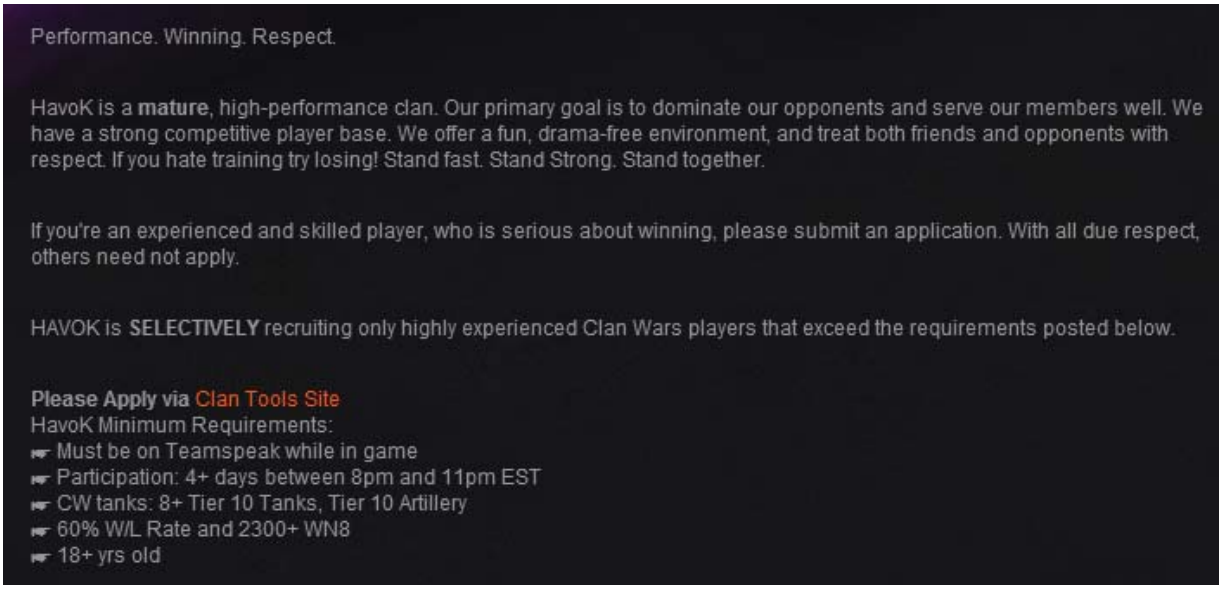


Figure 14. Example 2 of clan recruiting. From http://www.worldoftanks.com. Copyright 2010–2014 Wargaming.net. All rights reserved.

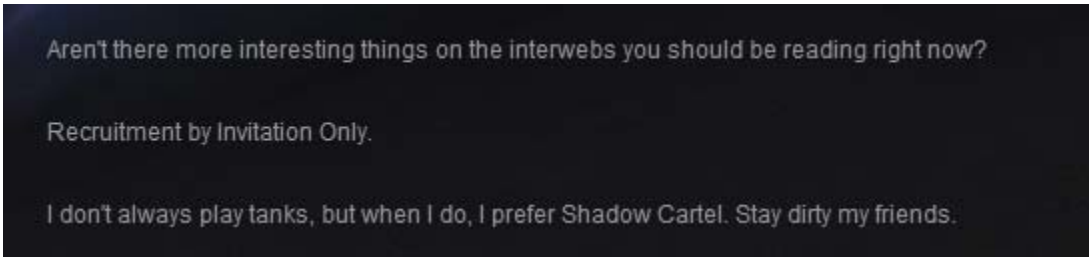


Figure 15. Example 3 of clan recruiting. From http://www.worldoftanks.com. Copyright 2010–2014 Wargaming.net. All rights reserved.

Virtual teams. The World of Tanks game experience also includes a number of the propositions that Bell and Kozolowski (2002) postulated concerning functioning virtual teams, including:

Proposition 2: "As virtual teams perform more complex, dynamic, and challenging tasks,…they are expected to be more likely to adopt synchronous, or tightly linked, communication media to facilitate collaboration, information richness, and group decision making," (Bell & Kozlowski, 2002, p. 25). In the case of World of Tanks, the use of synchronous audio communication applications such as TeamSpeak during the game, but outside of the confines of the game itself, enables *Clans*, teams and friends to collaborate and engage in group decision making.

Proposition 4: "The need for virtual teams to operate in real time (vs. distributed time) is expected to become more critical as tasks become more complex, workflow arrangements become more reciprocal and intensive, and situations require dynamic, external links," (Bell & Kozlowski, 2002, p. 31). Here again, the in game online chats, as well as the audio communication allow for collaboration to accomplish the range of complex tasks associated with winning the game. Especially for those who participate in the *Clan Wars* component of the game, where regular participation is a key feature of the game construct, the need for sufficient numbers of *Clan* members to be available at certain dates and times is vital. Even for those *Clans* not directly engaged in tournament play, many have requirements for participation during specific dates and times or for particular duration (see for example Figure 15).

