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Understanding the impact of radical innovation on innovator attitudes, attributes, and innovation-decision process: a case study of the Pulaski Academy football program's adoption of radical innovations

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UNDERSTANDING THE IMPACT OF A RADICAL INNOVATION ON INNOVATOR ATTITUDES, ATTRIBUTES, AND INNOVATION-DECISION PROCESS: A CASE STUDY OF THE PULASKI ACADEMY FOOTBALL PROGRAM'S ADOPTION OF RADICAL INNOVATIONS

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This dissertation, written by

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DEDICATION

To my grandmother, who sacrificed and set aside funds to help me pursue this dream; to my mother for teaching and encouraging me to do hard things; and to my wife for her constant support and love and in giving up her husband for countless nights in his pursuit of this opportunity, I say thank you with all my heart for blessing and enriching my life in countless ways.

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VITA

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President & COO, *Seedstone, Inc.* (June 2016 – Current)

- Lead the day-to-day operations of a multimillion dollar holding company
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Managing Partner, *Junto Strategy* (August 2009 – Current)

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- Acted as the HR lead for a tech company during a +$100M acquisition by Fortune 100 tech software and services firm.

Director, Product Management, *InsideOut Development* (June 2013 – February 2014)
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- Led the training product actualization and launch of a new individual contributor program, InsideOut Breakthroughs; Pilot programs included Nestle, Discover, and Valero.
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Director of Operations, *Sutherland Institute* (October 2006 – August 2009)

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ABSTRACT

Understanding the attitudes and attributes of innovators is crucial given the gatekeeper roles these individuals or organizations play in enabling innovation diffusion to occur. But what do innovators look like, and are their characteristics the same regardless of the type of innovation being adopted?

This case study of sought to understand the experience of the Pulaski Academy football program during the 2003 season as it acted as an innovator in adopting several radical innovations. The study provides a detailed case narrative that relies upon 25 existing text, audio, and video artifacts as well as 12 semi-structured interviews with program participants that included coaches, players and administrators, which were part of the 2003 Pulaski Academy football program.

The findings of this study suggest that the innovations Pulaski adopted were radical in nature as defined by Henderson and Clark (1990) and did have an impact on the attributes required to be an innovator. Further, these attributes differed in several instances from what Rogers' (2003) diffusion of innovations theory posits. The study showed that team's improved performance was the result of the adoption of a single radiation innovation, the no punting philosophy, but rather a combination of the adoption of several of the innovations and the leadership style of the head coach. The results of the case study confirmed Rogers' (2003) and Goss' (1979) assertion that unintended consequences occur with adoption. This particular case demonstrated that one of the unintended consequences of becoming an innovator is that the innovator status opens up additional and early access to other innovations.

These findings point to several recommendations for researchers, including: seeking to understand what innovator characteristics are unique for other innovation types noted in

Henderson and Clark's typology, testing the findings of this case in other social contexts, and evaluating the role the other unintended consequences noted in the study had in contributing to the Pulaski's success. For practitioners, the findings suggest possible leadership core competencies needed to facilitate innovation adoption and a caution to avoid the temptation to look for a silver bullet when attempting to help an organization be more innovative.

Chapter 1: Introduction

"Necessity is the mother of invention." ~ Plato*, The Republic*

Pulaski Academy is an independent private school located in Little Rock, Arkansas. While Pulaski has developed a reputation as an excellent academic institution, it also boasts a highly successful sports program that includes baseball, basketball, cross country, football, golf, volleyball, soccer, softball, a spirit squad, swimming, tennis, trap shooting, and wrestling. These programs have combined for a total of 35 state championships. But not all of their programs have seen such high levels of success.

Pulaski Academy began playing high school football in 1974. For 29 years, Pulaski Academy had been an average high school football program reaching the state semi-finals only twice. Because of the academic rigor and size of the school, the program had some limits on the kinds of athletes that could come to and be successful at Pulaski. It was a program that simply could not get over the hump and compete at a championship level like other programs at Pulaski had done.

In 2003, Pulaski promoted its offensive coordinator, Kevin Kelley, to the position of head coach, and his hire brought immediate changes to the program. Shortly after being hired, Coach Kelley began asking himself several questions relating to how coaching was being done. During this process, he came across a video of a Harvard professor that shared some interesting questions given the statistics he had evaluated about play calling decisions, particularly regarding punting and how statistics seem to indicate that teams would be better off running an additional offensive play rather than punting the ball. As a result of his initial program assessment, Kelley began to adopt a series of innovations to improve the football program, some of which were quite radical in nature.

The improved results were immediate. In his first year as head coach, Kelley and the Pulaski Academy football team won a state championship for the first time in school history. In the years that followed this initial adoption, Kelley has adopted additional innovations, including more frequent on-side kicking, constant practice regimen change ups, and the leveraging of new technologies to increase his players' ability to review game film. Kelley's efforts to be a first adopter for many of these changes have resulted in a football program that is now consistently winning at a high level and includes an additional four state championships. The performance hump has finally been cleared.

Statement of the Problem/Issues

The literature relating to innovation presents two conflicting viewpoints regarding what the attributes of innovators or *first adopters* actually are. The first line of scholarship is represented by Everett Rogers (2003) and his diffusion of innovations framework, which posits that first adopters (or what he calls *innovators*) are resource rich, have complex technical knowledge, and can deal with a high degree of uncertainty about the innovation and its adoption. The second line of scholarship is best symbolized by the work of Clayton Christensen (2000) and his concept of *disruptive innovation*, which characterizes first adopters as resource poor, willing to accept inferior products, and focused on lower cost.

Rogers' theory and description of innovator characteristics has been validated in multiple studies (Mahajan, Muller, & Srivastava, 1990; Mahler & Rogers, 1999; Martinez & Polo, 1996; Smith & Findeis, 2013). The conclusions reached by these studies are logical as it relates to innovations that require access to superior levels of resources to be a first adopter. Small banks, for example, were not able to afford ATM's early in the adoption cycle because of the high upfront costs of the first versions. Only later once scale had been achieved and the capital

investment costs had come down because of prior large adopters could a smaller, resource-constrained bank adopt the ATM technology.

Christensen (2000) argued that there are different types of innovation and that the disruptive type of innovation is created specifically to enable the poorest to adopt first. While much of Christensen's writing has focused on product innovations, disruptive innovations can also be organizational structures, processes, or strategies. In a business context, these structures could include a radical innovative process like total quality management (TQM) that enabled Japan to overcome its resource disparity after World War II and compete with the United States. A recent disruptive organizational structure is exemplified by the company Zappos, which has adopted a Holarctic structure where individuals do not have titles, managers, or hierarchy (Pisoni, 2015).

While several differences exist between a business context like Zappos and a sports team, these organizational types do share several commonalities. For example, there are reporting structure practices – Zappos (Holarctic) and sports team (hierarchical). Other similarities exist in recruiting, talent management, union relations, key performance indicators, and so forth. These processes, strategies, and structures represent opportunities for the adoption of disruptive organizational structures, processes, and strategies for companies and sports teams alike.

One example of this type of organizational disruptive innovation in sports is the concept of Saber metrics for which the Oakland A's were the innovator or first adopter. In popular culture, Saber metrics is often referred to as *moneyball*. Within Major League Baseball (MLB), a major financial disparity exists between teams that reside in largemarkets (e.g., Chicago, New York, or Los Angeles) and those teams that reside in smaller markets (e.g., Denver, St. Louis,

and Oakland). Table 1 provides a list of total team salaries for all 30 MLB teams at the beginning of the 2014 baseball season (Petchesky, 2014).

Table 1

2014 Opening Day Payrolls

Team Rank in Terms of Total Payroll	Total Payroll
1. Los Angeles Dodgers	$235,295,219
2. New York Yankees	$203,812,506
3. Philadelphia Phillies	$180,052,723
4. Boston Red Sox	$162,817,411
5. Detroit Tigers	$162,228,527
6. Los Angeles Angels	$155,692,000
7. San Francisco Giants	$154,185,878
8. Texas Rangers	$136,036,172
9. Washington Nationals	$134,704,437
10. Toronto Blue Jays	$132,628,700
11. Arizona Diamondbacks	$112,688,666
12. Cincinnati Reds	$112,390,772
13. St. Louis Cardinals	$111,020,360
14. Atlanta Braves	$110,897,341
15. Baltimore Orioles	$107,406,623
16. Milwaukee Brewers	$103,844,806
17. Colorado Rockies	$95,832,071
18. Seattle Mariners	$92,081,943
19. Kansas City Royals	$92,034,345
20. Chicago White Sox	$91,159,254
21. San Diego Padres	$90,094,196
22. New York Mets	$89,051,758
23. Chicago Cubs	$89,007,857
24. Minnesota Twins	$85,776,500
25. Oakland Athletics	$83,401,400
26. Cleveland Indians	$82,534,800
27. Pittsburgh Pirates	$78,111,667
28. Tampa Bay Rays	$77,062,891
29. Miami Marlins	$47,565,400
30. Houston Astros	$44,544,174

The payroll delta between the highest spending team, the Los Angeles Dodgers (large market team), and the Oakland A's (small market team) was approximately $152 million in 2014. This disparity in resources created and continues to create competitive challenges for the

small or mid-market teams in their efforts to retain top talent and be competitive. The large market teams' access to higher amounts of capital enables them to afford to pay top performing players and coaches. It also enables them to minimize the negative effect of a bad contract that can cripple a smaller market team that can't *eat the contract*.

In describing his organization's financial status compared to other major league teams, general manager Billy Bean is quoted in the movie *Moneyball* as saying, "The problem that we are trying to solve is that there are rich teams, and there are poor teams. Then there's fifty feet of crap. And then there's us" (Miller, 2011).

The adoption of the concepts of moneyball by the Oakland A's appears to be an attempt by a resource-poor organization (versus a resource rich organization) to compete in a market with organizations that controlled substantially larger resources thus appearing to contradict one of Rogers' main assertions regarding the prerequisites to be an innovator.

The Oakland A's example of radical innovation adoption is but one of many that appear in sports. Some of these examples include: the extended use of the full court press (Gladwell, 2013), the *spread offense* developed by Rusty Russell (2015), and the adoption of a west-coast style passing attack that was adopted by BYU in the 1970s (Edwards & Nelson, 1980). Each of these innovator adoption examples appears to demonstrate innovator characteristics (resource poor, seeking for a simpler solution, or willing to use what may be perceived as an inferior system in order to level the playing field and compete with more resource rich and technically superior organizations) that run counter to Rogers' adopter typology.

Purpose of the Study

As noted previously, a conflict exists regarding characteristics of innovation adopters. Christensen (2000) noted that innovators tend to be the poorest performing customers or the most

resource constrained, which is why they are looking for innovations that are often cheaper and simpler, even if that innovation performs (at least initially) at a sub-standard rate compared to established products or processes. Rogers (2003), on the other hand, argued that prerequisites for being an innovator include: having control of substantial financial resources, possessing the ability to apply complex technical knowledge, and demonstrating the ability to deal with a high degree of uncertainty about the innovation and its adoption.

The purpose of this case study was to describe the attributes, attitudes, and innovation decision-process of participants in a high school football program acting as a first adopter (innovator) for a series of radical or disruptive innovations relating to play-calling strategy and game management. By including a focus on the specific type of innovation being adopted, the researcher was able to provide further insight regarding the attributes, attitudes, and innovation-decision process of an innovator in the context of adoption of a radical innovation and thus strengthen the argument that Rogers' (2003) theory of diffusion needs to integrate some form of innovation typology to account for the variances in innovator characteristics when a radical innovation is present.

Research Questions

In order to achieve the purpose of this study, the following research questions were examined:

1. What are the attributes of those involved in the radical innovation adoption process?
2. What are the attitudes of those involved in the radical innovation adoption process regarding innovation?
3. How did those involved in the radical innovation adoption process experience the innovation decision-making process?

4. How do those involved in the radical innovation adoption process describe the nature of innovation?

Theoretical Framework

Innovation creation and adoption is a pervasive cultural phenomenon that has been studied extensively in the literature (Rogers, 2003). One of the most prominent theoretical frameworks used to study the process by which an innovation spreads within a social system is the diffusion of innovations framework posited by Everett Rogers. Gatignon & Robertson (1985) noted that scholars from a wide range of disciplines have made important contributions to the theory thus raising the theory's profile in both the academic and practitioner circles. The extensive use of Rogers' framework has been valuable in helping researchers better explain the flow of information, ideas, practices, products, and services within a variety of settings and contexts (Gatignon & Robertson, 1985).

Rogers' framework consists of four components as outlined in his definition of innovation diffusion where diffusion is "the process by which (1) an innovation (2) is communicated through certain channels (3) over time (4) among members of a social system" (2003, p. 11). Figure 1 shows graphically the process of diffusion over time (Wardley, 2013).

Rogers' framework has provided important insight into adopter types, the influence and impact of various types of communication channels, the role of innovation characteristics in the rate and ease of adoption, and the role of opinion leadership and change makers in facilitating diffusion (Gatignon and Robertson, 1985).

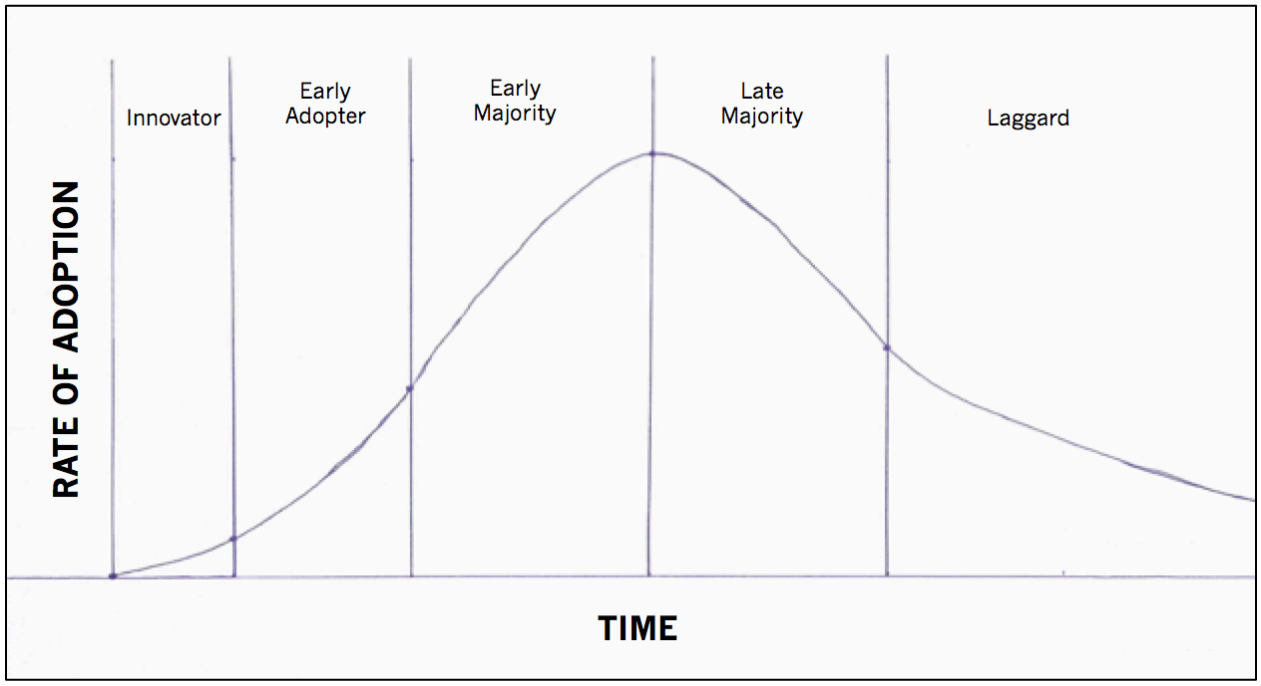

Figure 1. The diffusion process.

Rogers' theory, however, has done little to create a more comprehensive innovation typology, which may be a contributing factor to the apparent disagreement in the literature about the prerequisites and characteristics of first adopters. To date, innovation typology has not come from diffusion scholars but from other innovation scholars such as Enos' (1962) alpha and beta distinctions, Christensen's (2000) work on disruptive innovations, and Henderson and Clark's (1990) innovation typology. Of particular interest for this case study is the typology posited by Henderson and Clark that identifies four fundamental types of innovation: incremental, modular, architectural, and radical. Rather than distinct types, Henderson and Clark argued that these innovations exist by degrees and that an innovation may share elements of each category.

For this case study, the researcher approached the research purpose and objectives by combining Rogers' framework of diffusion of innovations with Henderson and Clark's innovation typology, which included the radical innovation type.

Definition of Relevant/Key Terms

The following section provides definitions to two different types of terms related to this research project. First, this section provides definitions for several key terms relating to the theory of diffusion and diffusion research. The second set of terms in this section relate specifically to the game of football.

Diffusion of innovations. A process of social change that consists of four key components: an (a) innovation that is communicated through a given set of (b) communications channels over a period of (c) time between members of a (d) social system (Rogers, 2003). Diffusion represents a special type of communication process in that the messages communicated are always about a new idea.

Innovation. The definition of innovation consists of two parts. First, innovation is a multi-stage process that enables individuals or organizations to take an idea and reshape, reconstruct, or transform the idea into a set of new or improved products, services, or processes (Baregheh, Rowley, & Sambrook, 2009). Second, the concept of innovation requires a perception of newness by the adopter, which may or may not relate to how new the idea is in terms of time (Rogers, 2003).

Radical innovation. An innovation that creates clear challenges for existing firms because it undermines the usefulness of existing capabilities and ways of operating (Henderson & Clark, 1990). Further, a radical innovation requires the development of a new set of

knowledges (e.g., how to use, develop, or market the innovation) regarding the innovation as existing knowledge sets become obsolete.

Innovativeness. Innovativeness refers to the relative speed of adoption of an individual or other unit compared with other members in the social system (Rogers, 2003). The sooner an individual or unit adopts an innovation compared to peers the more innovative that individual or unit is considered. Determining innovativeness plays an important role in helping to categorize an individual or unit within Rogers' five adopter categories: innovator, early adopter, early majority, late majority, and laggard.