Proposition 5: "Virtual teams often cross functional, organizational, and/or cultural boundaries...When tasks are more complex, requiring established operating procedures and more stable relationships, a virtual team's boundaries are expected to remain less malleable over the

team's lifecycle. However, when tasks are on the less complex end of the continuum, personnel inflows and outflows cause less disruption to team processes and established operating procedures are less critical, and a virtual team's boundaries are expected to be more permeable," (Bell & Kozlowski, 2002, p. 33). In the case of World of Tanks, both constructs appear to be valid. Because individuals can participate in World of Tanks from around the world, each game by its very nature crosses at least geographic if not cultural boundaries, although because participation is done anonymously through the use of gamertags or usernames, the awareness of those boundaries may not be readily apparent, especially during pick-up or ad-hoc games. As such, the basic game environment supports a fluid dynamic where each battle is an amalgam of individuals from across a range of demographic variables. For example, the collected data show that individuals from seventeen countries including Australia, China, Poland and Russia, were players in and participated in the survey from the North American server. In addition to the range of Age and Education variables, there were 90 different occupations represented by the survey respondents ranging from CEO and lawyer to truck driver, millwright, music teacher and baker.

At the same time, the *Clan Wars* aspect of the game requires more dedicated participation and a higher functioning group dynamic. As a consequence, *Clan* recruiting is often done by word of mouth or by invitation, and *Clans* that do advertise for members do so by specifying a range of desired characteristics from documented game performance metrics to attitude and approach to gaming, as highlighted above. Thus as the nature of the game moves from the comparatively less complex ad-hoc battles where the field of play is reset after every game, to the more ongoing, extensive and thus more complex *Clan Wars* where teams compete to capture and hold territory through a range of battles over a series of weeks or months, the need for more stable and persistent participation becomes critical.

Proposition 6: "When the tasks a virtual team performs are complex and challenging, the team is expected be more likely to maintain a stable team membership and develop a more continuous lifecycle. When tasks are less complex and challenging, however, a virtual team is expected to be able to function effectively with a dynamic team membership and a more discrete lifecycle," (Bell & Kozlowski, 2002, p. 34). As above, the one-off nature of the ad-hoc game allows for the creation of teams on the fly with players assigned randomly to each side, based only on their game performance history and choice of tank. *Clan Wars*, by contrast requires the creation of a *Clan* and its persistence as a unit throughout the entire arc of the *Clan Wars* tournament.

Proposition 7: "Virtual team members often hold multiple roles both within and across different virtual teams. However, as the tasks a virtual team is required to perform become more complex and challenging, requiring greater levels of expertise and specialization, a higher premium is expected to be placed on synchronous workflow arrangements and the roles of individual team members will be more likely to be clearly defined, fixed, and singular. Under conditions of low task complexity, however, there is minimal interdependence among team members and more asynchronous workflow arrangements are expected to be adopted. In these situations, a virtual team's members can hold multiple roles without compromising the effectiveness of the team," (Bell & Kozlowski, 2002, p. 35). With ad-hoc battles, especially in situations where all players are assigned randomly, there is often little interaction among players, especially newer players, and an *every man for himself* ethos often appears to permeate. As soon as the game starts, tanks will tear off in multiple directions, some to hide, some to race to engage the enemy directly, some to take a more indirect path to flank the enemy. With more experienced players, or those who know one another, small groups can form or individuals work

collaborative in pairs to cover each other, flank and surround enemies or serve as decoys to draw out the enemy, allowing the other player to attack. Toward the end of the game, as the number of tanks diminishes on either side, players are forced by circumstances to work together. There is also no defined hierarchy in ad-hoc games, despite the fact that there are players with better performance scores, stronger tanks or greater skill. This *flat* organization means that there is no specific leadership, nor any specific roles to play. More experienced players will often use the chat feature to recommend locations to be attacked or point out the hiding places of enemy tanks, but these are suggestions rather than directives. *Clans* by contrast have a formal hierarchy with eight defined roles. While these roles are largely for the administration of the *Clan*, the three commander positions can also play a role in directing in-game battle action as well.

Conclusions

This study suggests that:

1. There are significant correlations between the leadership positions in World of Tanks and both Transformational and Transactional Leadership Styles as measured by the Multifactor Leadership Questionnaire. The data indicate that individuals with greater leadership roles were more inclined toward transformational leadership styles and saw value in leading and helping others. These same leaders were also inclined toward the use of a reward based leadership style that mirrors the structure of the game environment. Combined with the significant correlations with Age and Education and Number of Battles played, the behaviors of Leaders differed significantly from those of non-leaders and younger and less experienced players differed significantly from older and more experienced players.

2. While these significant correlations exist, additional research must be done to tease out the exact nature of those links and to relate them to offline experiences. The extent to which the

majority of the questions on MLQ questionnaire were significantly linked to both *Clan* Position and other performance variables not only reinforces the direction of existing research but highlights the need for further refinement of the methodology of player performance analysis.

3. Given the connections uncovered in this research between leadership, social constructs and virtual teams it is possible, as we have seen with Bass and Avolio's (2004) development of the MLQ itself, that while the instrumentation and conceptual frameworks that both define and measure online leadership as expressed in games have yet to be developed, they can be derived by extending and enhancing existing leadership constructs, concepts and tool sets such as the Sloan Model and the MLQ. By building on existing tools and linking with the recommendations concerning the refinement of player performance analysis discussed above, it should be possible to iterate toward a set of criteria that not only are useful in understanding the range of player performance that can truly be defined as *skill* but in reshaping the conceptual frame used to define leadership to accommodate these new skills and the new technology based realities in which they are created and flourish.

4. The fact that there are significant correlations between a number of performance variables and defined leadership roles in World of Tanks and a range of leadership style components should provide a sufficient foundation for future researchers to further examine the elements of behavior and performance in online games, to uncover additional areas of correlation, and perhaps discover the specific performance elements or performance measures that can be combined to create a more accurate picture of the substance of and development pathways for online leadership.

5. That the Internet itself is a unique context and construct in which to undertake research, especially research on a global scale. Because games like World of Tanks transcend

geographic boundaries and create environments in which all players experience the same affordances as well as the same limitations, the capacity of these games to serve as environments for future research and cross cultural analysis are profound.

Recommendations for Further Research

While the results from this study did not demonstrate an unambiguous connection between the World of Tanks online game and leadership styles, it did point to a link between the attainment of leadership positions in the online gaming world and traditional leadership styles, suggesting several areas for future research.

Refining elements of online leadership. This study, as with others cited in Chapter 2, reinforces the finding that there are clear leadership roles in online gaming. Additional research should be focused on continuing to define the elements of leadership in the online gaming context and looking for patterns of behavior that link to offline leadership styles and abilities.

There are also clearly multiple levels of group interaction that occur in online games. From the ad hoc *pick up* game or *random battle*, to the more organized *Clan Wars* model, these games continually place individuals in collaborative contexts that call out for leaders, and leaders are emerging. As the limited anecdotal information that was gleaned from the individual interactions with *Clan Commanders* demonstrates, there is a richness to the gaming experience that is not fully captured by the raw empirical data. In looking at the demographics of the *Clan Commanders*, there were no particular patterns in age, education or other factors. Occupations ranged from college student, to welder, to firefighter, to IT consultant, to receptionist and private security officer. Only one or two of the occupations listed evidenced a clear leadership role such as Manager. Attempting a more robust ethnographic or qualitative study of the individuals who seek out these roles may point to other factors that are critical in the definition and development

of these leaders. It may also help tease out the factors that encourage these individuals to seek these leadership posts in the online world.

Effectiveness of online leadership. There is also the question of the effectiveness of the leaders. As the limited rater data indicated, followers tended to rate their leaders slightly higher than the leaders rated themselves. This could be an indication of a successful or at least appreciated leadership. Identifying metrics for evaluating the effectiveness of in-game leadership may lead to a greater understanding of and means to evaluate the performance of different kinds of distributed leadership. For example, for the small sample of *Clan Commanders* who's *Clans* participated in the most recent *Clan Wars* series, there does not appear to be any correlation at all with either leadership style or rater ranking. While one could argue that having one's *Clan* atop the leader board after a multi-month campaign is the definition of successful leadership from an outcome perspective, it may not be truly indicative of the skills of the leader in helping his or her *Clan* achieve that outcome.

Further use of online data. There is also much to be learned from the volumes of data that are generated by these games. While the statistics analyzed for World of Tanks did not appear to link to leadership styles, there may be other data elements that are already collected by these games which could yield different frameworks for understanding individual performance as well as pair and group interaction and potentially other elements of leadership skill or leadership development.

As Praetor 77 and the other players engaged in the ongoing refinement of the WN performance scale demonstrate, there is a both a richness and a complexity to the interplay of the wide range of data elements that exist. Their continued efforts at revision and refinement provide evidence that players at a high level believe there are ways to structure quantitative metrics that

provide true qualitative performance evaluations. The significant shift in WN8 from a damage per-tier-based ranking model to a per-tank-based ranking model, is a fundamental realignment of the rating formula that evidences a deeper understanding of how the game is played.

As Praetor 77 notes in on the WN Efficiency Wiki, "WN8 seeks to measure the observable contribution to matches, across an account, and hopefully infers some information about the latent variable *skill*" and further, "[s]o WN8 becomes a *per-tank* rating, instead of a *dmg/tier* rating. This is why you won't see the average tier term in the final equation, although the information from which tiers were played is in the methodology, in the earlier steps. So part of the information in WN8 now includes both the tanks a player has chosen, but also the number of games played on an account. (Praetor77 et al., 2014)."

Clearly there is both a wealth of empirical data as well as the clear existence of true leadership opportunities and qualities available through these game worlds. Using the results of this study, as well as its methodology to explore other online games and game types, may provide both a foundation and a rich landscape for future research.

Impact of global games. As games like World of Tanks expand across the globe, they provide a unique window into both cultural differences as well as the impact of globalization on cultural homogeneity. The relatively small differences between respondents across the three servers studied (Europe, North America and Asia Pacific), as well as the lack of differentiation among the international players on the North American server, should provide some interesting lines of future inquiry. One would anticipate that attitudes toward leadership might reasonably vary across geographies, and yet that was not the case in this study. Is it possible that the fact that the game is essentially the same for all players reinforcing a set of global cultural norms, or could it be that achievement in the game requires an adherence to a world view that transcends

culture and geography? Further exploration of the variances among players in different geographies, therefore, may lead to some interesting and unexpected conclusions not only about leadership and leadership styles but about the impact of these global games on the individuals who play them and the cultures they represent.

Final Summary

The purpose of this study was to explore the extent to which player performance in the multiplayer online video game World of Tanks is correlated with individual leadership styles, as measured by the MLQ. The goal of the research was to evaluate a range of demographic characteristics and game performance metrics to determine the extent to which they correlated with MLQ measured player leadership styles.

While no direct correlations between leadership styles and World of Tanks player performance were uncovered, there were a series of relationships that could set the foundation for future research in this area.

While there are clearly offline behavioral differences in individuals that manifest themselves in player performance, the number of significant correlations between the variable *Clan* Position, Age and Education and MLQ leadership styles, indicate that there are connections between the roles players assume in the game context and the changes in behavior occasioned by age and amount of formal education. In addition, the range of player performance characteristics that were significantly correlated with elements of the leadership styles perhaps provides a foundation to explore the development of a new leadership construct that is derived from existing research but which is unique to the context of online gaming leadership.