Innovator. Rogers' (2003) adopter typology includes five different types of adopters: innovators, early adopters, majority adopters, late majority, and laggards. The innovator in Roger's five-tiered adopter framework represents a distinct type of adopter when compared to the other adopter types, particularly as it relates to risk (Bass, 1969). Innovators play an important gatekeeper role in diffusion (Rogers, 2003). They tend to be more interested in new ideas and show a high willingness to adopt new innovations (Jin, 2013). Innovators are not inhibited by the lack of diffusion of an idea (Mahler & Rogers, 1999), because innovators, unlike all other adopter types, are not influenced by the decisions of other actors in a social system (Bass, 1969). Rogers (2003) added that the most innovative members of a social system are often seen as deviants and as such are given low credibility status by the average member of the system and that innovators tend to have substantial financial resources within their control. Organizationally, innovator organizations tend to be larger in size (Libertore & Bream, 1997; Mahler & Rogers, 1999), which most likely translates into a larger revenue base and free cash flow with which to invest in innovative activities.

Innovation-decision process. This is a five-step, information-seeking process through which an individual or other decision-making unit moves from initial awareness of an innovation to full use (Rogers, 2003). The five steps include knowledge, persuasion, decision, implementation, and confirmation. The length of time required for an individual or other decision-making unit to pass through this process can vary greatly and can be an important way to differentiate adopter types.

Play-calling. At a fundamental level, play-calling is an individual behavior where typically one individual (an offensive or defensive coordinator) works with the head coach to determine a particular play that will be executed by the team (Reed, Critchfield, & Martens, 2006). In football, nine general types of play-calling decisions exist: three offensive (run, pass, or read-option), two defensive (run or pass defense) and four special teams (kick-off, punting, extra point or field goal). Play-calling strategies have a significant impact on the success of the team and tend to by highly subjective based on the past experiences, personal biases, and other observable factors (Jordan, Melouk, & Perry, 2009).

Game management. Sometimes referred to as situation management, game management refers to the decision-making process and approach of a coaching staff to a given range of variables and situations during the course of a game. Some of these management issues include play calling, use of timeouts, substitutions, and clock management. Because no "definitive literature on the subject [game management] exists" (Shpigel, 2015), game management is often considered one of the most challenging and demanding aspects of the coaching trade.

Cosmopoliteness. This is an attribute of innovators that leads them out of their local circle or sphere of influence (Rogers, 2003). It is often measured by how connected an individual is to outside sources of information and how connected the individual is to other innovators.

Communication. Rogers (2003) provided a concise definition of communication as the "process by which participants create and share information with one another in order to reach a mutual understanding" (p. 18). In this particular case, the mutual understanding relates to information regarding an innovation.

Authority innovation-decision. This type of decision to adopt or reject an innovation is made by a relatively few individuals within a system (Rogers, 2003). These decision makers tend to have high amounts of power, social status, or technical expertise.

Communication channels. At a basic level a communication channel is the means by which information is exchanged between individuals concerning a new idea (Rogers, 2003). Two types of channels are potentially present in an adoption process: mass media channels (one- or few-to-many) and interpersonal channels (one or few-to-one).

Rate of adoption. A basic definition of the rate of adoption is "the relative speed with which an innovation is adopted by members of a social system" (Rogers, 2003, p. 23). Several factors can influence the rate of adoption including the complexity of the innovation, opinion leaders, and proactive knowledge-building activities.

Social system. A social system refers to the set of interrelated units that are seeking to solve or accomplish a common goal (Rogers, 2003). The social system is the fourth element of Rogers' diffusion of innovations framework and is important in the diffusion process because the social system and the innovation shape each other through constant interaction (Loosemore, 1998). In the case of sports, the interrelated units may be members within a team, members within a particular role (quarterback, goalie, point guard, etc.), teams within a given level of competition (high school, college, professional, etc.), or an entire sport (baseball, tennis, soccer, etc.).

Case Setting

This case study uses Rogers' diffusion of innovations framework combined with Henderson and Clark's innovation typology. Diffusion consists of four elements: an innovation, communication, time, and a social system. Using this framework, the organizational setting characteristics were as follows:

1. The radical innovation was a redefined playbook and approach to play calling and game management with a particular focus on reducing the number of times a team decides to punt in a game, but other innovations may be identified during the research.
2. The communication channels appeared to consist of mostly proactive knowledge seeking by Coach Kelley. These initial sources of information regarding the radical innovation were primarily academics, who had conducted research on new ways to approach play calling and game management based on statistics. These sources represented a form of interpersonal communication channels.
3. The time frame under consideration for this case study was the hire of one of the team's assistant coaches in 1994 up through the 2016. Particular attention was given to the first season that Coach Kelley was the head coach.
4. The social system being evaluated in this case study was the high school football program at Pulaski Academy. The social system included coaches, administrators, players, and parents of players at Pulaski at the time the innovation adoption was occurring.

Role of the Researcher

The researcher has long been both an avid fan of football and sports in general. He has also been a regular participant. In addition, the researcher has had a keen interest in the process of adoption based on his work experience in the consumer products, political, and high-tech

sectors. Innovation adoption is of prime interest in these three sectors as noted by the vast amount of innovation diffusion research studies conducted in these contexts. Further, his interest has been both in understanding how organizations adopt innovation as well as identifying cases where great ideas never seemed to find broad acceptance. Based on these two interests, the researcher sought for way in which to conduct a research project that brought these two interests together.

This is not the first time the researcher has had interaction with Coach Kelley. A previous case study was done in 2014 with Kelley using the SPELIT matrix to understand various elements the adoption environment and to gain a greater understanding of Kelley's leadership style. The interview was conducted over the phone and the case study was later published in the *Journal of Strategic and International Studies*. Much of the researcher's understanding of the organizational setting and background of Kelley and history of the Pulaski Academy football program came as a result of this initial interview.

The previous relationship with Kelley and a broad prior knowledge of the social system as described by Kelley presents a potential for researcher bias, which is important for the researcher to acknowledge (Creswell, 2009). However, this previous relationship also indicates the researcher's ability to gain approval from key gatekeepers at Pulaski Academy to gain entry to the setting having gained approval for an earlier study.

Importance of the Study

The importance of this study is three-fold. First, the area of sports, particularly high school sports, is a largely unexplored social system with respect to diffusion of innovations when compared to other social system contexts such as IT, healthcare, public policy, marketing, and so forth. A search for diffusion of innovations and high school sports on *scholar.google.com*

yielded 11 results. Seven of the 11 results were related to injury prevention program adoption, particularly with regard to concussions. A study conducted by Sawyer et al. (2008) entitled "High School Coaches' Assessments, Intentions to Use, and Use of a Concussion Prevention Toolkit: Centers for Disease Control and Preventions 'Heads Up: Concussion in High School Sports'" is illustrative of what kinds of research have been done regarding innovation adoption in the high school sports context. None of the results, however, look at innovation adoption in terms of innovations that are changing the way playing schemes and strategy are being adopted by high school football coaches. This study helps fill that void.

Secondly, no study has been done using Henderson and Clark's innovation typology in conjunction with Rogers' diffusion framework. This study addressed that gap by incorporating the Henderson and Clark innovation typology into Rogers' framework in an effort to better understand the attitudes, attributes and innovation-decision making process of an innovator moving through the process of adoption of a radical innovation type.

Finally and perhaps most importantly, this study provides a potential explanation as to why the attributes, attitudes, and innovation-decision process identified in this explanatory case study differ from what Rogers (2003) asserts. In addition, the researcher makes the argument that there is a need for a potential theory extension to Rogers' framework where innovation typology is included. This inclusion helps to create a more holistic understanding of who first adopters are, explain why a certain type of innovation may have an impact on the innovator prerequisites and innovation decision-making process, and create a bridge between the two opposing characterizations of first adopters.

Summary

What does a first adopter look like? What impact does the innovation or the type of innovation have on the decision to adopt? What is the process an individual or organization goes through in deciding to adopt or reject a radical innovation? How long does it take for a radical innovation to go from idea to mass adoption? And where do people learn about radical innovations? The purpose of this case study was to examine the lived experiences of individuals associated with the Pulaski Academy high school football program to gain greater understanding of these questions as they relate to the adoption of a series of radical innovations.

In the next chapter, the researcher will look to the literature to outline the theoretical framework of this study and how the aforementioned questions have been studied in the past. The review of literature will also take an initial look at Henderson and Clark's innovation typology that may prove to be an important extension of the diffusion of innovations theory.

Chapter 2: Review of Literature

A critical part of the innovation lifecycle is the adoption process or how an innovation diffuses across a given social system. Enos' (1962) work on innovation identified two types of innovation: alpha and beta. This distinction like other innovation typology helped to highlight the notion that innovation moves through some sort of process or set of stages that took the innovation from idea toward adoption or application. While Enos' alpha and beta distinctions proved useful in demonstrating that there is an underlying process of adoption occurring, his alpha and beta innovation typology did not supply the how, the why, or the rate at which the innovation lifecycle occurs. In the 1940s and 1950s, a few independent scholars in education and sociology began to develop a line of inquiry that started to address these innovation lifecycle questions. Their efforts paved the way for the creation of a theoretical groundwork that Rogers would later call the diffusion of innovations (Rogers, 2003).

The Diffusion of Innovations Framework

Everett Rogers in *Diffusion of Innovations* defined diffusion as "the process by which an innovation is communicated through certain channels over time among the members of a social system" (p. 35). In his definition, Rogers (2002) highlighted the four key elements of diffusion: the innovation, communication channels, time, and the social system into which the innovation is introduced. The diffusion framework outlined in Rogers' book was the first attempt to more clearly define a general model of diffusion based on the work of previous scholars that could better explain the how, why, and rate of innovation adoption. The creation of a more formal umbrella framework (Campbell & Masser, 1995) for innovation diffusion was instrumental in creating momentum for diffusion inquiry and in helping to increase awareness among the disparate research traditions (Rogers, 2003). Innovation diffusion research includes both the

spontaneous, as well as the planned spread of new products, processes, or services. Rogers (2003) added that process of diffusion is an important form of social change where new ideas are invented, and in their adoption or rejection, these ideas lead to social consequences and change.

In the decades following the publication of *Diffusion of Innovations*, scholars from a growing number of disciplines have made important contributions to the theory raising the theory's profile in both the academic and practitioner circles (Gatignon & Robertson, 1985). This breadth of research has been valuable in helping researchers better explain the "flow of information, ideas, practices, products, and services within and across cultures and subcultures, or markets and market segments" (Gatignon & Robertson, 1985, p. 849). Since Rogers' first publication of *Diffusion of Innovations* (1962), the framework has become one of the most widely used theoretical models explaining how an innovation progresses from idea to early implementations to broad market adoption (Rogers, 2003). According to Rogers (2002), some 6,200 studies have been conducted using the model since the theory's introduction in 1963.

The Innovation

Rogers' first element of the diffusion framework is the innovation itself (Rogers, 2003). In order to create a formal construct of how innovation is viewed within a diffusion context, this section will look at the literature to provide a comprehensive definition of innovation, identify various types of innovation, define the five major characteristics that aid or impede innovation adoption, and address the construct of re-invention as it relates to innovation.

Definition. Definitions of innovation vary widely based upon the perspective of the individual, industry, or organizational function. A basic definition of innovation is found in Merriam-Webster's dictionary, which defines innovation as a "the act or process of introducing new ideas, methods or devices" (Innovation, 2015). This is similar to the Rogers' (2003)

definition of innovation where innovation is defined as “an idea, practice or object that is perceived as new by an individual or other unit of adoption” (p. 12). The main distinction in Roger’s definition versus the Merriam-Webster definition is the idea of perceived newness.

How innovation is defined can often depend on one’s professional background. A technologist’s definition of innovation includes the idea of evaluating old ways of thinking, embracing creativity, and seeing the possibilities of what technology can do (Violino, 1998). Kuczmarski (1996) provided a marketing-oriented view of innovation where innovation is not an act of introducing or reexamining but rather it is a mindset, attitude, or way of thinking that enables individuals or organizations to focus beyond the present to create a future vision. For the organizational development professional, innovation is inherently a non-linear, social process to ideate how organizations manage, organize, and deploy the firm’s people, technology and other assets (Totterdill & Exton, 2014).

Merriam-Webster’s and technologist’s definitions of innovation (2015) align with a more historical notion of innovation, where innovation is seen as something confined to the ideas, methods, and devices that emanate from R&D departments or science labs (Hull & Kaghan, 2000). However, over the past 20 years, the study of innovation has broadened to include a growing body of literature, particularly in strategic management, that looks at innovation as a primary organizing principle for firms. This shift in focus has enabled the creation of a deeper and more comprehensive definition of innovation. Baregheh et al. (2009) conducted a review of 60 definitions of innovation found in marketing, economics, organizational studies, entrepreneurship, technology, knowledge management, and business management literature. They found that innovation is not a simple process but rather a multi-stage process that enables individuals and organizations to “transform ideas into new/improved

products, services or processes" (Baregheh et al., 2009, p. 1334). Further, the definition of innovation includes an organizational rationale, namely that innovation occurs in order to enable organizations to compete more effectively, create market differentiation, or enable the organization to make critical advances in their respective marketplaces.

Types of innovation. The Rogers framework does not incorporate a formal innovation typology; however, for decades, literature regarding technical innovation has upheld the notion that there are varying types of innovation (Henderson & Clark, 1990).

Christensen (2000) noted that there are two fundamental types of innovation: *sustaining* and *disruptive*. Sustaining innovations generally improve existing product performance. These innovations can be incremental in nature or radical, but the product improvements are always aligned with the value set of mainstream customers in major markets. Further, sustaining innovations tend to be readily adopted by larger, more established firms (Mahler & Rogers, 1999) and generally enhance the market position of the current industry leaders (Christensen, 2000).

Disruptive innovations often initially result in poorer product performance compared to mainstream products. The feature set and value proposition of a disruptive innovation appeal to a fringe or completely new set of customers and are "typically cheaper, simpler, smaller, and frequently, more convenient to use" (Christensen, 2000, p. xv). Finally, disruptive innovations are most likely to be adopted by the least or poorest performing customers, which stands in direct conflict to what Rogers' (2003) argued regarding the characteristics of those who adopt first. This conflict could be the result of Rogers' definition of innovation being somewhat simplistic leading to the lack of a formal innovation typology within the diffusion of innovations framework.

Enos (1962) similarly divided innovation up into two types: *alpha* and *beta*. The alpha phase describes the actual invention process including laboratory and pilot operations up through the first successful commercial application of the invention. An alpha phase of innovation ends when it begins to successfully compete with an existing product or process. Both Enos and Christensen (2000) noted that alpha or disruptive innovations generally arise outside of existing market leaders. While the innovators had to have general knowledge of the space, they were generally not attached to any of the major firms.

The beta phase is characterized by improvement on the innovation itself. These improvements fall into one of three categories: (a) improvements to leverage economies of scale, (b) adoption and improvement by ancillary markets or industries that lead to new or additional applications, or (c) a general increase in tacit knowledge in operating or utilizing the innovation.

Henderson and Clark (1990) argued that innovation is more complex than this traditional two-type approach to labeling innovation. Rather than simply categorizing innovation as either incremental or radical, Henderson and Clark identified an alternative framework that introduces four types of innovation: *incremental, modular, architectural,* and *radical.* Rather than distinct types of innovation, their framework views the distinctions between the four types of innovations as a matter of degree. Figure 2 shows the four types of innovations and classifies them along the dimensions of impact and linkage to existing technology.

Linkages between Core Concepts and Components	Core Concepts	
	Reinforced	Overturned
Unchanged	Incremental Innovation	Modular Innovation
Changed	Architectural Innovation	Radical Innovation

Figure 2. Henderson & Clark's innovation typology

In this framework, radical innovations demonstrate similar characteristics of the Enos' alpha and Christensen's disruptive innovations typology. Henderson and Clark (1990) noted that radical innovation often creates difficulty for established firms, because a radical innovation undermines existing capabilities and destroys the usefulness of existing knowledge sets that have provided competitive advantage held by the established firms. A radical innovation often requires new learning and new skills and can pose a threat to old architectural knowledge. This threat to existing knowledge is one of the reasons that radical innovations often get screened out of internal communication channels for leading firms. Finally, radical innovation changes the fundamental design components and nature of the product, process, or system.

Similarly, incremental innovation holds similar characteristics to Christensen's sustaining innovation or Enos' beta phase innovations. These types of innovations tend to help established firms because they build on existing strengths or core competencies. Tushman and Anderson (1986) referred to this attribute of sustaining or incremental innovation as competence enhancing.

Henderson and Clark (1990) defined modular innovation as innovation that "changes only the core design concepts of technology" (p. 12). Further, this type of innovation makes no change to the product's architecture. Architectural innovation, on the other hand, makes major changes to the product architecture. More importantly, this type of innovation has a direct impact on the configuration of how the existing system links to components in entirely new ways. This type of innovation is often triggered by the introduction of components that then creates new linkages with other components in the core design of the product or service.

Characteristics of innovation. Innovation diffusion rates vary (Rogers, 2002). The primary cause for differing rates of adoption is directly tied to the characteristics of a particular innovation. Rogers (2003) noted five primary characteristics that affect adoption: (a) the perceived relative advantages (or disadvantages) of the innovation; (b) the degree to which the innovation is compatible with the needs, past experiences and values held by the potential adopter; (c) the level of complexity relating to understanding, use and integration of the innovation; (d) the ability of the adopter to experiment with implementation on a limited or trial basis; and (e) the visibility of results attained as a result of adoption.

Relative advantages. At a basic level, relative advantage refers to the degree to which an innovation is perceived to be superior to the current state (Rogers, 2003). Moore and Benbasat (1991) argued that this definition is incomplete and that relative advantage should be looked at in terms of perception of use such that the more correct definition of relative advantage would be "the degree to which using the innovation is perceived as being better than using its precursor" (p. 196). Relative advantage plays an important role in adoption because innovation adoption is often associated with risk (Kuczmarski, 1996; Violino, 1998). Thus, the perceived relative advantages of an innovation over the current state play an important role in whether or not an

innovation gets adopted as well as the rate of adoption (Rogers, 2002). Zirger and Maidique (1990) found that new products needed to provide superior benefit as perceived by the adopter compared to the current practice, idea, or product for adoption to be considered.

These value-added advantages of a new innovation could include a unique set of features; superior technical performance; reduced pricing; or improved quality, reliability, or design. Image is also another important relative advantage where image relates to how adoption impacts or enhances the social status of an individual or other decision-making unit within a social structure (Moore & Benbasat, 1991). Finally, perceived ease of use of an innovation plays a significant role in innovation adoption (Templeton & Byrd, 2003). Ease of use becomes increasingly important as an individual or decision-making unit evaluates an innovation's compatibility and trialability. Individuals and firms use a variety of methods to determine the relative advantage of an innovation. Some firms use justification exercises or feasibility studies (Chan & Williamson, 1999). Others have developed instruments that help gauge perceptions of using the innovation not just evaluating the perceptions of the innovation itself to determine likelihood and success of adoption (Moore & Benbasat, 1991). Two of the most prominent of these instruments are the *theory of reasoned action* (TRA) developed by Ajzen and Fishbein and the *technology acceptance model* (TAM), which was developed by Davis (Templeton & Byrd, 2003).

Compatibility. Rogers (2003) defined compatibility as "the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters" (p. 240). A wide range of relationships and organizations can shape an adopter's values. One prominent organizational relationship that impacts an adopter's value is religion (Paul, 1990). Muslim women in Bangladesh, for example, were reluctant to adopt contraception

innovations (particularly birth control pills) because they believed the practice was not permitted by Islam. This lack of compatibility between values, as shaped by religious beliefs, and the innovation created a significant obstacle to the promotion of family planning in Bangladesh.

Past experiences can also have an impact on adoption, particularly if the experience is negative (Rogers, 2003). The term *innovation negativism* refers specifically to compatibility characteristic, where the more an individual experiences failure around adoption of an innovation the more likely that they are to reject or to view all future innovations with apprehension. Templeton and Byrd (2003) demonstrated a positive correlation between the compatibility and a users perception of ease of use. The perceived ease of use enabled users to believe that an innovation would be compatible with the existing organizational infrastructure and as such have a minimal impact on their work tasks and setting, thus meeting a need of adopters to reduce risk related to innovation adoption. It is important to note that while compatibility is a factor in the rate of diffusion, it is less important that the perceived relative advantage of an innovation (Rogers, 2003).

Complexity. Complexity is the perceived difficulty in using or adopting an innovation (Kellison & Hong, 2015). Rogers (2003) noted that complexity also refers to how well an individual or organization understands the innovation. In contrast to the other four characteristics of innovation, complexity and rate of diffusion share an inverse relationship, meaning that the higher the level of complexity the lower the rate of adoption (Rogers, 2002). One element that can increase the perceived level of complexity of an innovation is the amount of change required for adoption, which often accompanies the innovation adoption process (Hull & Kaghan, 2000). Thus, a lower the level of change needed for innovation adoption will mean that the individual or organization will be more likely to adopt as the perceived complexity is reduced. Examples of

innovations that would require lower levels of change would be Henderson and Clark's incremental innovation or innovations that align with Enos' beta innovation construct. On the other hand if an innovation requires a great deal of change in order to facilitate adoption, the perceived level of complexity will rise and the individual or organization will be less likely to adopt. Examples of a more complex innovation would be a disruptive innovation as described by Christensen (2000) or radical innovation as described by Henderson and Clark (1990).

Trialability. Trialability refers to the extent to which an innovation can be *tried* on a limited or incremental basis (Rogers, 2003). Trialability is one of the main ways an adopter can reduce risk and remove uncertainty enabling faster adoption of the innovation. Trialability is a unique characteristic in that the context of the innovation often determines the impact of this innovation characteristic. The context of an innovation refers to the stage of innovation adoption or adopting unit (individual or organization).

Trialability, as well as observability, is less important for innovators and early adopters but more important for later adopters seeking to minimize risk (Kellison & Hong, 2015). This is largely the result of the newness of an innovation on the diffusion curve. The newness or lack of adoption example makes it difficult to test drive a new idea or have sufficient information on how to successfully implement the innovation.

Rogers (2003), on the other hand, argued that trialability matters more at the early stages of the diffusion curve and less so as an innovation becomes more widespread in its adoption. Perhaps this conflict in data is a reflection of the second context of innovation: the adopting unit. Moore and Benbasat (1991) noted that the importance of trialability changes is based on the adopting unit. Trialability matters much less in an organizational context where risk can be

spread out; however, trialability is a significant concern when individuals are adopting at their own risk.

Observability. Observability is perhaps the most complex construct of the five characteristics (Moore & Benbasat, 1991). At a basic level, observability refers to the degree to which the results of the innovation are both visible and communicable to others in the social system (Rogers, 2003). But as Rogers' (2003) noted, "some ideas are easily observed and communicated" and "other innovations are difficult to observe" (p. 258). Moore & Benbasat (1991) found that observability is perhaps better assessed by dividing the characteristic into two sub-characteristics: *result demonstrability* and *visibility*.

Result demonstrability focuses on the tangibility of results of adopting or using a particular innovation and ties back to the relative advantage characteristics of an innovation. Visibility on the other hand looks at the level of exposure or the literal ability to see the innovation. Zajonc and Markus (1982) found that even a base level of exposure to the innovation can make an individual's attitude toward the innovation more positive.

Mahler and Rogers (1999) demonstrated the importance of observability in their study of innovation of adoption in the German banking industry. The lack of observability was found to be one of the most important characteristics of innovation that prevented non-innovators in the German banking industry from adoption. The German bank study noted that every innovator category, with the exception of innovators, listed the low rate of innovation adoption (or observability) as the most significant reason for not proceeding with adoption. Even innovators wrestled with the low rate of diffusion, listing the low rate of diffusion as the second highest reason for not adopting a telecommunications innovation.

While these five characteristics have proven most common, other innovation characteristics can also have an impact on the rate of adoption, most notably the lack of knowledge regarding an innovation (Henderson, Dancy, & Niewiadomska-Bugaj, 2012).

Re-invention. Rogers (2003) defined re-invention as the "degree to which an innovation is changes or modified by a user in the process of its adoption and implementation" (p. 180). Other terms associated with re-invention in the literature are *adaptation*, which is synonymous with re-invention, and *fidelity*, which is the opposite of reinvention and refers to the adherence or level of full adoption of the innovation without changes.

One of the challenges of adoption fidelity is that innovation is not a fixed entity and is shaped not only by the creator but also by the users (Rogers, 2003). Boczkowski (1999) also noted that innovations "are not only constructed by their designers, they are also reconstructed by their users" (p. 91). This *reconstruction* or re-invention is most likely to occur during the implementation stage of adoption (Rogers, 2003). During implementation, the level of trialability (one of the five major innovation characteristics) plays an important role in re-invention or adaptation.

As early adopters try out the new innovation, they tend to customize it to their own conditions leading to product or process changes as the innovation further diffuses. Conditions that can have an impact on the level of re-invention include local practice norms or needs, other innovations, and perceived levels of risk (Hashimoto et al., 2006). A report from the Center for Substance Abuse Prevention (2002) found that common adaptations include deletions or additions, cultural modifications, and intensity levels in the form of administrative or manager pressures.

The challenge is that while innovation is not static, too much re-invention or adaptation can have significant negative consequences on the innovation providing desire results (Noonan et al., 2009). This is particularly relevant for innovations like evidence-based programs where fidelity to the program is often required in order to see high levels of program effectiveness. Re-invention can help speed the process of adoption (Rogers, 2003), and so the challenge then for the individual and the organization is to find a balance between enabling some level of re-invention to help speed adoption and sustainability of the innovation and maintaining a certain level of fidelity to the original innovation (Center for Substance Abuse Prevention, 2002).

Communication Channels

The second element of the diffusion of innovations framework is communication channels or the means by which information is exchanged between individuals concerning a new idea. The following three sections provide a broader review of three key concepts relating to this second element of diffusion: communication in the context of diffusion, communication channel types, and the concepts of homophily and heterophily.

Communication in the context of diffusion. According to Rogers (2003), communication is "the process by which participants create and share information with one another in order to reach a mutual understanding" (p. 18). Within the context of diffusion, the communication process must involve information regarding an innovation, an individual, or other unit adoption that has developed some level of knowledge of, or experience with, the innovation, another individual(s) or organization that does not have knowledge of, or experience with, the innovation and the use of some type of communication channel connecting the two units.

Grantham and Tsekouras (2005) noted that successful diffusion is dependent on effective communication regarding the merits of the innovation between the users and potential users. An effective communication process therefore is not linear in nature but is, as Rogers (2003) argued, a process that is iterative and interactive in nature as the two parties seek a shared understanding of the innovation and how that innovation effectively replaces existing systems, behaviors or ways of doing things.

Communication channel types. As noted above, the communication process in diffusion requires or relies up on one or more types of communication channel. Rogers (2003) identified four different types of communication channels: mass media, interpersonal, localite and cosmopolite. Each of these communication channels plays a different role in creating knowledge, influencing the adoption decision, and impacting attitudes regarding an innovation. The level of influence of these communication channels has become a key element of diffusion measurement tools like the Bass model (Song & Parry, 2009).

A fundamental assumption of diffusion assessment models like the Bass model is that communication channels have an influence on the timing of innovation adoption. In the Bass model, communication channels are represented via the coefficients of external and internal influence (Bass, 1969). The influence of these types of communication channels is not static. Communication channels differ in their level of impact and at what point in the diffusion process a specific channel has more or less influence on the five different adopter types (Gatignon & Robertson, 1985; Rogers, 2003).

Mass media channels leverage a mass medium (e.g., radio, television, newspapers, etc.) to enable communication from one or a few individuals to a large and broad audience (Rogers, 2003). Mass media channels are most effective at creating new knowledge or awareness about a

product, shifting weakly held attitudes regarding the innovation, and reaching a large audience quickly. In general, mass media channel is more influential during the knowledge gathering stage of the innovation-decision process. However, mass media channels can be influential even during the persuasion stage of innovation-decision adoption process when the innovation requires a lower level of cognitive processing to adopt (Bettman, 1979; Robertson, 1971; Swinyard & Coney, 1978). Finally, the use of mass media channels can serve as an indicator of adopter innovativeness, because mass media usage typically represents information gathering that is external to the immediate social system of the adopter (Gatignon & Robertson, 1985). Thus the greater the propensity of the individual to use information from these external or cosmopolite sources the more likely the individual is to be an early adopter.

Interpersonal channels are primarily a face-to-face interaction where information is exchanged between two or more individuals (Rogers, 2003). These interpersonal channels are shaped by the level of personal influence of the individual who holds knowledge or experience with the innovation and play an important role in both the speed and shape of the diffusion process (Gatignon & Robertson, 1985). In many cases the impact of interpersonal channels and the impact of personal influence can mediate the impact of mass media communication channels particularly for later adopters. The nature of interpersonal channels allows for information exchange that helps to provide clarification and a deeper level of information regarding the innovation (Rogers, 2003). Further, interpersonal channels are more effective than mass media channels at helping to overcome various social-psychological barriers (e.g., selective exposure, selective perception, and selective retention) and strongly held attitudes regarding a given innovation. One common type of interpersonal channel, particularly in a professional or working setting, is what Rogers calls *near peers*. The influence and presence of these near peer networks

are most influential during the persuasion and decision stages of the innovation-decision process (Van den Bulte & Lilien, 2001).

The emergence of the Internet communication tools and social media has blurred the lines somewhat between mass media and interpersonal channels. These new virtual mediums represent somewhat of a hybrid channel that has characteristics of both mass media channels as well as interpersonal channels (Rogers, 2003). In future research, it may be beneficial to treat the Internet as its own unique channel.

Localite channels link individuals within a social system (Rogers, 2003). As such, these channels are almost entirely interpersonal; however, not all interpersonal channels are localite. There are several types of interpersonal channels that are cosmopolite in nature (e.g., change agents, visits outside the local community, and outsiders visiting the local system). One of the key characteristics that localite channels share with both localite and cosmopolite channels is the influence these channels have on adopters during the persuasion stage of the innovation-decision process.

Cosmopolite channels link an individual or group of individuals with sources that exist outside of the social system where a particular innovation is diffusing (Rogers, 2003). Mass media channels tend to be exclusively cosmopolite and share the same importance during the knowledge stage of the innovation-decision process. Rogers and Shoemaker (1971) found that cosmopolite channels (consisting of both mass media channels and cosmopolite interpersonal channels) in both developed and developing nations were most important during the knowledge stage and less important during the persuasion stage. In the developing nations, 81% of respondents were using cosmopolite channels during the knowledge stage compared to 58% usage during the persuasion stage.

Time

The third component of the innovation diffusion theoretical framework is time. This aspect of the diffusion framework represents one of the theory's unique strengths as compared to other behavioral research frameworks that tend to ignore the time dimension (Rogers, 2003). The time dimension of innovation diffusion incorporates three components: the innovation-decision process, the concept of innovativeness and adopter types, and the rate of adoption. Given that the focus of this study is to better understand the nature of an innovator in adopting a radical innovation and how that individual or organization experiences implementation of a radical innovation, the researcher will give greater attention to the attributes and motivations of innovator adopter category.

Innovation-decision process. The decision to adopt or implement an innovation is not an instantaneous act (Rogers, 2003). Ryan and Gross (1943) were the first to identify a set of stages that an individual or decision-making unit goes through in innovation-decision process. Subsequent scholars: Mintzberg, Raisinghani, & Theoret (1976), Simon (1977), and Rogers (2003) have each developed models that take a linear view regarding the adoption decision or progression through the decision. Each model contains phases that include a level of knowledge acquisition, problem framing, adoption decision, innovation adoption, and a confirmation of the adoption decision. For this research study, the author relies on Rogers' model. Rogers' framework identifies five specific phases in the innovation-decision process (Henderson et al., 2012):

- Knowledge about the particular innovation;
- Persuasion about the benefits of the innovation;
- Decision to adopt the innovation;
- Implementation of the innovation; and
- Confirmation from continuing implementation of the innovation.

Walitzer, Dermen, Barrick, & Shyhalla (2015) validated the utility Rogers model finding that "variables representing the knowledge, persuasion, decision and implementation stages of the innovation-decision process directly predicted immediately subsequent stage variables" (p. 8).

The following five sections will provide a brief overview of each of these phases in the innovation-decision process.

Knowledge. The knowledge phase is the first step in the decision making process and occurs when a decision-making unit (an individual, team or organization) is first exposed to an innovation's existence and gains some level of understanding of how it functions (Rogers, 2003). This early knowledge of an innovation can be gained actively as individuals or organizations that seek out innovation knowledge generally are looking to address a perceived need. The decision-making unit may also become aware of an innovation passively. Passive knowledge of an innovation is often generated through advertising, sales persons, trade associations or peers. A study of family forest owners by Korhonen, Hujala, and Kurttila (2013) provides an example of how both passive and active knowledge gathering occurs at this early stage of the decision-making process. The study found that knowledge regarding innovations in forest management came primarily from passive sources: newspapers, industry/trade publications, and from government agencies; however, some of the forest owners had been actively seeking information and forming opinions regarding protection practices years before formal programs were introduced by government agencies.

Rogers (2003) noted that not all knowledge is the same. In the information-gathering process, individuals or organizations come in contact with three types of innovation knowledge: awareness, how-to, and principles knowledge. Awareness knowledge usually answers the question of "What is the innovation?" and is most easily gained via mass media channels and can

lead the individual or other decision-making unit to seek for additional levels of knowledge. It is most impactful and most present at the knowledge stage of the decision-making process. Awareness knowledge can also be gained through peer/professional networks, professional development or institutional on-boarding processes (Henderson et al., 2012).

How-to knowledge provides the adopter with use knowledge. This type of knowledge is an essential component in facilitating or inhibiting the rates of trial or adoption of an innovation and as such is more critical at during later phases of the decision process (King & Rollins, 1995). This type of knowledge helps provide a clearer conceptual understanding (Cheung, 1999) of the particular innovation. Change agents or opinion leaders play an important role in the dissemination of how-to knowledge and in so doing can have the most impact on facilitating movement from the knowledge phase to the persuasion phase of the innovation-decision process (Rogers, 2003).

The final type of knowledge is principles knowledge. This type of knowledge helps to explain the how and why the innovation works. Examples of principles knowledge in relation to an innovation would be germ theory and boiling water, human reproduction and family planning, and information technology platforms and online commerce. Principles knowledge is not necessary for adoption, but the lack of principles knowledge can result in the misuse of the innovation and/or ultimately discontinuance. Rogers (2003) argued that change agents should focus most of their effort in disseminating this type of information because they often have the most relevant technical knowledge.

Persuasion. The persuasion phase begins once a decision-making unit (an individual, team or organization) creates either a favorable or unfavorable attitude towards the innovation (Rogers, 2003). While the knowledge phase is largely a cognitive exercise, the persuasion phase

is far more affective in nature. During the persuasion phase, the individual or decision-making unit becomes much more psychologically invested and involved. At this phase, perception and perception formation become critically important as the individual begins to form attitudes relating to the innovation's attributes. These innovation attributes include relative advantage, compatibility, the level of complexity of the innovation both in terms of use and integration into the organization.

An individual develops favorable or unfavorable attitudes toward an innovation via an evaluation of the compatibility with the innovation relative to their current situation (Cheung, 1999). For example, English teachers in Hong Kong examined the compatibility of an innovative teaching approach with regard to the impact or effectiveness in improving student learning outcomes as well as evaluating the advantages and potential problems the innovative teaching approach could pose for them personally.