It is also clear that leadership is an essential component of multiplayer online gaming and that by understanding the nature and structure of that leadership in greater depth it may be

possible to identify stronger linkages with offline leadership. The ability to make that connection could allow online games to serve as both a learning space and a proving ground for both online and offline leadership development.

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APPENDIX A

Demographic Questions

1. What is your World of Tanks Gamer Tag?
2. What Clan do you belong to?
    a. None
    b. Clan Name
3. If you belong to a Clan, what is your position in the Clan?
    a. Commander
    b. Deputy Commander
    c. Company Commander
    d. Diplomat
    e. Treasurer
    f. Recruiter
    g. Soldier
    h. Recruit
4. What are your Rankings?
    a. Average WN7 Rating
    b. Average Win Rate
    c. Average Efficiency
5. What is your age
    a. >18
    b. 18-24
    c. 25-40
    d. 40-55
    e. 55+
6. What is your gender
    a. M
    b. F
7. What city and country do you live in
    a. Country
    b. City
8. How long have you played World of Tanks?
    a. < 1 Year
    b. 1 Year
    c. 2 Years
    d. 3 Years
    e. 4 Years
    f. > 4 Years
9. How long have you played online video games?

   a. < 1 Year
   b. 1-3 Years
   c. 4-6 Years
   d. 7-10 Years
   e. > 10 Years
10. How many days per week and hours per day do you play video games?
   a. Days per week
   b. Hours per day
11. What is your highest level of education?
   a. Secondary (High) School
   b. Associates Degree
   c. Bachelor's Degree
   d. Master's Degree
   e. Doctorate
12. What is your occupation?
13. Would you be willing to evaluate another member of your clan?
   a. No
   b. Yes, Please click here to proceed to the Rater Survey

APPENDIX B

IRB Exemption

PEPPERDINE UNIVERSITY

Graduate & Professional Schools Institutional Review Board

January 21, 2014

Timothy Magner
[redacted]

Protocol #: E1213D04
Project Title: Leadership and Performance in Multiplayer Online Video Games

Dear Mr. Magner:

Thank you for submitting your application, *Leadership and Performance in Multiplayer Online Video Games,* for exempt review to Pepperdine University's Graduate and Professional Schools Institutional Review Board (GPS IRB). The IRB appreciates the work you and your faculty advisor, Dr. McManus, have done on the proposal. The IRB has reviewed your submitted IRB application and all ancillary materials. Upon review, the IRB has determined that the above entitled project meets the requirements for exemption under the federal regulations (45 CFR 46 - http://www.nihtraining.com/ohsrsite/guidelines/45cfr46.html) that govern the protections of human subjects. Specifically, section 45 CFR 46.101(b)(2) states:

> (b) Unless otherwise required by Department or Agency heads, research activities in which the only involvement of human subjects will be in one or more of the following categories are exempt from this policy:
>
> **Category (2) of 45 CFR 46.101**, research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: a) Information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and b) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

In addition, your petition to waive the documentation of informed consent, as indicated in your application has been approved.

Your research must be conducted according to the proposal that was submitted to the IRB. If changes to the approved protocol occur, a revised protocol must be reviewed and approved by the IRB before implementation. For any proposed changes in your research protocol, please submit a **Request for Modification Form** to the GPS IRB. Because your study falls under exemption, there is no requirement for continuing IRB review of your project. Please be aware that changes to your protocol may prevent the research from qualifying for exemption from 45 CFR 46.101 and require submission of a new IRB application or other materials to the GPS IRB.

A goal of the IRB is to prevent negative occurrences during any research study. However, despite our best intent, unforeseen circumstances or events may arise during the research. If an unexpected situation or adverse event happens during your investigation, please notify the GPS IRB as soon as possible. We will ask for a complete explanation of the event and your response. Other actions also may be required depending on the nature of the event. Details regarding the timeframe in which adverse events must be reported to the GPS IRB and the appropriate form to be used to report this information can be found in the *Pepperdine University Protection of Human Participants in Research: Policies and Procedures Manual* (see link to "policy material" at http://www.pepperdine.edu/irb/graduate/).

Please refer to the protocol number denoted above in all further communication or correspondence related to this approval. Should you have additional questions, please contact Kevin Collins, Manager of the Institutional Review Board (IRB) at gpsirb@peppderdine.edu. On behalf of the GPS IRB, I wish you success in this scholarly pursuit.

Sincerely,

Thema Bryant-Davis, Ph.D.
Chair, Graduate and Professional Schools IRB

cc: Dr. Lee Kats, Vice Provost for Research and Strategic Initiatives
Ms. Alexandra Roosa, Director Research and Sponsored Programs
Dr. Jack McManus, Faculty Chair