In addition to the innovation attributes, Van den Bulte and Lilien (2001) noted the importance of near peer networks in the innovation decision process for doctors developing positive attitudes during the persuasion phase. After the initial awareness of the innovation (tetracycline) was acquired, doctors tended to rely on the experiences of their peers for how-to and principles knowledge and discount the information from pharmaceutical companies as less credible.

Decision. The decision phase takes place once the decision-making unit (an individual, team or organization) starts to engage in the kinds of activities that lead to a choice of whether or not to adopt the innovation (Rogers, 2003). A wide range of studies have been conducted to analyze various factors influencing this stage of the decision process including the influence of gender roles (Ndubisi, 2006), spousal differences in adoption (Krampf, Burns, & Rayman, 1993),

change agent attitudes (King & Rollins, 1995), benefits and usability communication (McDonald, Heanue, Pierce, & Horan, 2015) and adopter attitudes, the nature of work, organizational design and relative advantage (Nbubisi & Kahraman, 2005). According to Rogers (2003), trialability also is an important factor in the decision stage. If during a trial of an innovation, the process/idea/technology proves to have relative advantage over the current state individuals will most likely move toward full adoption. In some cases trials can occur vicariously or be accomplished via a demonstration by a respected opinion leader.

While the decision phase is the most likely spot for adoption or rejection, each phase of the decision-making process represents a potential rejection point. This view is consistent with Seligman's (2006) sensemaking framework, where he argued that the decision-making process is less linear than described by Rogers and that the decision to adopt or reject can happen at any point and is not necessarily final.

Implementation. The implementation phase occurs when an decision-making unit (an individual, team or organization) takes the steps necessary to integrate the a new idea into operating processes of the team or organization (Rogers, 2003). This phase represents a shift from a mental process, or what Klonglan and Coward (1970) referred to as *symbolic adoption*, to overt changes in behavior as an innovation is put into use. During the implementation phase, adopters become more active in their information seeking efforts as they seek to understand key questions regarding usage such as "Where or how can I obtain the innovation?" "How do I use it?" and "Are there potential problems I might encounter to operate or integrate the innovation into my current work habits?" (Rogers, 2003). These types of how-to knowledge questions are usually best answered by change agents who have a certain level of technical knowledge regarding the innovation.

Implementation represents perhaps the most challenging phase for the adopter and is usually more serious when the adopter is an organization (Rogers, 2003). One reason for this difficulty is a direct result of the nature of implementation process itself, which requires some level of real behavior change (Evans, Murphy, & Scourfield, 2015). According to Zigarmi and Hoekstra (as cited in Blanchard, 2010) 70% of all change initiatives fail. A Towers Watson survey (2013) found that the failure rate was even higher and that only 25% of change initiatives are successful over the long term. Harvey, Dopson, McManus, & Powell (2015) acknowledged this dilemma in the medical field noting that while medical innovations have shown benefit in academic evaluations, those same innovations have proven difficult to implement.

A whole body of literature has developed around implementation and change management as researchers have attempted to better understand factors that impact successful implementation of an innovation. Henderson et al. (2012) found that the lack of ongoing support during implementation led to one-third of faculty ending use of the innovation after a brief adoption trial. Securing acceptance of the innovation by those impacted by the change is also an important factor to ensure that the implementation of the innovation is successful (Fullan & Hargreaves, 1992). This finding is consistent with the fourth element of Kotter's change model; Kotter (1996) posited that successful change efforts require the change agent to communicate for buy-in or acceptance of the change from a broad range of individuals within an organization (Cohen, 2005) as well as a communication cadence that is sufficiently frequent (Kotter, 2006) or the likelihood of the implementation change being successful is reduced.

Cheung (1999) posited that one of the reasons that successfully navigating the implementation phase has proven difficult is that the process is often more complex than what Rogers' model defined. Evans et al. (2015) also argued for more models that can help adopters

understand the complex nature of the implementation process. Given that the implementation phase can continue for a lengthy period of time (Rogers, 2003), Cheung's argument that the implementation should be subdivided into four sub-phases (experimentation, adjustment, mastery and personalization) makes sense in an effort to better identify and understand key transitions that need to occur for successful completion of the implementation phase. While Cheung's model is perhaps more directly tied to the innovation adoption process, several other implementation models exist. For example, Kotter (1996) argued for an eight-stage model for effective implementation of change while Bridges and Bridges' (2009) model called for only three phases: Ending/Losing/Letting Go, The Neutral Zone, and The New Beginning. These two models represent only a small fraction of the range and number of approaches and models dealing with the implementation of any form of change—be that innovation adoption or some other form of change.

Confirmation. For many, the implementation stage may represent the final stage of the decision-making process (Rogers, 2003). It is also not uncommon to see levels of attrition of decision-making units throughout the five stages of the innovation-decision process (Henderson et al., 2012). However, the confirmation phase represents the final stage of the decision-making process (Rogers, 2003).

Three pathways are considered during the confirmation stage: continue use and complete adoption, explore reinvention options to further personalize the innovation, or discontinue use of the innovation. For those that continue to use and become high users of the adoption, one of the common behaviors during the confirmation stage is to look for external reinforcement of their innovation-decision. This behavior enables the adopter to mitigate the effects of dissonance, which could possible lead to discontinuance. Long-term users are typically a small minority of

adopters. In the adoption of research-based instructional strategies, approximately 23% of all physics faculty became high users of the innovative research-based instructional strategies, thus indicating a full progression through the innovation-decision process.

If the individual, team, or organization begins to receive credible and compelling conflicting messages about the innovation it is not uncommon for discontinuance to occur (Rogers, 2003). Adopters generally choose to discontinue use for two reasons. First a replacement innovation is adopted that displaces the prior innovation. Second, adopters become disenchanted with the innovation because the innovation fails to produce the desired relative advantages. Those who tend to discontinue most often share similar characteristics with laggards, who have a higher rate of innovation discontinuance overall.

Innovativeness and adopter types. Innovation adoption is an over time sequence, meaning that individuals in a given social system do not adopt a particular innovation all at the same time (Rogers, 2003). The categories or groupings of these adopter types can vary from study to study (Martinez, Polo, & Falvian, 1998). For example, Bass (1969) referred only to types of adopters: innovators and imitators. Rogers (2003) identified five classification categories of innovation adopters: Innovator, Early Adopters, Early Majority, Late Majority, and Laggards. These groupings are typically based on a scale of innovativeness that evaluates the on the timing and rate of adoption of a particular innovation of an adopter as compared to others in the social system (Rogers, 2003). The over-time sequence of adoption typically mirrors a normal frequency distribution. Figure 3 shows the adopter type and percentage for each category.

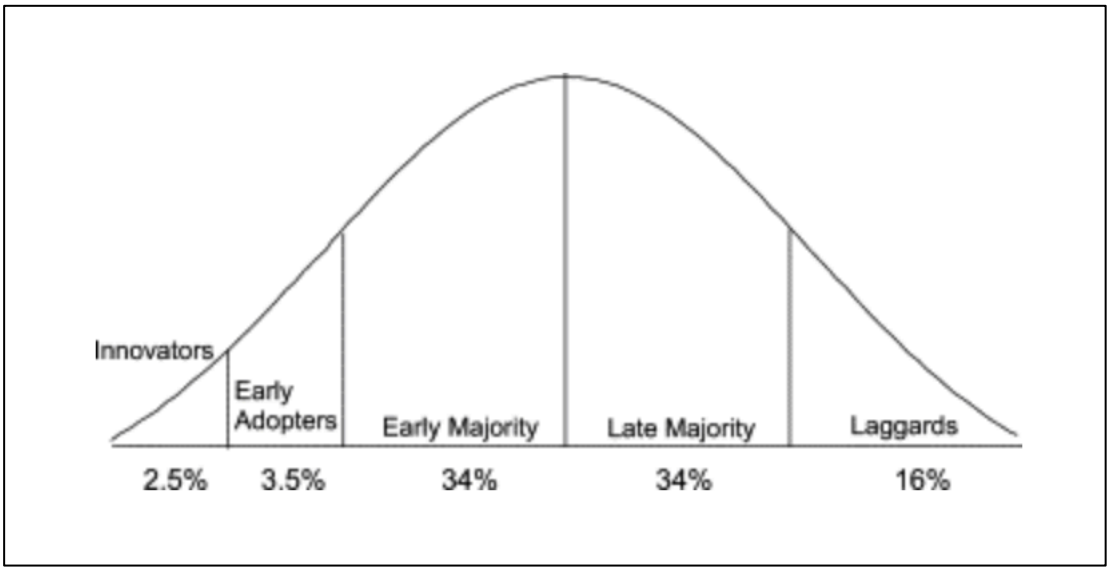

Figure 3. Adopter categories & sizes

For the purposes of this study, the author will rely on the five categories theorized by Rogers. The following five sections provide an overview of the five types of adopters and some of their characteristics. The fifth section, *innovators*, will provide a much more extensive review of the literature regarding the innovator adopter type because of the intent and purpose of this study in examining innovators in the adoption of disruptive or radical innovation.

Early adopters. Early adopters are a key constituency in the diffusion process. These adopters are often referred to as opinion leaders and play an important role in the diffusion process as later adopters rely heavily on the adoption experiences of the early adopters (Fahey & Burbridge, 2008; Rogers, 2003; Schmidt & Brown, 2007). As a group they represent 13.5% of all adopters (Rogers, 2003). Early adopters tend to be far more integrated into local systems than innovators (Rogers, 2002). This connection enables them to have a high degree of opinion leadership compared to innovators. When enough early adopters have gone through the innovation-decision process, a critical mass is achieved, which represents an inflection point along the diffusion curve where the rate of adoption becomes self-sustaining.

Martinez et al. (1998) found that an inverse relationship between age and the likelihood of an individual being an early adopter exists, namely that as an individual's age increases the probability of that individual to be an early adopter decreases. Communication channels for early adopters also differ from later adopters. For the early adopter, external influence in the form of publicity through a range of media channels is critical but becomes almost irrelevant for later adopters.

Early majority. Majority adopters represent 34% of total adopters (Rogers, 2003). As one of the largest groups of adopters, majority adopters represent an important link between the innovators and early adopters and the late adopters and laggards. These adopters are more deliberate, and while they tend to be willing adopters, they seldom lead the adoption process. Hartzler and Rabun (2013) found that early majority adopters tended to take a wait-and-see approach toward adoption. These adopters tended to be more guarded in their optimism about the benefits of an adoption and used the innovation in selective ways. Early majority adopters' use or adoption of a particular innovation may also tend to quickly stop if interest wanes or the impacts do not become apparent soon after adoption.

Late majority. Similar to majority adopters, late adopters represent 34% of total adopters (Rogers, 2003). For these adopters, adoption may be more of necessity or as a result of social pressure as opposed to the willingness to adopt that characterizes majority adopters. Late adopters rely heavily on word of mouth or internal influence in their decision to adopt (Martinez et al., 1998). For late majority adopters, a negative experience with a previous attempt at adoption can become a powerful disincentive and hindrance to future openness to innovation (Hartzler & Rabun, 2013). Late majority adopters can have a difficult time sustaining adoption because it often results in a sort of cognitive dissonance for the adopters where the new process

or nature of the innovation runs counter to their closely held beliefs or personal philosophy. Rogers (2003) referred to this dissonance as *disenchantment discontinuance*.

Laggards. Laggards are the final group to adopt an innovation (Rogers, 2003). These adopters tend to be the most isolated in their social networks and are characterized by a relative suspicion of innovations and change agents. They also tend to lag in their awareness of new ideas and have limited resources compared to early adopters. This lack of resources helps to explain, at some level, their hesitancy to adopt as failure of an innovation to provide promised value is more costly to the laggard. Martinez and Polo (1996) confirmed the impact of economic resources in adoption of an innovation. In the adoption of a range of consumer goods, a positive correlation existed between annual income and innovativeness. Rogers (2002) also noted that these late adopters tend only to accept a new idea when surrounded by peers who have adopted the innovation and are highly satisfied with the new idea.

Innovators. As noted previously, this section will provide a more in-depth look at this particular innovator type. Rogers defined this category arbitrarily as the first 2.5% of innovation adopters (Bass, 1969). Innovators play an important gatekeeper role in diffusion (Rogers, 2003). They tend to be information seekers, always on the lookout for new ideas. This information seeking bias means that they have a high degree of exposure to a wide range of mass media channels and their personal networks extend over a large and diverse area. Innovators, as well as early adopters, tend to be tentative in the degree of their adoption of a new idea. Because they cannot depend or look to the experience of their peers, they attempt to mitigate some of the uncertainty of innovation adoption by resorting to limited trials of an innovation before fully adopting. In several studies, innovators are combined together with early adopters (Martinez et al., 1998) because they share several similar attributes.

The innovator in Roger's five-tiered adopter framework represents a distinct type of adopter when compared to the other adopter types. This distinctness or uniqueness is a direct result of being first. The adoption of a new product, idea, or service often necessitates behavioral change by an individual, group, or organization. This change represents a set of risks and uncertainty for any adopter (Rogers, 2003). These risks are more pronounced for an innovation that has no instance of previous adoption. Because of these risks, those choosing to be first adopters are of necessity different from later adopters or what Bass (1969) called *imitators*. Several factors tend to be prerequisites for an individual or organization to be an innovator. These prerequisites include:

- Not inhibited by a lack of diffusion
- A willingness to assume risk
- Generally more interested in new ideas
- Access to greater resources

First, innovators are not inhibited by the lack of diffusion of an idea (Mahler & Rogers, 1999) because innovators, unlike all other adopter types, are not influenced by the decisions of other actors in a social system. In fact there appears to be an inverse relationship between the pressure to adopt by others in the social system and the decision or rate of adoption by an innovator (Bass, 1969). One reason for this lack of inhibition may be the result of the unique set of motivations driving the innovator's decision for adoption. Burns and Krampf (1992) argued that innovators tend be driven by sensation-seeking and uniqueness-seeking motives. These motives allow innovators to be willing to assume physical and social risks that are inherently a part of being the first to adopt an unproven innovation.

Second, innovators demonstrate a willingness to assume risks that other adopters do not share. This is perhaps one reason why these adopters are often described as venturesome and daring (Bass, 1969). However not all descriptors of innovators' willingness to assume risk are

positive. Football coaches that were the first to adopt new ideas in play-calling and game strategy were referred to as quirky (Evans, 2012), radical (Manfred, 2013) and aggressive (Himmelsbach, 2012). Rogers (2003) added that the most innovative members of a social system are often seen as deviants and as such are given low credibility status by the average member of the system. Thus while the innovator acts a key gatekeeper in the adoption cycle, the innovator may not be respected by other members of their local system and have limited influence in the rate of diffusion.

Third, innovators tend to be more interested in new ideas and show a willingness to adopt new innovations (Jin, 2013). This is due in part to the innovators ability to understand and apply complex technical knowledge regarding the innovation better than other adopter groups (Rogers, 2003).

Fourth, the innovator has substantial financial resources within his/her control (Rogers, 2003). For the individual this generally means that demographically they come from higher income brackets and have greater social mobility (Gatignon & Robertson, 1985). Organizationally, innovator organizations tend to be larger in size (Libertore & Bream, 1997; Mahler & Rogers, 1999), which most likely translates into a larger revenue base and free cash flow with which to invest in innovative activities. These greater resources enable them to absorb a loss caused by the adoption of a failed innovation. For example, German banks with the most resources consistently scored higher on an innovativeness scale and were more likely to be earlier adopters of innovative communications technologies within their industry (Mahler & Rogers,1999). Finally, it is important to note that while innovators seem to be undeterred by a lack of adoption and demonstrate a willingness to be aggressive, they do have concerns or issues that can prevent them from adoption (Mahler & Rogers, 1999). These adopters are more

concerned with those elements of an innovation that could potentially stall or inhibit implementation of an innovation, particularly when dealing with a more complex innovation. These implementation concerns were validated in a study of a group of innovator German banks that listed issues such as lack of standardization, security and organizational problems as relevant to a decision to not adopt.

Rate of adoption. A final component of the time dimension of the diffusion of innovations framework is the rate of adoption, which considers "the relative speed with which an innovation is adopted by members of a social system" (Rogers, 2003, p. 23). The rate of adoption typically follows a cumulative frequency pattern that results in an S-shaped curve. Some variation can occur in the slope of the curve with some innovations diffusing quite rapidly while others have a much slower rate of adoption. Several models have been developed to measure the rate of diffusion and can be classified into two broad categories: random mixing models and spatial models (e.g., wave models and hierarchical models) (Hudson, 1971). This review of the literature will look at two of the most prominent: the Bass model (random mixing), and the Hägerstrand model.

The Bass model was developed as a way to determine or predict the initial purchase of new consumer products (Bass, 1969). As of 2005, Bass' work has been cited more than 582 times and has been particularly influential in marketing applications of the model (Meade & Islam, 2006). Bass' equation is a linear function, and in his initial study, the model provided good predictions of the timing and magnitude of the sales peak of consumer goods.

Two key benefits of the Bass equation are how the model helps to reflect the importance of innovators in the social system—shown as *Y(T)* as well as taking into account the pressures operating on imitators as a product gains increased adoption— shown as *q/m* times *Y(T)*. It also

provided a way to estimate the market potential of an innovation, another reason why the model has used heavily in marketing literature (Meade & Islam, 2006). Two of the downsides to the Bass model, however, are that it tends to have a left-hand data-truncation bias (Jiang, Bass, & Bass, 2006) and can give off wrong signs regarding adoption as well as unstable estimates of adoption (Meade & Islam, 2006).

The Hägerstrand model approaches measurement of the diffusion process from a spatial perspective (Hägerstrand, 1967). Instead of the S-shaped curve employed by linear-type models like Bass, Hägerstrand's model produces results that are represented cartographically. The model assumes a proximity effect where communication within a local community (or system) is a more powerful agent of diffusion than mass media communication channels (van der Horst, 2011). Similar to the Bass model, the Hägerstrand model has produced its fair share of refinements to the original model (Haynes, Mahajan, & White, 1977). Some models including the Haynes model included elements of both models.

Table 2

Summary of Influences, Inhibitors and Facilitators of Diffusion

Diffusion Concept	Research Findings
Adoption Process	• Mass media channels are most effective in diffusion when a lower level of cognitive processing is required for adoption.
Personal Influence & Opinion Leadership	• Negative personal influence is more impactful than positive personal influence. • Personal influence is maximized when a state of optimal heterophily is present. • When mass media and interpersonal communication come into conflict, interpersonal generally has greater impact. • Adopters who are highly dependent on normative influences will tend to be slower to adopt.
The Social System	• The greater the level of compatibility between the innovation and social system values, the greater the rate of diffusion and chance for maximum penetration.

(continued)

	• Rates of diffusion tends to be higher in the more homogeneous the social system. • Maximum levels of innovation penetration are affected by normative change.
The Diffusion Process	• Marketing expenditures can affect the rate of diffusion • The more customized and tailored a marketing campaign is to the changing characteristics of segments at different stages of diffusion, the faster the rate of diffusion. • Active information dissemination within the social system can increase the speed of diffusion. • Some level of competitive innovation activity can increase the rate of adoption if the products are similar
Perceived Innovation Characteristics	• Relative advantage, compatibility, trialability, and observability are positively related to the speed of diffusion. • Complexity is negatively related to the speed of diffusion. • Faster rates of adoption can be associated with knowledge and experience that are related to the innovation.

van der Horst (2011) validated Hägerstrand's model by demonstrating the neighborhood network effect, a form of spatial-temporal clustering, in the adoption of an Environmentally Sensitive Area (ESA) scheme in Scottish farming communities. The study noted that the effects were most pronounced in small and remote communities. Coll, Vandersmissn, and Thériault (2014) also found that car-sharing diffusion in Québec City also followed Hägerstrand first two principles, namely the local concentration of initial acceptance and then the spread via *piggybacking* or wave form diffusion from the original "contaminated" centers of acceptance.

Influences on the rate and inhibitors/facilitators of diffusion have been discussed previously in the *Characteristics of Innovation* and *Innovation Decision-Making* sections of this chapter. As such, this section will provide only a brief review of these factors on the rate of adoption shown in Table 2 which is an adaptation of the review of the literature by Gatignon and Robertson (1985) in their propositional inventory for new consumer diffusion research.

Social System

The final element of the diffusion process is the social system in which the innovation diffuses. This section will provide a more formal definition of the social system, discuss the role of norms and values, outline key individuals in the system (opinion leaders, change agents, aides), define three different types of innovation decisions (optional innovation-decisions, collective innovation-decisions and authority innovation-decisions) and review some of the consequences that occur within the system.

Definition of a social system. One of the basic assumptions in diffusion literature is that innovation diffusion occurs within the boundaries of a social system (Gatignon & Roberton, 1985). Not only does innovation occur within the boundaries of a social system but also both the system and the innovation shape each other through constant interaction (Loosemore, 1998). Rogers (2003) formally defined a social system as "a set of interrelated units that are engaged in joint problem solving to accomplish a common goal" (pp. 23-24). A social system may be constituted of a group of individuals, communities, members of a profession, an organization, or companies within a particular industry (Rogers, 2003). A social system is present when members of these groups cooperate to some extent in seeking solution to a common problem.

Within a social system are various structures including *social* and *communication structures*. Social structures are typically more formal and help to define human behavior within the system. These structures help to decrease uncertainty and allow an individual within the system to predict behavior with some degree of certainty. Communication structures are more informal in nature and help to define how communication flows within a given social system. Rogers (2003) noted that by comparison to other aspects of the diffusion of innovations

framework that relatively few studies have been done to evaluate the impact of these structures on the rate of diffusion.

Rogers' framework assumes that the boundaries of a social system are set and of a fixed size, but Gatignon and Robertson (1985) noted that this notion is problematic particularly within a consumer diffusion context. Gatignon and Robertson argued that instead of a fixed size, the actual size of a given social system is variable because as conditions shift within that system so too does the actual size of the social system itself. Some of those conditions can include time, place, and economic backdrop (Grantham & Tsekouras, 2005).

The role of values and norms. According to Gatignon and Robertson (1985), values and norms are one of the three fundamental dimensions of a social system. As noted previously, the degree to which a given innovation aligns with a systems current set of values and norms has an impact on the rate and penetration of an innovation (Paul, 1990; Rogers, 2003). Norms and values can be held by the entire system where those norms and values help to define normal behavior for a particular group to which an individual belongs (Blackwell, Miniard, & Engel, 2001). Norms and values can also be highly individualistic when the value of individual uniqueness is high (Hong & Tam, 2006). It is not uncommon for both norms (conformity and counter-conformity) to be at play within a social system.

As discussed previously in the innovation characteristics section, compatibility (the level to which a given innovation is consistent with existing values and needs of the adopter) plays an important role in the decision to adopt and continue use of an adoption. For example, in evaluating differences between diffusion curves of the *collaborative team model* (CTM) for nurses and primary care physicians (PCPs), researchers found a link between perceptions of compatibility (based on their norms, values, and work practices) and the differences in the rate of

adoption (Vedel et al., 2013). PCPs were much slower to adopt the CTM approach because of fears that the practice could have a negative impact on relationships with case managers, continuity of care, information sharing, collaboration with specialists, and lower levels of professional autonomy.

Key individuals in the social system. Two types of individuals can have a significant impact on the rate and penetration of innovation adoption: opinion leaders and change agents (Rogers, 2003). *Opinion leadership* is the "degree to which an individual is able to influence other individuals' attitudes or over behavior informally in a desired way" (p. 27). A *change agent* is one who seeks to influence "clients' innovation-decisions in a direction deemed desirable by a change agency" (p. 27). One of the key differences between opinion leaders and change agents is that opinion leaders tend to be members of the social system in which they exert their influence while a change agent is an individual that remains external to the system.

When discussing values within a social system, it is necessary to evaluate not only the values and norms of potential adopters but also to examine the values and norms of peers within that system. Romano (1994) found that the values of peers within a social system can have an impact adoption. When peers within a social system hold opinion leader status, they can have significant influence on the attitudes and behaviors of other individuals within that system. The degree to which an opinion leader can have influence is based upon the leaders' technical competence, social accessibility, and conformity to the social system's norms and values (Rogers, 2003). The degree of influence is also enhanced when opinion leaders share or exist within a similar professional group as those they seek to influence (Vedel et al., 2013).

Opinion leaders tend to be more cosmopolite, of somewhat higher socioeconomic status and are demonstrate a greater degree of innovativeness than others within the social system

(Rogers, 2003). Vedel et al. (2013) confirmed several of these characteristics of opinion leaders. They found that opinion leaders in the nurse and PCP social system were true innovators and were able to influence early adopters in facilitating implementation of the CTM practices. Most importantly opinion leaders reside at the center of the communication networks that exist within a social system (Rogers, 2003). This is perhaps one of the reasons why Vedel et al. (2013) found that implementation of an innovation (particularly a complex innovation) requires securing buy-in and collaboration from opinion leaders in order to obtain commitment from later adopters who may be more cautious and hesitant to adopt.

Change agents tend to use or leverage the influence of opinion leaders in order to accelerate or at times slow down the rate of adoption (Rogers, 2003). Change agents tend to be professionals with university degrees in a technical field. Because change agents reside outside of the social system, they tend to be highly heterophilous in relation to the social system, which can create significant communication challenges in promoting the desired innovation-adoption process and without the help of more homophilous aides or opinion leaders, change agents can have little to no effect on diffusion particularly as it relates to later adopters. Bracheau and Wetherbe's (1990) study on information system adoption confirmed that pioneer adopters had significant contact with change agents where the agents could provide information on new technologies, but that these same change agents had little contact with later adopters.

Types of innovation decisions. Two basic units exist in an innovation decision-making model: the decision unit and the adoption unit (Flanagan & Todd-Mancillas, 1982). Rogers (2003) posited that there are three types of innovation decisions involving these two basic units: optional innovation-decisions, collective innovation-decisions, and authority innovation-

decisions. Rather than clear-cut categories, these decision types are best visualized a part of a continuum of decision making.

Optional innovation-decisions are made by individuals that are independent from other members of the social system. As such in an optional innovation-decision, the decision unit and the adoption unit are one and the same person (Flanagan & Todd-Mancillas, 1982). While optional innovation-decisions are independent, peer influence and other social system pressures can have an impact on the decision to reject or adopt (Watson, 2007). Bussey, Dormody, and VanLeeuwen (2000) found that teacher perceptions of how often optional and authority decisions are made showed a positive relationship to the rate of adoption of technology education.

Collective innovation-decisions represent a decision to adopt or reject that is made by consensus (Rogers, 2003). All units within a social system participate in the decision, and once a decision has been reached, units within the system are expected to conform to the decision to adopt or reject. This type of innovation-decision, as well as an authority innovation-decision, is more common within an organization (e.g., a school, church, field office, or government agency). Collective decisions are perhaps most easily seen through the democratic process like ballot initiatives or constitutional amendments. Wall and McCain (1975) looked at variables affecting the rejection of a school bond referendum using Rogers (1971) collective decision-making framework. The study found that the type of social structure (modern, mixed and traditional) played an important role in adoption or rejection, specifically the more modern the structure the more innovative and more open to outside influences (change agents, politicians, media, etc.) were those within that system to accept the innovation or change.

Authority innovation-decisions are made by a small group of individuals within a social system (Rogers, 2003). These individuals tend to possess power (can be in the form of implicit or

explicit power), social status (e.g., rank or title) or technical expertise that provide the decision-making unit to enforce an adoption or rejection decision on other individuals within the social system (Flanagan & Todd-Mancillas, 1982; Rogers, 2003). The rate of adoption is generally faster for authority innovation-decisions. In a study of college students' adoption of nonsexist language, the authority innovation-decision group achieved 100% adoption of the innovation (using nonsexist language), while the optional innovation-decision group saw 71% adoption (Flanagan & Todd-Mancillas, 1982). The study also found (contrary to the researchers' initial hypotheses) that not only did students operating in an authority innovation-decision system not express a higher discontinuance intention than optional innovation-decision group, but they also were more communicative with their classmates regarding the innovation.

Consequences of innovations. By nature of the process, innovation adoption results in a series of consequences that can impact both the individual and social system and directly stem from decision to accept or reject an innovation (Rogers, 2003). One of the inherent biases of the diffusion of innovations framework is that "adoption will bring desirable consequences for the clients" (Goss, 1979, p. 754). Goss (1979) made the case that the diffusion of innovations framework lacked a robust codification of factors that represent various types of consequences associated with the diffusion of an innovation and that the definition of consequences should be broadened to include all members of the social system not just adopters. In response to Goss, Rogers (2003) diffusion framework now incorporates Goss' three types of consequences that may come as a result of the decision to adopt or reject an innovation:

- Desirable versus undesirable consequences. These consequences are evaluated based on whether or not the innovation improves functionality or creates additional dysfunction within the social system (Rogers, 2003). This category helps observers to consciously

take account of his/her own frame of reference and how their cultural norms and personal beliefs create subjective judgment on classifying this type of consequence (Goss, 1979). This awareness and intellectual honesty helps to avoid possible bias or unrealistic assumption that objective judgments can be achieved. Further, the assessment of desirable versus undesirable is best measured by the individual, group or social system affected versus the change agent.

- Direct versus indirect consequences. Rogers (2003) noted that this category of consequences deals with the timing and level of the consequences. Direct versus indirect consequences are perceived based on a cause-effect relationship (Goss, 1979). A direct or primary consequence shows a direct link to the independent variable(s) in the diffusion process while indirect or secondary consequences are tied to two or more causal chains linking back to the independent variable(s).
- Anticipated versus unanticipated consequences. These consequences are perceived by the change agents driving the adoption process (Goss, 1979). The difference between anticipated versus unanticipated consequences is the degree to which the changes or consequences are recognized and anticipated by members of the system (Rogers, 2003). Typically unanticipated consequences occur because of a lack of understanding by change agents of the internal and external forces operating within a client system and how those forces relate to the larger social system (Goss, 1979).

While the intent of most change agents it to facilitate the adoption of innovations that have direct, anticipated and desirable consequences on a social system and the adopters, unanticipated, indirect, and undesirable consequences are common (Rogers, 2003). The largest

unknown for change agents is that it is extremely difficult to predict what an innovation' unintended consequences will ultimately be within a social system.

Criticisms of Rogers' Framework

While diffusion of innovations has become a dominant paradigm in the literature, Rogers' framework is not without its critics, simplified assumptions, and blind spots. Even Rogers' (2003) acknowledged that it is healthy and beneficial for the diffusion field and his framework to face robust intellectual criticism. Such criticism can help promote progress within the field and overcome some of the inherent intellectual blinders that naturally begin to occur when scientists follow a particular paradigm. This section will take a closer look at four criticisms relating to Rogers' framework: the pro-innovation bias, the innovation-decision as a linear process, the recall problem, and persistent research gaps.

The *pro-innovation bias* is rooted in one of the assumptions of diffusion researchers, namely that a presumption exists that any new technology or innovation is mainly beneficial (Goss, 1979; Rogers, 2003; Sapp & Korsching, 2004). Goss (1979) noted this bias by observing that few researchers, particularly rural sociologists studying agricultural innovation adoption, seemed to express doubt regarding the benefits for clients even though several examples existed of the negative consequences that had ensued for adopters especially in cross-cultural applications in underdeveloped nations. This bias also is present in the terminology surrounding adoption where innovation represents progress, which is beneficial, and those who adopt later are considered more conservative or are labeled as laggards. Rogers (2003) noted how this is problematic and used the illustration of farmers adopting 2, 4-D weed killer where at the time of adoption laggards were seen in a negative light. Now with the emphasis on organic farming as a

result of the chemical harm of the 2, 4-D product, those same "laggards" are now the progressive farmers.

Another criticism of Rogers' theory is the theory's underlying assumption that the innovation-decision is a linear process. Because of this view, the diffusion of innovations framework fails to provide a real-time picture of the internal processes that an adopter experiences during the adoption process (Seligman, 2006). Seligman (2006) further argued that rather than a purely linear process, instead the adoption process neither begins with the introduction of a technology or innovation nor ends with a single decision. Rather the process of innovation adoption is a series of sensemaking cycles that lead to apparent adoption or rejection of an innovation. Parthasarathy, Rittenburg, and Ball (1995) noted that the linear or *think-do-feel* assumption of the diffusion's theoretical framework excludes decisions that are not necessarily based on the information procurement and evaluation cycle outlined by Rogers.

A third criticism of the diffusion of innovations framework is the *recall problem*. This criticism with the framework is to some degree unavoidable (Rogers, 2003) because the very nature of diffusion requires time (Haider & Kreps, 2004). As one of the four essential elements of the model, it is impossible to study the diffusion phenomenon and exclude the time factor. While some research has shown that certain details and events can be recalled correctly (Mayer, Gudykunst, Perrill, & Merrill, 1990), the accuracy of how respondents reconstruct history from past memory remains a challenge for the measurement of time within the framework. Rogers (1976) noted that some of the prime obstacles in preventing researchers from better overcoming this criticism include the cost of time-series data gathering, respondent sensitization to repeated data gathering attempts, and time constraints (dissertations, pressures from research sponsors, etc.) on researchers that keep them from pursuing over-time research designs.

A final criticism of the framework comes from a *persistent research gaps in the literature*. Eastlick and Lotz (1999) noted that while a large body of research exists that profiles innovators and early adopters, a lack of research exists profiling the characteristics of early majority, late majority, and laggards. Often these later adopters are simply grouped together and called imitators (Bass, 1969; Haider & Kreps, 2004; Parthasarathy et al., 1995) because the distinction between them is not viewed as significant or differentiated enough (Tanny & Derzko, 1988). Another gap in the literature stems from a researcher bias in studying mainly successful examples of diffusion (Jonsson, 2009). Finally, the area of innovation diffusion in a sporting context lags behind other areas where diffusion research has been abundant. This research disparity will be addressed more fully in the summary of this literature review.

Additional Theories & Frameworks

In reviewing the concept of innovation diffusion, three types of theories relating to diffusion of innovations have emerged: informant, extension theories, and competing or stand-alone theories. The first group or category includes theories that either informed Rogers original framework or serve as extensions to his theoretical framework. This section will briefly discuss three of these types of theories that either served to inform Rogers' theory or develop a further extension of the theoretical framework: (a) the law of imitation, (b) the technology acceptance model (TAM), and (c) sensemaking.

Law of imitation. The law of imitation represents an example of an informing theory. This law predates Rogers and was articulated by Gabriel Tarde (Kumar & Kaur, 2014), who is considered to be one of the founding fathers of diffusion research (Kinnunen, 1996). Tarde noted three generalizations or laws of imitation. First, innovations that are similar to ones that have already been accepted are more likely to be adopted. As previously discussed these kinds of

innovation extensions or incremental innovations tend to, as Henderson and Clark noted, reinforce and offer little change to existing core concepts. Second, the rate of adoption generally follows an s-shaped curve. Based upon his observations of fashion in particular, Tarde argued diffusion has an areal or geometrical center and that inventions diffuse from this center "as waves from the point where an object hits water" (as cited in Kinnunen, 1996). However, the law of imitations does not rule out the possibility that certain environmental factors could distort these waves.

Tarde's final rule of imitation notes that innovations are most likely to be adopted by individuals or a decision-making unit that are socially closest to the source of the new idea and generally of a higher status than later adopters. Change or diffusion therefore happens in a "trickle-down pattern" where the ideas flow from a higher to a lower strata (Katz, 2006). For a period of time, Tarde's work was set aside or marginalized (Abrutyn & Mueller, 2014; Katz, 2006); however, researchers have begun to revisit his work. Further, recent popular business books (e.g., *The Tipping Point*) have made reference to Tarde's theory, and even Rogers (2003) acknowledged the influence of Tarde's work on the diffusion of innovations framework.