APPENDIX C

Bi-Variate Pearson Correlation

		Clan Position	# of Battles	WN8	WN7	WinRate	Efficiency	Age	Gender	Played WOT	Played Videogames	Days per week	Hours per day	Hrs WK	Education
Five I's of Transformational Leadership	Pearson Correlation	-.244**	0.083	-0.014	-0.014	-0.026	0.025	0.101	0.007	-0.004	0.022	0.047	0.068	0.078	0.117
	Sig. (2-tailed)	0.001	0.226	0.844	0.833	0.706	0.719	0.138	0.916	0.955	0.755	0.489	0.325	0.25	0.089
	N	179	215	215	218	218	218	217	218	216	213	217	214	218	211
Idealized Influence Attributes	Pearson Correlation	-.239**	0.018	0.078	0.083	0.1	0.114	-0.004	0.012	0.071	0.033	0.089	0.072	0.083	-0.008
	Sig. (2-tailed)	0.001	0.795	0.254	0.226	0.143	0.095	0.949	0.862	0.302	0.635	0.193	0.295	0.222	0.914
	N	178	214	214	217	217	217	216	217	215	212	216	213	217	210
Idealized Influence Behaviors	Pearson Correlation	-.171*	0.084	-0.073	-0.073	-0.078	-0.03	0.108	0.015	-0.005	0.018	-0.006	0.028	0.037	0.077
	Sig. (2-tailed)	0.022	0.219	0.288	0.285	0.25	0.657	0.111	0.829	0.938	0.794	0.925	0.687	0.587	0.265
	N	179	215	215	218	218	218	217	218	216	213	217	214	218	211
Inspirational Motivation	Pearson Correlation	-.232**	0.04	-0.044	-0.033	-0.022	-0.017	0.027	0.059	-0.034	0.004	0.075	0.092	0.095	0.066
	Sig. (2-tailed)	0.002	0.556	0.522	0.625	0.748	0.806	0.694	0.384	0.618	0.953	0.273	0.181	0.162	0.341
	N	179	215	215	218	218	218	217	218	216	213	217	214	218	211
Intellectual Stimulation	Pearson Correlation	-0.099	0.073	0.065	0.059	0.007	0.077	0.052	-0.005	-0.022	0.052	-0.017	0.012	0.023	.206**
	Sig. (2-tailed)	0.187	0.288	0.343	0.384	0.919	0.255	0.444	0.938	0.743	0.45	0.801	0.867	0.738	0.003
	N	179	215	215	218	218	218	217	218	216	213	217	214	218	211
Individual Consideration	Pearson Correlation	-0.132	0.101	-0.033	-0.048	-0.074	-0.006	.250**	-0.063	-0.037	0.002	0.024	0.047	0.049	.141*
	Sig. (2-tailed)	0.078	0.138	0.626	0.481	0.279	0.932	0	0.354	0.586	0.976	0.725	0.495	0.47	0.04
	N	179	215	215	218	218	218	217	218	216	213	217	214	218	211
Extra Effort	Pearson Correlation	-.148*	.143*	-0.077	-0.084	-0.093	-0.036	0.066	0.023	0.065	-0.063	0.055	.142*	.147*	0.094
	Sig. (2-tailed)	0.049	0.037	0.262	0.219	0.173	0.597	0.333	0.737	0.339	0.359	0.421	0.039	0.031	0.175
	N	178	214	214	217	217	217	216	217	215	212	216	213	217	210
Effectiveness	Pearson Correlation	-.211**	0.04	0.023	0.023	0.023	0.052	0.034	0	-0.04	-0.002	-0.022	0.109	0.096	.140*
	Sig. (2-tailed)	0.005	0.559	0.732	0.732	0.741	0.445	0.619	0.999	0.559	0.977	0.75	0.113	0.158	0.042
	N	179	215	215	218	218	218	217	218	216	213	217	214	218	211
Satisfaction with the leadership	Pearson Correlation	-.171*	0.101	0.005	-0.011	-0.018	0.023	0.057	-0.023	-0.022	-0.067	0.072	.154*	.145*	-0.032
	Sig. (2-tailed)	0.023	0.141	0.938	0.876	0.789	0.74	0.405	0.739	0.751	0.331	0.292	0.024	0.033	0.641
	N	178	214	214	217	217	217	216	217	215	212	216	213	217	210

(continued)

Contingent Reward	Pearson Correlation	-.184*	-0.055	-0.021	-0.029	-0.018	-0.009	0	0.016	-0.127	-0.025	-0.024	0.013	-0.005	0.129
	Sig. (2-tailed)	0.013	0.422	0.757	0.671	0.787	0.891	0.996	0.812	0.063	0.718	0.731	0.855	0.946	0.062
	N	179	215	215	218	218	218	217	218	216	213	217	214	218	211
Management by Exception Active	Pearson Correlation	0.031	-0.106	0.129	0.125	0.115	0.065	-.227**	-0.022	-0.127	-0.026	0.056	0.079	0.102	-0.006
	Covariance	0.067	-1354.7	63.894	39.934	0.492	17.291	-0.218	-0.003	-0.133	-0.028	0.059	0.187	1.701	-0.006
	N	179	215	215	218	218	218	217	218	216	213	217	214	218	211
Management by Exception Passive	Pearson Correlation	0.107	-.211**	-0.02	-0.043	-0.03	-0.103	-.203**	0.035	0.039	-0.062	0.002	-0.051	-0.055	-0.052
	Sig. (2-tailed)	0.154	0.002	0.771	0.523	0.659	0.131	0.003	0.61	0.573	0.366	0.979	0.461	0.419	0.451
	N	179	215	215	218	218	218	217	218	216	213	217	214	218	211
LaissezFaire	Pearson Correlation	.157*	-.168*	0.025	0.021	0.02	-0.039	-.192**	0.077	0.011	-0.045	0.005	0.016	0.008	-0.095
	Sig. (2-tailed)	0.036	0.014	0.72	0.762	0.764	0.566	0.005	0.256	0.868	0.515	0.941	0.818	0.912	0.168
	N	179	215	215	218	218	218	217	218	216	213	217	214	218	211

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

APPENDIX D

Correlations by MLQ Question Sorted by Leadership Style Element

Scale	Question	Clan Position	Date Joined	Battles	WN8	WN7	WinRate	Efficiency	Age	Gender	Played WOT	Played Videogames	Days per week	Hours Per day	Hrs WK	Education
IA	10	-.165*	-0.1	0.049	0.108	0.112	0.123	0.137	-0.01	0.003	0.078	0.014	0.109	0.084	0.091	0.083
IA	18	-.151*	-0.121	0.101	0.062	0.071	0.061	0.101	.170*	0.095	.166*	.142*	.135*	0.011	0.048	0.084
IA	21	-0.129	-0.011	-0.043	-0.04	-0.067	-0.063	-0.043	-0.053	-0.002	0.018	0.04	-0.005	0.06	0.049	-0.04
IA	25	-.220**	0.054	-0.01	0.086	0.096	.144*	0.1	-0.1	-0.057	-0.029	-0.086	0.054	0.085	0.09	-0.103
IB	6	-0.076	-0.029	0.101	0.064	0.045	0.014	0.067	0.028	0.037	-0.002	-0.054	0.005	0.062	0.067	-0.018
IB	14	-.152*	-0.006	0.048	-0.061	-0.06	-0.076	-0.036	0.059	0.025	-0.032	0.056	0.007	0.023	0.031	0.084
IB	23	-0.052	-0.039	0.052	0.019	0.009	0.014	0.029	0.108	-0.049	0.076	0.04	0.024	0.005	0.013	0.097
IB	34	-.229**	-0.011	0.044	-.215**	-.196**	-.178**	-.167*	0.03	0.016	-0.025	-0.074	0.006	0.041	0.041	0.004
IM	9	-.264**	-0.007	0.016	0.025	0.029	0.026	0.035	-0.003	0.057	-0.033	-0.038	0.023	0.055	0.038	0.099
IM	13	-.251**	-0.077	0.055	-0.072	-0.054	-0.075	-0.035	0.037	0.132	-0.007	-0.053	0.052	0.066	0.05	0.031
IM	26	-0.12	0.019	0.009	-0.035	-0.042	-0.015	-0.036	-0.028	-0.033	0.021	0.021	0.088	0.11	0.128	0.029
IM	36	-.197**	-0.044	0.062	-0.069	-0.053	-0.031	-0.038	0.015	0.041	0.002	0.013	0.065	0.09	0.098	0.035
IS	2	0.002	-0.111	0.031	0.123	0.117	0.098	0.086	-0.043	0.107	0.057	0.03	-0.052	-0.044	-0.02	.171*
IS	8	-.160*	-0.067	0.025	0.022	0.011	-0.026	0.035	-0.034	-0.012	0.014	0.032	-0.008	0.045	0.035	0.089
IS	30	-0.048	0.055	0.087	0.035	0.032	-0.014	0.049	0.121	0.02	-0.109	0.011	-0.008	-0.053	-0.055	0.091
IS	32	-0.07	-0.117	0.08	0.014	0.005	-0.034	0.036	0.064	-0.132	0.02	0.05	0.081	0.09	0.119	.218**
IC	15	-.226**	-0.001	.160*	0.019	0.011	-0.003	0.042	.259**	-0.024	-0.03	0.052	0.056	0.099	0.115	0.093
IC	19	0.026	-0.047	-0.07	0.038	0.032	0.024	0.034	0.034	-0.062	0.024	0.023	0.058	0.037	0.024	0.028
IC	29	0.007	-0.093	0.02	-0.088	-0.093	-.143*	-0.055	.175**	-0.114	0.012	0.025	-0.023	-0.071	-0.078	0.132
IC	31	-0.12	-0.001	.156*	-0.056	-0.086	-0.094	-0.052	.142*	0.019	-0.052	-0.127	-0.009	0.066	0.068	0.097
CR	1	-0.069	0.082	-0.015	-0.018	-0.012	0.001	0.002	-0.049	-0.011	-0.051	-0.028	-0.045	-0.023	-0.022	0.102
CR	11	-0.088	0.098	0.06	0.054	0.029	0.052	0.043	0.079	-0.076	-.147*	0.004	0.032	0.044	0.03	.146*
CR	16	-.170*	0.003	-0.086	-0.033	-0.053	-0.049	-0.047	-0.022	0.042	-0.036	-0.003	0.036	0.036	0.034	0.006
CR	35	-.236**	-0.03	-0.077	-0.041	-0.038	-0.067	-0.029	-0.055	.135*	-0.018	-0.099	0.001	0.003	-0.018	0.067
MBEA	4	0.013	-0.101	0.05	0.104	0.112	0.093	0.093	-0.035	0.009	0.108	0.096	-0.033	0.002	0.027	0.096
MBEA	22	-0.003	.207**	-.225**	0.099	0.074	0.092	0.009	-.285**	0.071	-.189**	-0.042	0.056	0.106	0.107	-0.091
MBEA	24	0.05	0.096	-0.09	0.055	0.078	0.061	0.046	-0.121	-0.031	-.204**	-0.088	0.03	0.069	0.09	-0.028
MBEA	27	-0.016	0.049	-0.065	0.132	0.124	0.109	0.064	-.251**	-0.12	-0.094	-0.034	0.06	0.064	0.078	0.025
MBEP	3	0.044	0.008	-.197**	-0.008	-0.007	-0.062	-0.041	-.178**	0.059	0.071	-0.062	-0.063	-0.027	-0.056	0.02
MBEP	12	0.092	0.023	-.256**	0.061	0.045	0.027	0.004	-.246**	0.069	0.003	0.053	-0.049	-.145*	-.147*	-0.012