Technology acceptance model (TAM). The technology acceptance model (TAM) is a diffusion theory extension and was developed by Davis to look at innovation diffusion and adoption intention within a specific innovation context: an information system (Kumar & Kaur, 2014). Figure 4 provides a schematic illustration of TAM. TAM is an adaptation of Fishbein and Ajzen's theory of reasoned action (TRA) and was specifically designed to explain an individual's true computer usage behavior (Davis, Bagozzi, & Warshaw, 1989).

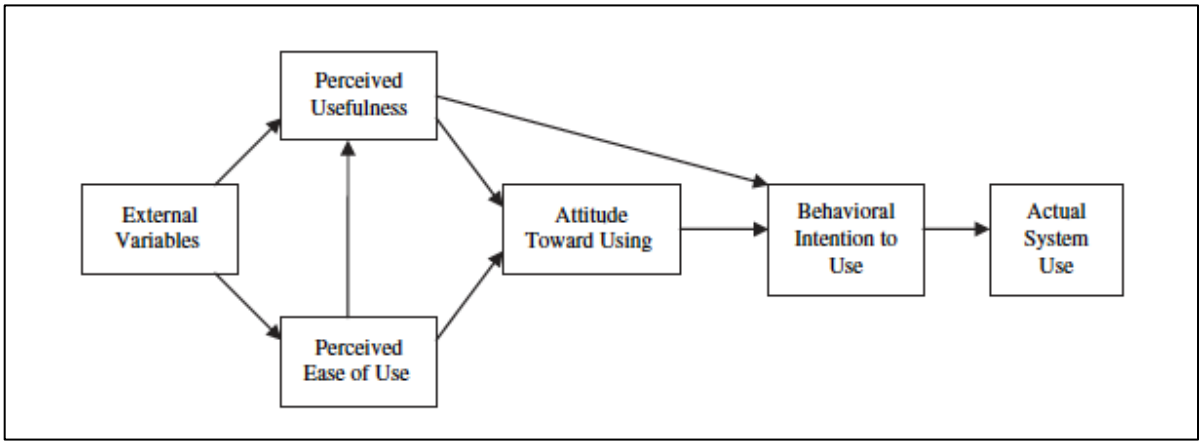

Figure 4. Technology acceptance model (TAM) diagram

This model presents two beliefs (perceived usefulness and perceived ease of use) that are of "primary relevance for computer acceptance behaviors" (Davis et al., 1989, p. 985). Thus, the framework is designed to capture causal linkages between these two beliefs and enable the researcher to predict the adopter's attitudes toward, intentions regarding and actual adoption behavior relating to a specific information system. For example, the adoption of e-learning technology and practices for 119 higher education professionals revealed a significant impact of perceived ease of use on the adopters' perceived usefulness of the technology and on the behavior intention to continue use (Park, Lee, & Cheong, 2007). The TAM framework has also helped technologists, in particular, identify system design attributes that they can control to improve the rate of adoption of new technologies (Kumar & Kaur, 2014). Primary among these design attributes is functionality deemed as very important by users, even more so than a friendly user interface (Davis et al., 1989). In a study of 107 MBA students, Davis et al. (1989) found that while users were willing to deal with a crude interface if functionality was key, those same users noted that "no amount of ease of use will be able to compensate for a system that doesn't do a useful task" (p. 1000).

Sensemaking. The sensemaking diffusion model offers an example of a stand-alone framework that provides an alternate or competing perspective on the innovation diffusion process. In his development of the sensemaking model, Seligman (2006) noted that

> Whereas other approaches focus on the adoption decision and its antecedents and consequences, sensemaking focuses on the adopter herself, i.e. her mental frameworks, and the antecedents and products of those frameworks. The sensemaking perspective provides a look under the hood, if you will, of the adopter's mental engine. It [sensemaking] is meant to compliment, not replace these other perspectives on adoption, just as an understanding of how an automobile engine works is complimentary to an understanding of how to drive, focuses on the adopter reveals a variety of new influences on the adoption process and begins to explain curiosities in other adoption models. (p. 110)

Seligman's framework borrows from Weick's work on sensemaking as described in Weick's (1995) book *Sensemaking in Organizations*. The framework assumes that adoption is not a single decision, but rather the adoption process consists of a series of sensemaking cycles that result in changing perceptions of the innovation until such a point in time where apparent adoption or rejection actions are performed. Sensemaking, according to Weick, consists several properties.

First, sensemaking is a grounded view in identity construction. This is one of the fundamental differences between sensemaking and basic cognitive psychology (Gililand & Day, 2000). The primary purpose behind sensemaking is to create identities for oneself and others (Seligman, 2006). These identities enable the individual to organize and make sense of an ever-changing environment of inputs in such a way that allows for further action (Weick, Sutcliffe, & Obstfeld, 2005). Part of identity construction can include labeling and categorizing. For example, an early adopter may label herself as one who is on the cutting edge of technology and this identity then drives behaviors in both the extent and timing of adoption that fit or aligns with that identity (Seligman, 2006).

Second, sensemaking is retrospective. People make sense of the present by looking back to the past. This is partly because our actions are according to Weick et al. (2005) "just a tiny bit ahead of cognition, meaning we act our way into belated understanding" (p. 419). As it relates to innovation adoption, retrospective sensemaking plays an important role in adoption attitudes where past adoption experience (positive or negative experience) can dictate future decision-making regarding the use of new ways of working (Seligman, 2006), because any knowledge of an innovation naturally must be incorporated into an individual's pre-existing mental or sensemaking frameworks.

Third, sensemaking is ongoing. The sensemaking process and thus the adoption decision process is never completely over (Seligman, 2006). Seligman argued that Rogers' notion of reinvention is actually a sensemaking process that is more aligned with Seligman's model. Because sense is continually being made and unmade, it allows researchers to look at adoption through a more fluid lens where neither adoption nor rejection is final. As such additional adoption concepts such as postponed adoption, re-adoption, and periodic adoption may enable a much richer view of actual adopter behavior over time.

Finally, sensemaking is driven by plausibility rather than accuracy. Weick et al. (2005) noted that sensemaking is not really about the truth rather sensemaking is about the creation of an emerging story that over time incorporates more observed data and stands up to criticism. This ongoing story making leads the adopter to form beliefs not necessarily based on what would happen (a *probability belief*) but rather based upon an understanding of what could happen (a *plausibility belief*).

Sneddon, Lee, and Soutar (2012) argued that the properties of sensemaking noted above are critical to creating a more holist framework that can help explain the activities of consumer

choice in wool apparel types. Their findings were consistent with other findings where researchers were consistent with other studies that found that consumers rely on past experiences (not just information about the innovation as Rogers argued) to interpret new experiences (Sneddon et al., 2012) and that mental schemas are not static and can be expanded and elaborated as an individual incorporates new information and experiences (Bartunek, 1987).

Summary

The study of innovation diffusion continues to receive great attention across a broad spectrum of academic disciplines, and the rate of examination is accelerating. According to a search on Worldcat.org for the term *diffusion of innovations*, the average number of results per year went from 91 during the 1970s to 96 in the 1980s to 159 in the 1990s to 580 per year in the last decade. Clearly, there is a significant upward trend in the study of innovation diffusion as a behavioral phenomenon.

However, the framework has been used sporadically in the area of sports. A similar term search on worldcat.org yielded only 261 results when combining the words *sports* and *diffusion of innovations*. By comparison, several other fields have received considerable attention by researchers studying the diffusion of innovations framework. Table 3 shows a Worldcat.org search comparison with other areas of study.

Table 3

Comparison of Diffusion Research Results by Topic on Worldcat.org

Area of Study	Number of Search Results
IT	7,845
Medical	2,672
Education	5,840
Public Policy	1,283
Marketing	4,430
Communications	3,405
Agriculture	999

(continued)

Sports	261

A more specific sub-search under sports, where the terms *football* and *diffusion of innovations* were used yielded 43 results. The most common type of study in this term grouping studies looked at coaching and the adoption of safety programs or protocols. For example, one diffusion study looked at factors affecting high school coaches and the intention to use a concussion prevention toolkit (Sawyer et al., 2008). None of the 43 results tied back to adoption of innovative play calling or coaching philosophies, the focus of the proposed study.

Another key finding from the literature review is that within the diffusion of innovations body of research, Rogers' definition of innovation is rarely challenged. Most of the studies relating to innovation diffusion cited in this literature review rely on or directly quote Rogers when defining innovation. But as noted in this literature review, the idea and definition of innovation is much more complex than Roger's broad description of innovation. By using a more nuanced definition that includes varying types of innovation (e.g., incremental, architectural, modular and radical) as noted by Henderson and Clark (1990) additional information and insight may be gained in better understanding adopter types and the impact of various innovation characteristics as defined by the Rogers' framework.

Chapter 3: Methods

Many diffusion studies are quantitative in nature where the number of adopters is measured over time (Ash, Lyman, Carpenter, & Fournier, 2001). However, this study sought to understand various *why* questions, and according to Ash et al. (2001), qualitative methods are best suited to answer these types of questions. Within qualitative methods research, five strategies of inquiry are common: narrative research, phenomenology, grounded theory, ethnography, and case study (Creswell, 2013). The research strategy selected for this research project was a case study.

Study Design

According Yin (2014), a case study design is the preferred research method when the research questions are focused on the *how* and *why* of a contemporary phenomenon. Further a case study method is useful where the researcher has little to no control over the events being studied. Simmons (2009) echoed Yin's assertion that the case study method should be "in-depth exploration from multiple perspectives of the complexity and uniqueness of a particular project, policy, institution, programme or system in a 'real life' context. It is research-based, inclusive of different methods and is evidence-led" (p. 21).

As such, case studies are highly effective at enabling the researcher to generate in-depth understanding of a specific topic, situation, policy, institution, or system in order to generate knowledge and/ or inform policy development, professional practice and civil or community action. Thus a good case study is not about establishing causality rather it is a method that enables the researcher to make connections, garner new insights, and provide answers to questions with good evidence and good reasoning (Thomas, 2011).

Gomm and Hammersley (2000) noted that a case study has four defining characteristics, where a case study is:

- An investigation of a one or a small number of cases;
- A process where data is collected and analyzed by viewing and studying a large number of features and from a number of different angles the case(s);
- A study of something that occurs naturally where there is no attempt to control the variables;
- A quantification of the data is not the priority.

The primary reason why quantification is not a priority in a case study is because as Thomas (2011) noted, the researcher is looking to a range of methods and data sources in order to look at and understand relationships and the process in study.

Within the case study methodology, several types of case studies have been identified. Thomas (2011) noted that there are anywhere from three to six different types of case studies depending on the author. Table 4 is an adaptation of a similar table from Thomas that provides a summary overview of the range of case types available to the researcher.

Table 4

Various Types of Case Study According to Different Authors

Merriam	Stake	Bassey	Yin	Thomas	Creswell
Descriptive	Intrinsic	Seeking a Theory	Critical	Intrinsic	Intrinsic
Interpretive	Instrumental	Testing a Theory	Extreme or unique	Exploratory	Instrumental
Evaluative	Collective	Storytelling	Longitudinal	Explanatory	Collective
		Drawing a picture	Representative	Interpretive	

(continued)

		Evaluative	Revelatory	Retrospective	

In determining which is a best fit for a given case, Thomas (2011) noted that it is important to focus on your purpose, approach, and process for how you will conduct the research. Creswell (2013) also highlighted the importance of considering the intent of the case study. Thomas proposed a framework to determine the type of case study by evaluating the subject, the purpose of the research, the approach of the researcher, and the process taken collect data. Based on Thomas' framework, the researcher has identified the following components of this case:

1. Subject: The subject of this case study represents a key case. Thomas defined a key case as one that is a good example of something or a classic/exemplary case. The Pulaski case fits this description because it is representative of other radical adoption cases where the Rogers' innovator prerequisites do not seem to align with those who first adopt. As noted in Chapter 1, some of these similar examples of radical innovation adoption in sports include the extended use of the full court press (Gladwell, 2013), the spread offense (2015) developed by Rusty Russell, and the adoption of a west-coast style passing attack that was adopted by BYU in the 1970s (Edwards & Nelson, 1980).
2. Purpose: The purpose of this case study is explanatory. An explanatory case study provides the researcher the opportunity to relate one observation/theme to another and then offer explanations based on the observed interrelationships between those theme/observations. In this case, the interrelationships under observation were the attitudes, characteristics, and innovation decision-process and the adoption of a radical innovation.

3. Approach: This case study was built on the assumption that diffusion frameworks already exist. The case focused on testing a theory with regard to how these two frameworks, when combined, further understanding regarding innovation adoption. The case study confirmed the apparent contradiction regarding certain prerequisites and characteristics of first adopters. By combining the two frameworks, this case study serves the purpose of helping to propose a revised theoretical framework for innovation diffusion that includes a more holistic innovation typology.
4. Process: A retrospective case study looks at data connected to a past phenomenon (Thomas, 2011). In order to construct a detailed timeline, the researcher gathered background data on participants that spanned a total of 22 years (from 1994 to 2016) with a added focus on the 2003 season, which was Coach Kelley's initial season as head coach. By virtue of the process, this case was retrospective. As such in-person interviews were conducted with those involved with the case as well as the collection of existing artifacts regarding the case that included text, audio, and video formats from standard news outlets as well as other non-traditional media sources.

In summary, the Pulaski Academy case study is a key case that took a retrospective view of the 2003 football season in order to explain the apparent differences between Rogers' innovators characteristics when a radical innovation is present.

Minimizing Researcher Bias

Yin (2014) noted that case study researchers are somewhat more prone to bias because of the nature of case study research, which requires a level of prior knowledge and understanding of the case. To assess the degree to which bias may occur, Yin recommended some level of self-assessment to determine the level of openness to contrary evidence.

To address Yin's (2014) recommendation, the researcher kept a journal to record his thoughts, initial assumptions, reactions to the data. This process of reflexivity helped the researcher to assess more closely and identify potential biases. It also helped to capture instances where the researcher found data that did not align with some of his initial assumptions about the case.

In addition to Yin's (2014) recommendation to self assess openness to contrary evidence, Creswell (2009) recommended that researchers explicitly identify potential biases, background, and connections that exist between the researcher and the participants. As it relates to this case, the researcher has long had an interest in the sport of football and in the game strategy elements of the sport. Further, it is important to note that the researcher did have a prior relationship with Coach Kelley based on a previous research project in which the researcher interviewed Kelley using a different protocol. That experience did create a positive view of Kelley as an innovator in the football game strategy. Several other individuals who have interviewed Kelley in the past or have presented him with awards based on his innovative work also hold this view. To help with this potential positive bias the researcher intentionally designed the study to seek out multiple perspectives of the program where there was no prior relationship.

Overview of the Case

Pulaski Academy is an independent private school located in Little Rock, Arkansas. While Pulaski is a relatively small college-preparatory institution, it has maintained a wide range of highly successful sports program that including, baseball, basketball, cross country, football, golf, volleyball, soccer, softball, swimming, tennis, and wrestling. According to the school's website, these programs have combined for a total of 35 state championships.

Pulaski Academy began a high school football program in 1974. The football program had some limitations on the kinds of athletes that could come to and be successful at Pulaski, and under a series of coaching regimes could not get over the hump and compete at a championship level like other programs at Pulaski had done. For 29 years, the football program at Pulaski Academy had struggled to be more than an average high school football program reaching the state semi-finals only twice.

In 2003, Pulaski promoted their offensive coordinator, Kevin Kelley, to the position of head coach, and his hire brought immediate changes to the program. Kelley had been involved with football for most of his life. Because of issues at home, football became an escape for Kelley and when he wasn't playing football he spent hours watching it on the television or searching for newspapers where he could read more about the sport. He collected football cards and his room was covered in posters and pictures and all that kind of stuff.

When Kelley went to college, he decided to go in accounting because he received a full-tuition business scholarship and that provided an avenue to get to college. However, those classes early helped shape Kelley's analytical side and taught him to thing about issues and problem solving from a numbers perspective. He liked that there were no grey areas, no hunches, and no gut feelings. If the numbers say something, then that becomes the final word and direction he will go.

After the college experience, Kelley decided he wanted to be a coach, but he was unable to find a job in the state of Arkansas. His initial job out of college was as an assistant manager of a clothing store called Miller's Outpost. It was another opportunity to get an education in numbers. To finally get a job in coaching, Kelley moved to Texas. While in Texas, he worked for four different high-schools and head coaches in five years, an experience that enabled him to

see a lot of different ways to do things. After spending five years in Texas, he was offered a job as an offensive coordinator back in his home state of Arkansas.

During his time as the offensive coordinator, he began to take a closer look at some things and approaches the team was taking. He began to ask a lot of *why* questions, and as he found answers, he began to form his own philosophy and approach to how game management and play calling should be handled to improve a team's chances to win more games. Some of the initial answers came from two different professors: one from Harvard and one from Berkeley. These professors approached game management and play calling from a purely statistical vantage point. They were particularly focused on what the statistics said regarding punting and how the statistics seemed to indicate that teams would be better off running an additional offensive play rather than punting the ball.

In his first season as head coach, Kelley began to implement the no punting philosophy in addition to several other important changes that had an important impact on his approach to play calling, game management, and practice regimens. The improved results were immediate. In his first season as head coach, Kelley coached the Pulaski Academy football team to its first state championship. In the years that followed this initial adoption, Kelley has continued to adopt additional radical innovations in game management and play calling. Kelley's efforts to be a first adopter for many of these changes have resulted in a football program that is now consistently winning at a high level and includes multiple appearances in state championship games as well as an addition two state championship trophies.

This case study took a more in-depth look at Kelley's first year, 2003, as head coach. While Kelley continues to be an aggressive adopter of radical innovations, this case was mostly focused on understanding the initial shift in attributes, attitudes, and the innovation-decision

process of innovation adoption cycle for Pulaski Academy, which occurred during the 2003 season.