(continued)

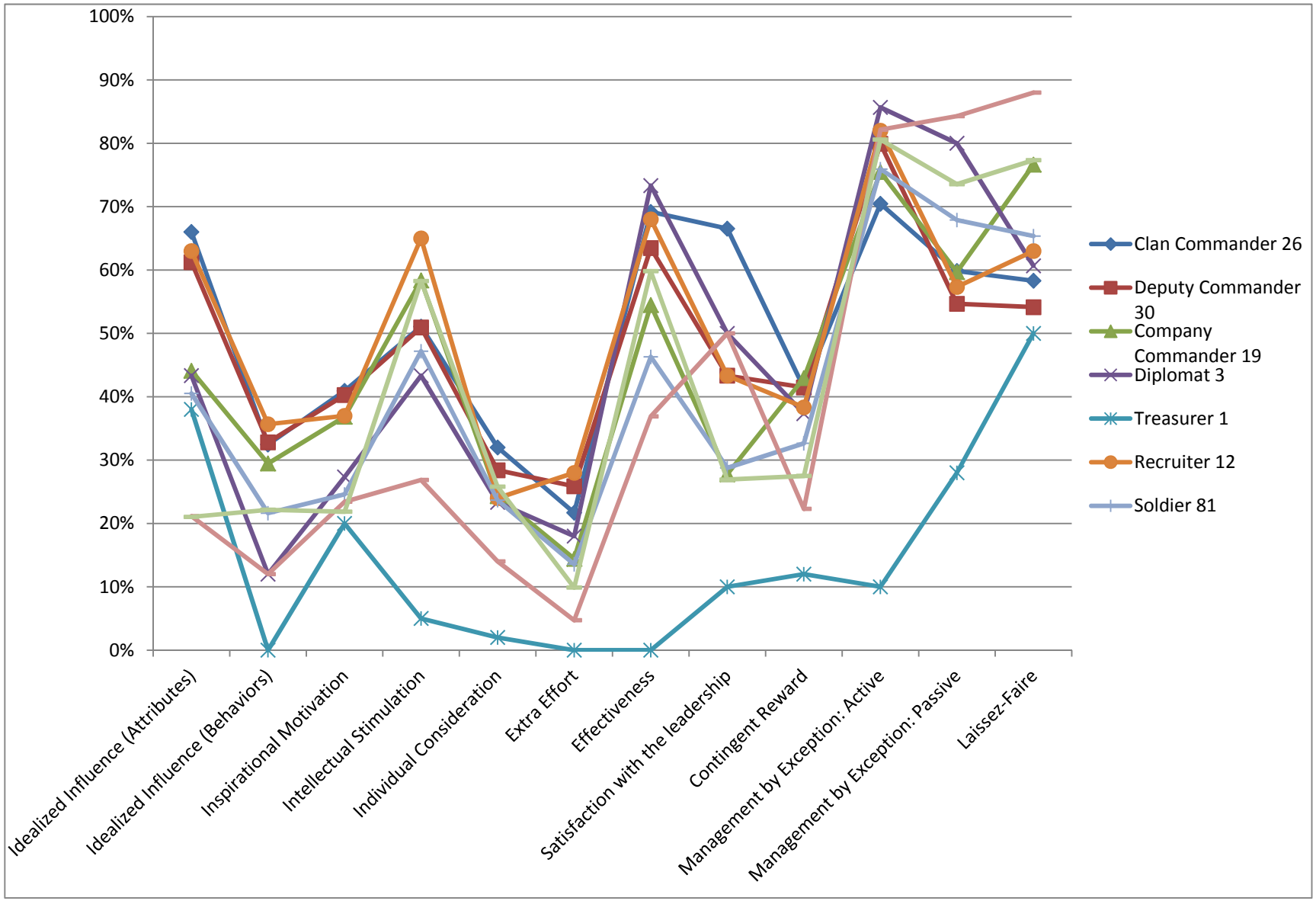
MBEP	17	-0.058	0.037	-0.09	-.172*	-.171*	-0.1	-.188**	0.035	-0.04	-0.039	-.153*	-0.019	-0.006	-0.011	-0.046
MBEP	20	0.149	0.063	-0.112	0.076	0.05	0.078	-0.019	-.238**	0.022	0.017	0.054	0.006	-0.01	-0.001	-0.083
LF	5	0.078	.144*	-0.068	-0.119	-0.108	-0.072	-0.102	0.038	0.026	0.056	-0.014	-0.027	-0.029	-0.035	-0.023
LF	7	0.051	0.007	-0.085	-0.008	0.007	-0.018	0.004	-.158*	0.025	0.008	-0.005	-0.027	0.016	0.028	-0.093
LF	28	.245**	0.047	-.205**	0.12	0.107	0.082	0.072	-.180**	0.092	-0.026	0.059	-0.034	-0.037	-0.051	-0.076
LF	33	0.077	0.113	-.135*	0.001	0.022	0.039	-0.086	-.184**	0.062	-0.11	-0.132	-0.019	-0.006	-0.014	-0.018
EE	39	-0.005	0.014	0.089	-0.044	-0.069	-0.092	-0.059	0.09	0.059	0.005	-0.136	0.047	0.049	0.059	0.13
EE	42	-.202**	-0.031	.140*	-0.039	-0.037	-0.022	0.005	0.001	-0.034	0.021	-0.062	0.026	.217**	.206**	0.094
EE	44	-.189*	-0.103	0.113	-0.071	-0.069	-0.071	-0.016	0.109	0.007	0.045	-0.015	0.055	0.099	0.106	.154*
EEF	45	-.214**	-0.051	0.092	0.126	.146*	0.135	.151*	-0.033	0.089	-0.022	-0.076	0.014	0.046	0.046	0.137
EEF	43	-0.137	-0.058	0.069	-0.052	-0.039	-0.016	-0.013	0.086	-0.033	-0.048	0.057	0.018	0.116	0.096	0.091
EEF	40	-.188*	-0.077	-0.008	0.033	0.03	0.009	0.055	0.017	-0.043	0.085	-0.033	0.013	0.059	0.072	0.101
EEF	37	-0.055	0.056	-0.004	-0.056	-0.072	-0.08	-0.037	0.014	-0.039	-0.123	-0.008	-0.062	.141*	0.109	0.122
SAT	38	-.221**	0.021	0.098	0.06	0.041	0.035	0.071	0.013	-0.024	-0.009	-0.121	0.126	.163*	.166*	0.04
SAT	41	-0.053	-0.054	0.11	-0.036	-0.048	-0.057	-0.027	0.121	-0.017	-0.019	0.026	-0.019	0.1	0.083	-0.062