Data Sources

Creswell (2013) noted that case studies rely on a wide range of data sources to help provide the in-depth description and analysis of the case. Sources should include interviews, observations, documents, and other artifacts. In the case of the Pulaski Academy adoption of game management and play calling innovations, numerous documents and artifacts were available due to interest in the Pulaski Academy case. The ongoing interest was the result of both the success and radical nature of the innovations adopted. The researcher gathered 12 textual artifacts and 13 audio/visual artifacts that represented a sample of pre-existing, public artifacts of the Pulaski program. These artifacts were published between 2007 and 2015 and included both traditional media outlets (e.g., ESPN, HBO, etc.) as well as other non-traditional or social media outlets (e.g., straitpinkie blog) response relating to the adoption of several innovations at Pulaski.

Much has been written about Kelley; however, little information had been captured from other actors during the innovation-adoption process of that 2003 season. This case study gathered data from these additional primary data sources, which were part of the innovation adoption process for the radical innovations Kelley attempted to implement during that 2003 season. Key data sources for this case study included:

- Coach Kevin Kelley: Kelley was the positional leader during this change; this case study gathered additional information regarding the attributes and leadership style of the head coach. Kelley had a tremendous amount of power in running a football program was focused on doing what was right for the program and not worrying about what everyone else thought. Based on this philosophy and given his position within the organization,

the decision to adopt the radical innovations around game management and play calling was what Rogers (2003) called an authority innovation-decision. As such, understanding the attitudes, attributes and innovation decision process of the leader is critical to describing this case.

- Kelley's Assistant Coaches (*n* = 2): This is an important constituency in the adoption process, particularly in an authority innovation-decision because these subordinates can play an important role in either supporting the change or actively undermining the innovation decision process. The data gathering process with this group of actors will generated a better understanding the attitudes toward innovation, their individual characteristics and how they line up with Rogers typology, and finally the role they played in the innovation adoption decision.
- The Student Athletes (*n* = 7): Because of the makeup of a high-school team, the researcher interviewed former student athletes from different classes: sophomore (*n* = 3), junior (*n* = 1), and senior (*n* = 3). This range is important because the seniors played for two years under the previous coach, while the sophomores had little or no previous experience with the prior head coach. The lack of experience with the prior head coach meant that these younger players had fewer previous allegiances or pre-conceived notions of what should happen in terms of play calling.
- School Administrators (*n* = 2): While Kelley was the head coach of the football program in 2003, the school administrators represented Kelley's direct supervisors and had power to remove Kelley. The researcher collected data on their attitudes and satisfaction with Kelley during the innovation adoption process as well as an increased understanding of the school community and their view of how the innovation decision process took place.

A total of 12 semi-structured interviews were conducted in two ways: over-the-phone (n = 5) and in-person (n = 7). Participants were asked a series of questions to better understand personal attitudes and attributes, comparisons between Pulaski and other programs in the area, and their lived experience relating to the adoption of a set of innovations during the 2003 season. The data collection time period spanned four weeks in the Spring of 2016. The in-person interview research sites included Pulaski academy, a player's home, a player's office, and at the researcher's hotel.

Interview Protocol

The format for these interviews was a semi-structured interview. Topics included the individual's background, how the individual described the innovation, reaction and initial attitudes toward the radical innovation, perceptions of others at Pulaski who were going through the same process, and finally the process the individual went through to adopt the innovation. The interviews lasted anywhere from 35 to 75 minutes. All of the interviews were conducted on an individual basis.

The interview questions (Appendix A) were based on Rogers' diffusion of innovations framework as it relates to adopter attitudes and the innovation adoption process framework. The questions relating specifically toward the innovation and the characteristics of a radical innovation were tied to the Henderson and Clark innovation typology. The interview protocol was validated with Dr. Kurt Sandholz, a professor organizational leadership and strategy at BYU, and Dr. Dave Ulrich, a professor of organizational behavior at University of Michigan and leading expert in the human resources (HR) practitioner field. Once the reviewers deemed the protocol as considered valid, a pilot interview was conducted with a former high school football player, who experienced a change in head coach, to ensure reliability of the interview process.

The researcher recorded the phone interviews using freeconferencecall.com. For the in-person interviews the researcher recorded the interviews with the voice memo app on his iPhone. The researcher stored the audio file in a password-protected file on his computer and created a backup of the files on a password protected USB drive. Once analysis of the data was performed the files were deleted.

Human Subjects Considerations

Study approval and site access for current employees of Pulaski Academy was obtained from Coach Kelley, who also currently serves as the athletic director for Pulaski Academy and reports directly to the head of schools at Pulaski. All individuals were provided informed consent prior to participation in the interview process with the exception of Coach Kelley. Because his name is noted by name in the findings, the researcher secured prior consent in writing from Coach Kelley. Pepperdine University's Institutional Review Board approved the research proposal as Exempt (Appendix B).

Study participation was voluntary, and all subjects were given a copy of the informed consent form prior to participation. Participants were informed that they could choose not to participate in the study, or withdraw at any time, without consequence.

Participants were informed there were no known psychological, physical, legal, social and/or economic harm involved with participation in the study. Participation posed no more than minimal risk such as boredom or mild discomfort. No participants choose to skip or not answer any specific question during the interview process. Participants were apprised of the fact that there were no known immediate personal benefits for participation in the study. Participants were informed that the study could have some social benefits and could add understanding about the innovation adoption process, improve product development processes, improve understanding of

how organizations experience adoption. All participants expressed interest in seeing a completed version of the research project. Participants were asked to answer all questions honestly and to the best of their recollection.

Administration of the researcher-designed qualitative interview protocol was conducted on site or virtually based on the availability of the participant. All subjects were given the option to keep their information confidential such that no personally identifiable data would be collected or reported or to allow the researcher to use their name and title in the case description and conclusion's section of this research project. Artifacts including any identifiable information were also handled confidentially. Participants were provided anonymity in study dissemination with the exception of Coach Kelley who provided explicit consent to be named in the study.

Analysis

Creswell (2013) noted that data analysis for a case study is primarily accomplished by analyzing the various sources of data through description of the case itself as well as identifying themes within the case. Themes and issues can be organized by chronology, across cases, or presented as a theoretical model.

For this case study, the researcher applied Creswell's holistic approach to collecting both existing data, documents, and artifacts, as well as new interview data gathered from a range of participants in the innovation decision-process. The researcher analyzed the data to create a case timeline. The chronology strategy is important because one of the fundamental components of the Rogers' framework is time, thus the presentation of a case chronology is consistent with very nature of the framework. The researcher also identified six key themes from the data.

The researcher used the qualitative analysis tool HyperRESEARCH to document the qualitative coding process. HyperRESEARCH is a well-recognized qualitative tool and enables

the researcher to work with a variety of data sources including text, graphics, audio, and video (Cresswell, 2013) that has been collected and used to answer the objective and intent for this case study.

The researcher followed a three-step, data-analysis, which included:

1. Coding. This is a process of getting from messy, unstructured data to ideas about what is going on (Richards & Morse, 2013). Coding was an important process in creating categories and themes from the data.
2. Classifying/Categorizing. This is normal sensemaking activity that enabled the researcher to understand and make sense of the broad set of data collected.
3. Interpretation. This is the process of identifying themes, patterns, and explanations from the data gathered. Based on the intent of this study, this part of the analysis also focused on theory construction as it relates to the innovation component of Rogers' framework.

To ensure a reliable data interpretation process was observed, the researcher followed the recommendations of Creswell regarding bracketing of assumptions, multiple reviews of the interview transcripts, and other artifacts and the use of the qualitative analysis software in documenting the data, analysis, and interpretation processes. Further, the researcher used a peer reviewer to ensure consistency of the coding process as a part of the manuscript review process. The peer reviewer was given the HyperRESEARCH codebook and study file to conduct a review of all the code definitions and audit the coding of the data. The primary function of the code audit was to assess and ensure that the researcher maintained a level of consistency in applying codes to the data. The peer reviewer holds a doctoral degree from Pepperdine University in Organizational Leadership.

The validity of the study's conclusions were confirmed using a process of triangulation. According to Creswell (2009), triangulation is a validity strategy where different data sources (in this particular case: exiting artifacts, interviews with coaches, interviews with players, and interviews with administrators) are examined to build a coherent justification for the identified themes, conclusions, and recommendations.

Presentation of Findings

The findings of this case study are presented in two different ways. First the researcher presents an in-depth description of the case. This includes a detailed overview of the case from a chronological standpoint and a description of the various groups involved in the innovation decision-process as well as how those descriptions compare with Rogers' innovator typology.

Findings in a case study are often presented as assertions, patterns, or explanations (Creswell, 2013). The researcher followed a similar pattern for reporting the findings of this case study by providing interpretation of the findings of the case based on the themes generated during the data analysis process. Chapter 4 provides the findings including direct quotes from participants and artifacts. Chapter 5 includes study conclusions with a discussion of implications and recommendations for future research.

Chapter 4: Report of the Findings

The purpose of this case study was to examine the attributes, attitudes, and innovation decision-process of participants in a high school football program acting as a first adopter (innovator) for a series of radical innovations relating to play-calling strategy and game management. To achieve the purpose of this study, the following research questions were examined through a review of existing artifacts regarding the Pulaski football program and a series of semi-structured interviews with a range of participants who were involved with the program during the 2003 season:

1. What are the attributes of those involved in the radical innovation adoption process?
2. What are the attitudes of those involved in the radical innovation adoption process regarding innovation?
3. How did those involved in the radical innovation adoption process experience the innovation decision-making process?
4. How do those involved in the radical innovation adoption process describe the nature of innovation?

This chapter provides a summary of the demographics of those interviewed and a general description of the reviewed artifacts. The content analysis process provided for a detailed case timeline along with six themes that emerged from the data. These themes include: (a) the nature of the innovation, (b) the range of innovation perceptions, (c) the nature and attributes of the innovator, (d) the nature/attributes of Pulaski and the football program, (e) the innovation-decision process and (f) the leadership style of the lead innovator.

Interviewee Demographics & Artifact Summary

A total of 12 interviews were conducted with various individuals associated with the Pulaski Academy football program during the 2003 season: coaches (*n* = 3), administrators (*n* = 2), and players (*n* = 7). Two of the coaches and both administrators were still with the school as of Spring 2016. While the players remain connected to the program and have maintained an ongoing relationship with the coaching staff, none of the former players were working at the school at the time of data collection in the spring of 2016. Table 5 summarizes the demographic information of those interviewed.

Table 5

Interview Subjects' Demographics

Participant Code	Time at Pulaski (Or Year in School)	Role in 2003	Gender
KK	6 years	Head coach	Male
AC1	1 year	Assistant football coach	Male
AC2	9 years	Assistant football coach	Male
ADM1	2 years	Teacher	Female
ADM2	8 years	Administrator	Male
P1	Senior	Player	Male
P2	Sophomore	Player	Male
P3	Sophomore	Player	Male
P4	Junior	Player	Male
P5	Senior	Player	Male
P6	Sophomore	Player	Male
P7	Senior	Player	Male

The interview participants represented a diverse group of those that were directly involved with the program during the 2003 season. Of the seven players, three were sophomores playing on the varsity team for the first time, one was a junior, and three were seniors. The average tenure of the coaches interviewed was 5.3 years while the average tenure of administrators was 5 years.

The researcher also gathered 12 textual artifacts and 13 audio/visual artifacts that represented a sample of pre-existing, public artifacts of the Pulaski program. The 25 existing artifacts were published between 2007 and 2015. Each of these artifacts was reviewed by the researcher and was included in the content analysis process. Table 6 provides a list of the text artifacts and lists the artifacts code reference in the data findings, the type of artifact, and source of publication.

Table 6

Artifact Codes, Types & Sources

Artifact	Mode	Artifact Source
AP	Feature Story	http://www.oregonlive.com/collegefootball/index.ssf/2009/11/what_if_football_teams_didnt_p.html
ESPN1	Guest Column	http://espn.go.com/espn/playbook/story/_/id/8307736/tmq-praises-coach-punt-celebrates-innovative-mind-football
GC	Sports Blog	http://grantland.com/features/grantland-channel-coach-never-punts/
SBN1	Sports Blog	http://www.milehighreport.com/2010/4/12/1414920/never-tell-me-the-odds-the-strange
ESPN2	Guest Column	http://espn.go.com/espn/page2/story?page=easterbrook/071113
SI	Feature Story	http://www.si.com/more-sports/2011/09/15/kelley-pulaski
NYT	Feature Story	http://www.nytimes.com/2012/08/19/sports/football/calculating-footballs-risk-of-not-punting-on-fourth-down.html?_r=0
RA	Guest Column	https://forums.footballguys.com/forum/topic/449753-no-punts-interesting-hs-strategy/
SBN2	Sports Blog	http://www.sbnation.com/2011/9/15/2428040/kevin-kelley-pulaski-academy-onside-kicks-punting
SP1	Sports Blog	Accessed on 2/12/16 – site no longer available
SP2	Sports Blog	Accessed on 2/12/16 − site no longer available
WP	Feature Story	https://www.washingtonpost.com/news/sports/wp/2015/08/13/the-highly-successful-high-school-coach-who-never-punts-has-another-radical-idea/?postshare=8121439483153073

The text artifacts represented a variety of media sources including sports blogs (n = 5), feature stories in traditional media outlets (n = 4), and guest columns (n = 3) on sport aggregator

sites. All the artifacts discussed the Pulaski game strategy, but several of the articles also discussed the concept in a broader context looking at no punting at the college and pro level. For example, one of the sports blogs (SBN1) was a summary of conversations among three individuals with football coaching or playing experience where they analyzed, critiqued, and commented on what Pulaski was doing and what relevance the Pulaski program held for other levels of football.

Table 7 provides a list of the video and audio artifacts and lists the artifacts code reference in the data finding, the type of artifact, and source of publication.

Table 7

Artifact Codes, Types & Sources

Artifact	Types	Artifact Source
HBO1	Feature Story	https://www.youtube.com/watch?v=A6XQGtSMfTc
AFM1	Interview	https://www.youtube.com/watch?v=PM897SI_qk4
HBO2	Feature Story	https://www.youtube.com/watch?v=phYhMUiAf9Y
HLN	Feature Story	https://www.youtube.com/watch?v=ELeE4w-g7nA
AFM2	Instructional Video	https://www.youtube.com/watch?v=RoYD07-6Ru8
NFL	Feature Story	https://www.youtube.com/watch?v=rvJKST6P7Wc
HBO3	Feature Story	https://www.youtube.com/watch?v=PLSQ0kuQf08
THV	News Segment	https://www.youtube.com/watch?v=dMfmSwyXYA0
TRI	Award Ceremony	https://www.youtube.com/watch?v=p9z_d4-PGzI
HBO4	Feature Story	https://vimeo.com/36312722
GRTL	Feature Story	https://www.youtube.com/watch?v=uUE7uytjmGw
ESPN3	News Segment	https://www.youtube.com/watch?v=r5zlWtx47fk
HERD	Radio/Podcast	http://espn.go.com/espnradio/play?id=10607190

The video and audio artifacts came from six different types of sources: feature story (n = 7), interview (n = 1), instructional video (n = 1), news segment (n = 2), award ceremony (n = 1) and radio/podcast (n = 1). These sources represented both traditional media as well as other non-

traditional media outlets. Most of the artifacts had Kelley as the main source of information regarding the Pulaski program. Only the GRTL feature story included interviews with others affiliated with the Pulaski program.

All interview data was subjected to a detailed, iterative analysis process. Table 8 provides a listing of the categories, the total instances per category, and the listing of codes that were contained within each category.

Table 8

Categories & Codes

Categories	Number of Code Instances Per Category	Examples of Specific Codes within Category
Coach Descriptors	135	Backgrounds, hard workers, leadership style, motivator, relationship builder
Innovation Attributes	112	Aggressive, disruptive/revolutionary, data driven, Unique
Innovation Decision Process	324	Adoption timeline, confirmation, decision process, implementation, persuasion,
Innovator Attitudes	151	Comfort level w/ failure, open to change, take things to extreme, Willing to take risk
Innovator Attributes	148	Ability to deal with ambiguity, data bias, constantly learning new things, questioning
Knowledge re: the innovation	43	Coaching staff, research studies, social media
Negative Perceptions	123	Media/analysts, peers-other coaches, fans
No Punting Philosophy	82	Fundamental assumptions of the philosophy, no punting philosophy description, positive unintended consequences
Non-Innovator Attributes	139	Groupthink, lack of diversity, reliance on conventional wisdom, resistant to change
Organizational Resources	175	Financial resources, technical expertise, lack of players, size of the school
Player Descriptors	165	Hard workers, mental toughness, smart, sophomore, trust in the leader/innovator
Positive Perceptions	64	Fans, media, players
Reasons not to Adopt	84	Fear of failure, goes against conventional wisdom, stats may not be as relevant in another context
Reasons to Adopt	185	Exciting to play and watch, Gives coaches more flexibility, strategy works

(continued)

Not Assigned a Group	45	Decision Making – Individual/Leader, Lack of Adoption

The analysis produced a codebook with 95 codes that were grouped into 14 categories to guide the interpretation of the data. Two codes fell outside of the 14 categories: decision making– individual/leader and lack of adoption. The interviews and existing artifacts produced a total of 1993 coded passages. An analysis of the codes enabled the researcher to construct a detailed case study timeline. In addition, the researcher was able to construct six major themes from the 14 data categories: attributes of the innovation, innovation perceptions, attributes and attitudes of the innovators, attributes of Pulaski and the football program, innovation-decision process, and the leadership style of the lead innovator. A more in-depth review of the themes and codes gathered from existing artifacts and interviews will be provided as a part of a narrative report of each theme in the following sections.

Case Timeline

The case study timeline is an important component of the findings because of the context it provides. It represents an important set of information needed to understand when various elements of the innovation decision-process took place and the various backgrounds and perceptions of those associated with the program and their lived experience during this time of transition.