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

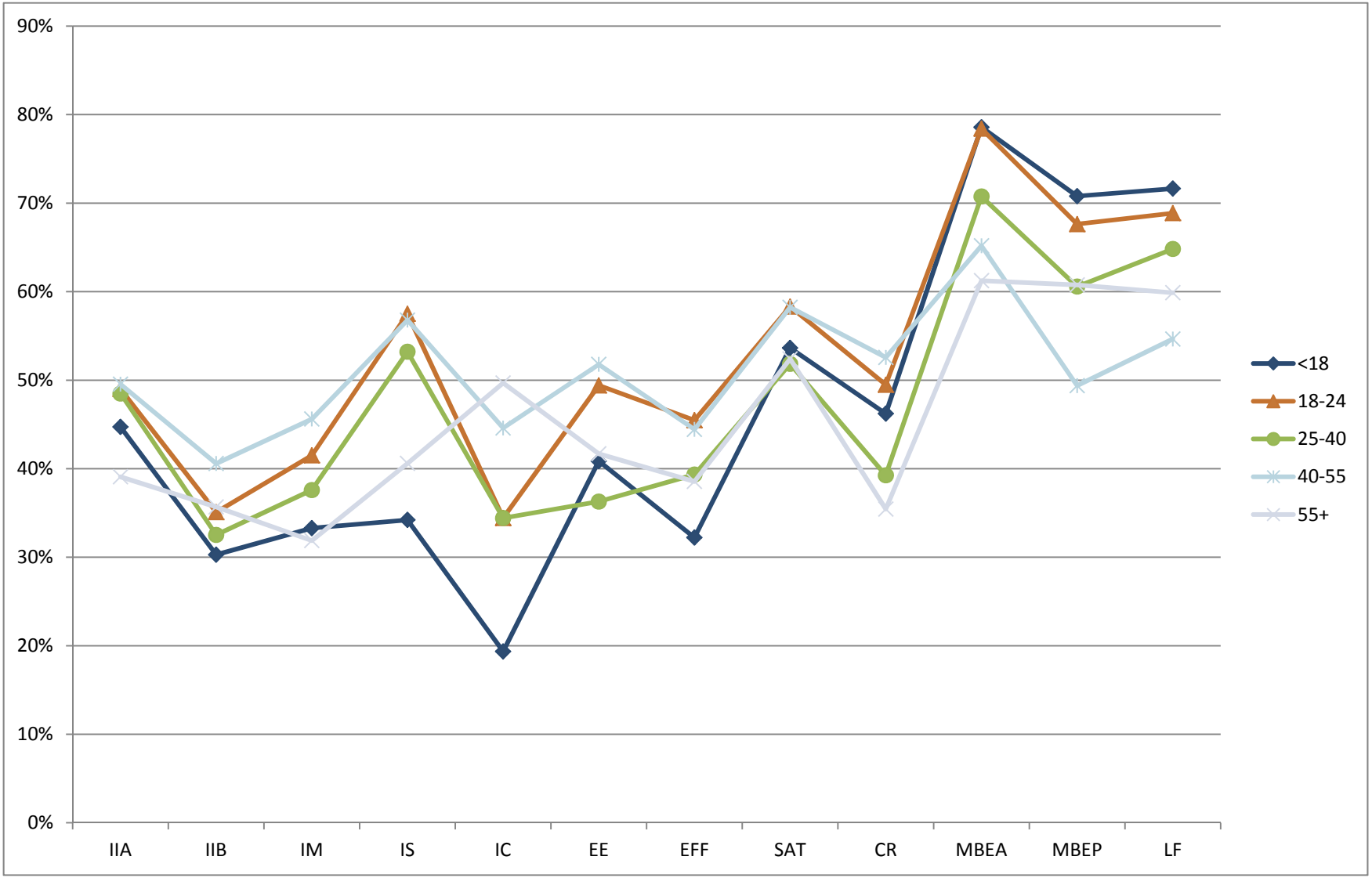
APPENDIX E

Graph of Elements of Leadership Style by Clan Position



APPENDIX F

Graph of Elements of Leadership Style by Age



APPENDIX G

Graph of Score Trends by Age