The case study timeline begins from the time of the hire of an assistant coach (AC2) in 1994 up through the 2003 season when Pulaski won its first state championship and closes with a review of how the program has performed since Kevin Kelley took over as head coach in 2003.

The Coach Norwood era. The Pulaski Academy football team had become a fairly

successful football program under a more traditional coach, Coach Kirby Norwood. P7 noted that Coach Norwood was "the winningest coach in Pulaski County when Coach Kelley took over." But the level of success under Coach Norwood had a ceiling. ADM2 noted that the success of the team often seemed to correlate with the talent level of the players for any given year. He said, "We had some good years. We had some mediocre years, depending on the athletes." During ADM 2's first year at the school in 1995, the team had an extremely talented group of players. The team went undefeated until it lost in the semi-finals. Because the traditional style of play used by Coach Norwood, the team typically hovered around .500. ADM2 observed, "We didn't match up well with some of the other schools, and our style didn't help that. Cause we really needed athletically to be better than they were [Pulaski's opponents]."

The hire of Kelley as the offensive coordinator. In 1996 after watching a talented team once again fail to make a state finals appearance, the school president went looking for a new offensive coordinator. According to KK, the interview process was unusual:

> I came up and interviewed with the president of the school, and it didn't really register to me until after I walked out that the head coach wasn't involved in the interview, and I thought that was odd. Well what had happened was they had had a really good group of players come through and our president at our school was really competitive and he played college athletics and so he wanted to win and he felt like they had underachieved. Well they were running the old-school Power-I; just ground and pound, and he knew we were running the spread down there [Texas], and he wanted to change the offense.

The president's mandate was a nod to Kelley's experience combined with the hope that Kelley could be a bit more innovative offensively in order to help the team take that next step in success. The president believed that a more successful football program would "bring in more

[financial] support for the school, which can be pushed into other things" (ADM2).

The president was rightfully hopeful that Kelley could help the program be a bit more out-of-the-box. Kelley was young and had gained his initial coaching experience in Texas where he was exposed to the spread offense, which was beginning to revolutionize the way offenses were being run. During his five years in Texas, Kelley coached under four different head coaches, which enabled Kelley to "see a lot of different ways to do things" (KK).

While the president saw promise in Kelley, Coach Norwood was not happy with the hire. Kelley noted that he ended up meeting his head coach "some time later and you know—he's obviously upset that I was hired. He didn't want to hire me, but his president had told him, 'You're going to relinquish the play-calling duties and let this guy do it.'" Despite the president's mandate, Kelley was not allowed to implement the spread offense or do the play calling during his first season as the assistant coach in 1997.

Norwood wasn't the only one who didn't care for Kelley. AC2, who was hired prior to Kelley in 1994, did not have a good initial impression of Kelley, commenting that Kelley was "cocky and arrogant…He and I rubbed each other the wrong way. He came in with a brash attitude and new ideas about wanting to throw the ball all over the place. Kind of a take charge guy." The relationship hit a boiling point as well as a turning point around 1999. Initially, Kelley and AC2 "got into each other's faces and barked at each other a little bit." From the heated exchange, the two decided to take a trip together to try and work things out. The result of that trip was according to AC2 that "We kind of put our differences aside and came to the point where we understood each other and from that point on, things were better."

In 1998 after another season where the team underachieved, the president again, according to Kelley, pushed Coach Norwood to hand over the offense play calling duties to

Kelley. That season, Kelley was able to get the program to dabble with some of the concepts, but the team still relied heavily on a traditional Power-I offense until the third game of the 1998 season, when an injury to the starting quarterback opened a window to more fully implement the new offense.

The team won the game with Kelley doing all of the play-calling duties, and the backup quarterback passed for a more than 300 yards, which was a first in Pulaski history. Fan reaction was universally positive. However, Kelley was only able to run the spread offense off and on the remainder of the season, and it was his first and only season as part of the coaching staff where Pulaski "didn't make the playoffs" (KK).

With the failure to make the playoffs in 1998, the president again met with Kelley and Norwood and told the two coaches that according to Kelley, "We are committing to the spread offense. So that's what we are going to do" Kelley found it strange that an administrator was giving orders on the coaching approach, but the results, or lack or results, of the previous offense and team seemed to support the change.

In 1999, the team took major strides to implement the spread offense and by the 2000 season, Kelley was in complete control of the offense. Coach Norwood retained his head coaching duties and was also fully in charge of the defense. In his first full year running Kelley's version of the spread offense, Pulaski averaged 50 points per game. In 2001, the team began setting national offensive records including the national record for most touchdowns (77) thrown in a single season. According to Kelley, it was during the 2001 season that "everybody's bought into the spread offense, which at the time was kind of innovative." P1 recalled watching this process come about noting that "Coach Kelley kind of broke through each year, and we did more and opened the offense up. And essentially when I was there, we were a spread attack."

Even with all this offensive success, the team had still been unable to get over the hump and advance to a state championship. P5 noted that, "We still had good seasons and great teams. We went to the playoffs every year, but we just couldn't ever get to the end. It was like we always would lose in the semi-finals or something." After the 2002 season ended by losing in the second round of the playoffs, the school was ready to make a head coaching change. P2 noted that "I think there was a general consensus that, I mean, it was going to happen at some point because of all the success of the offense."

Kelley's promotion to head coach. Not long after the 2002 season had ended, the school president called Kelley into his office and according to Kelley said, "I want you to know that I've removed the head coach and I want you to have the job." Kelley initially was uncomfortable with the idea and tried to get the president to "sit us [Norwood and Kelley] down and let's figure this out"(KK). But the president seemed intent on the change, and so Kelley accepted the position officially becoming the head coach in January of 2003.

All of the participants (n = 11) interviewed, excluding Kelley, noted a general excitement over the change in head coach. Comments regarding the coaching change included "Everyone was excited" (P6), "But Coach Kelley was the man. I mean he was the man. So for us, we were beyond thrilled to have that change as whole team" (P7), and "I had no problem with him becoming the head coach…my bond with Kevin became even stronger" (AC2). A more detailed review of responses and reaction to the series of innovations Kelley began to implement will be provided during the discussion of Theme 2 - Innovation Perceptions.

As soon as he was hired as head coach, Kelley felt pressure to do "something to push us over the top. That's why they hired me" (KK). Kelley's first action as head coach was to begin to ask a series of why questions "about our program. Why is it that we are doing this? Why are

doing this? If we can't come up with a good reason, do we need to research and find out why we are doing it or throw it out and do something else that we do have a reason for…So I started asking 'why' and that's when we started dabbling around and doing some different things as far as my first year in 2003" (KK).

Coach Kelley's intent was not to be a disruptor. His initial motivation to make changes and begin to adopt the no-punt philosophy were an attempt at "just tryin' to find a way to win. In my school, I guess, in 36 years they had been to semi-finals of the state championships twice, but we couldn't get past that." He realized that there would always be some limitations around the kinds of players he would have access to, and that the program would "need to change if we're gonna [win], cause we're gonna have the same kinds of kids every year."

The result of Kelley's series of why questions was a substantial list of changes that were "a little bit of everything" (KK). These changes represented a substantial shift from the "very old school" (P6) approach taken by the previous head coach.

Some of Kelley's innovations focused on player conditioning and the way the team practiced. For example, Kelley changed the expectation around offseason. During the summer months, players were "expected to be at the high school in the weight room four days a week in the afternoons" (P3). Kelley also started getting the players involved in a "diet with a lot of protein" and in having "a protein shake whenever you work out" (ADM1).

With respect to team practices, Kelley added the 7-on-7 concept and worked to make each practice unique. The 7-on-7 drill change was of the most memorable changes Kelley made according to P5, who noted that the team "got real involved in 7-on-7…we got real involved in 7-on-7 especially with Coach Kelley and you know—all of our plays." Kelley's predecessor ran a set schedule that he never deviated from. Players and coaches knew "on Sunday how each

practice would go that week…you knew in 10 more minutes we get a water break and then after that we run ten 40's and then we go to offense and then we go to defense" (P7). Kelley was "the exact opposite" (KK) and was "always trying to innovate and make it not so boring" (P6). This meant changes in practice that included, "hitting a lot less" (KK) and playing other games in practice like "sharks and minnows in full pads" (P7).

Other innovations focused on game preparation and game strategy. Kelley, contrary to other coaches, was more of a believer "in mental toughness than a physical toughness" (KK). This meant that game preparation had to include more mental preparation for his players. P1 noticed the impact of Kelley's efforts "to build us up. He would break us down, but he was also build us back up and make us stronger…It just wasn't always physical—you know—challenges. He also mentally challenged people. He made you, you know, get some mental strength, which I think helped us later down the road so when we, you know, playoffs and championship."

Kelley also made a major change in the team's game day routine where the team went from showing up for a game three hours early to arriving just 45 minutes before kickoff. The game day change was one of the favorites of AC2. "I loved the idea of getting to a game 30 to 45 minutes before a ballgame. One of the worst times…it's the 1.5 to 20 hours before a game when there's all this down time…The idea of showing up, getting stuff, get on the field, stretch, boo we're ready to go is—is one of the better things that I've ever been a part of."

The most radical of the changes in terms of their departure from normal football wisdom was Kelley's heavy reliance on trick plays and the initial experimentation with the no-punt philosophy. According to P1, "We ran a whole bunch of trick plays under Kelley." Further Kelley began running a trick play on the first play of every game, which enabled the team to score "7 out of 12 times on the first play of the game…they were triple passes, double pass

reverse passes. Once all five receivers touched in on play and scored" (P7).

And it was in the summer of 2003 where Kelley "happened to run across that first study…and I started looking at [not punting]" (KK). Unlike the complete adoption of other changes noted above, Kelley was "reluctant to dabble in the not punting simply because 'What if it doesn't work.'" So Kelley began to use a play on 4th down where the team "would line up– two receivers on each side and if they put someone back to receive the punt, we'd run a play" (P7). If the opposing team lined up to play defense, the quarterback would quickly punt the ball. The hybrid punt strategy was as a way to ease into or experiment with the concept and see if the results were playing out as the first no-punting study predicted.

The first year with these innovations in place did not start off well. Several coaches and players interviewed mentioned the first game and had the final score memorized. Comments ranged from "I think the score was like 62-0" (P3) to "It was the big Springdale team that beat everybody, but they beat us 62-0. That automatically brought heat on all of us" (AC2) to "…his very first game as head coach and we get beat 62-0. This was a summer after replacing the winningest coach in Pulaski history, and I know that people weren't – This is not supposed to be happening" (P7). After three games, the team was 1-2 and had lost to its cross-town rival CAC, which according to P5 was "the biggest letdown."

After the slow start and the initial setbacks, the team would not lose another game on its way to winning the school's first state championship in football. ADM1 talked about the reaction of the school to winning that first state championship:"I did go to that state championship game, and it was just…and the crowds went wild because we hadn't done that. And it was amazing. And then you get that taste of success and they wanted it every year – every year."

Post 2003 Kelley program results and additional innovations. The win gave Kelley "a

free pass for a couple of years. Guy comes in and changes a few things and wins one—whatever he says, let's be all in. I think that certainly solidified and stamped approval, because that's what everybody wanted." With that free pass, Kelley began to more aggressively implement the no-punting concept where according to football historians, Pulaski in 2008 became "the only school in the history of the United States (high school wise)…to win a state championship and not punt" (KK).

Kelley has continued to push the football innovation envelope. In addition to the innovations he began adopting during that 2003 season, Kelley has gone on to adopt an innovative onside kicking philosophy, unique player management practices, use of rugby concepts for play design and many more trick plays. The result: Pulaski has become a perennial champion winning state titles in 2003, 2008, 2011, 2014, and 2015. The team also appeared in the state championship game in 2007 and 2013. The program has also become somewhat of an Internet phenomenon and was one of the "front page" (KK) stories on Yahoo.com for a "long time" (KK) in 2008.

Theme 1: The Attributes of the Innovation

Each of the 12 participants was asked to describe the nature and attributes of the innovations Kelley implemented during his inaugural season as head coach compared with other innovations that they had seen in football. Analysis indicated over 100 coded passages from the interviews, which were then organized into the following four subthemes: aggressive, disruptive-revolutionary, innovation-data driven, and unique. Figure 5 presents the number of occurrences in the data for these four subthemes.

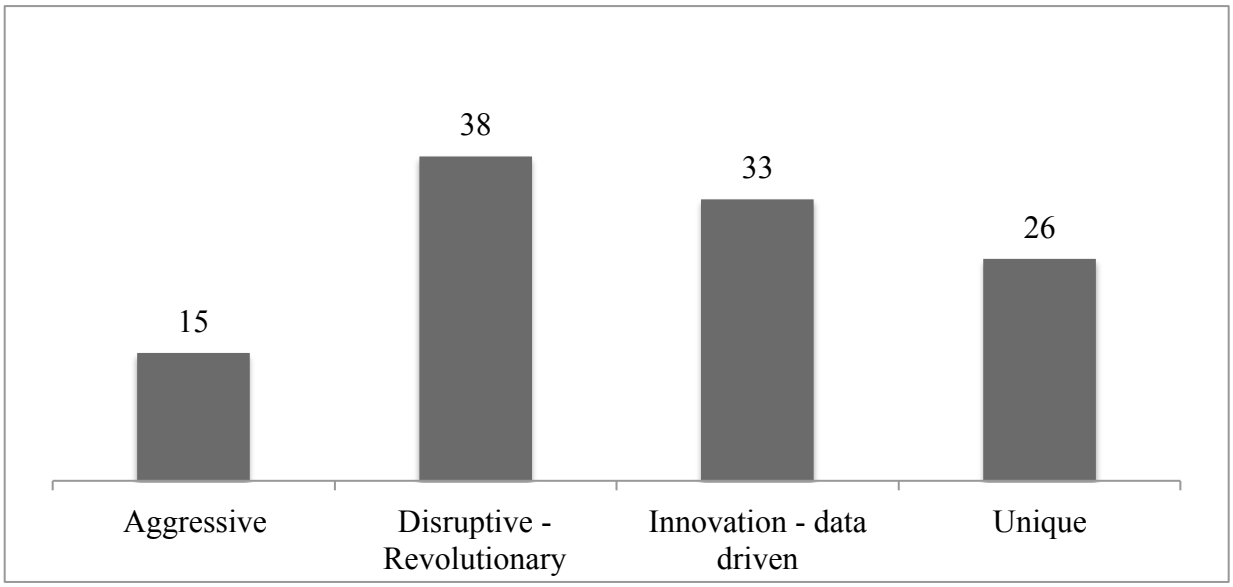

Figure 5. Innovation attributes and number of occurrences

Aggressive. The nature of the innovations that Kelley adopted were often characterized as aggressive or led to an aggressive mindset. AC2 noticed that in 2003 Kelley's "play calling from the sideline became quicker…we became more of a—much more, in my opinion, aggressive offense. We were really kind of stretching things out, kind of going outside of what normal people would do in the spread offense." The aggressive approach was "one of the more things that stand out was just an aggressiveness in coaching philosophy…It is bold. It is aggressive." (P3).

Disruptive—revolutionary. This subtheme considered actual descriptions of the innovations where analysts, players, coaches, and administrators called the innovation itself revolutionary, radical, or disruptive. For example, one former player has subsequently tried to get the series of innovations adopted at other schools but has been unable to because the innovations are "still radical" (P7). Kelley noted his initial hesitation to adopt the no-punting innovation because "it was so different that I didn't want to jump into it."

The theme also captured the perceived impact on the game both in the short-term as well as the long-term. Part of the radical nature of the innovations, the no-punting philosophy in particular, is that Kelley's success in implementing them has "caused us to question the way the game is played" (GC). One sports analyst has called the no punting philosophy "the most significant football innovation we've seen since the veer option" (ESPN2). One of the school administrators agreed with that analyst's sentiment assessment saying, "I think that this probably is the single thing that could change all football if other people would take the risk, and they are not willing to do it because to actually have four downs to play the football, that's amazing instead of three" (AD1).

Innovation—data driven. A best practice in offensive play calling is for teams to punt the ball to the other team when they are in their own territory or if they need more than a couple of yards to generate a 1st down. This subtheme looked at how the numbers relating to the no-punt philosophy tell a much different story and how that data helped Kelley first consider and then adopt the innovation. While Kelley was at first hesitant to adopt, he was impressed with the statistics:

> I did really believe based on statistics I'd seen…he [the Harvard professor] had shown that field position was not important…He had used numbers from all levels of football from Division 3 all the way up through Division 1 and ran thousands of games through and came up with his conclusion that it was that the right thing to do was almost never punt the ball. (KK)

As he began to adopt, Kelley relied on the data behind the philosophy to get players and coaches on board. "I remember him presenting it to us like that as far as very statically based argument. But, you know, as far as, you know, here are the odds. Here are the percentages…I

remember him speaking, you know, presenting choices very, you know, well studied argument," said P3.

Unique. The uniqueness of the no punt philosophy captured participants' descriptions where they specifically characterized the innovation as unique, being different, unlike anything else, or totally different from the norm. An example of this is found in a video artifact of Coach Kelley presenting the philosophy on AFM where he concisely states, "It's unique and it's benefited us." ADM2 commented on how the philosophy "is different than most teams play." Further it is a departure from how the players had been taught "since 3rd grade, so this is all different." Five of the seven players commented on the uniqueness of the innovations and "that it was something that was not being done elsewhere"(P4).

Theme 2: Innovation Perceptions

Kelley's offensive philosophy, his aggressive style, and the no-punt concept had both fans and critics. Most of the critics resided outside the football program, but during the first few years of change and adoption, several parents within the school community also held negative perceptions of the innovations as evidenced through various artifacts and interview data.

Analysis indicated over 180 coded passages from the interviews, which were identified as either a negative perception or a positive. Perceptions were further subdivided into the following four perception sources: media/analysts, peers (other coaches), players, and fans. Figure 6 provides a summary of the type of perception, the source of the perception and the number of instances perceptions of the innovation appeared in the data. Negative perceptions totaled 123 codes while mentions of positive perceptions totaled 64.

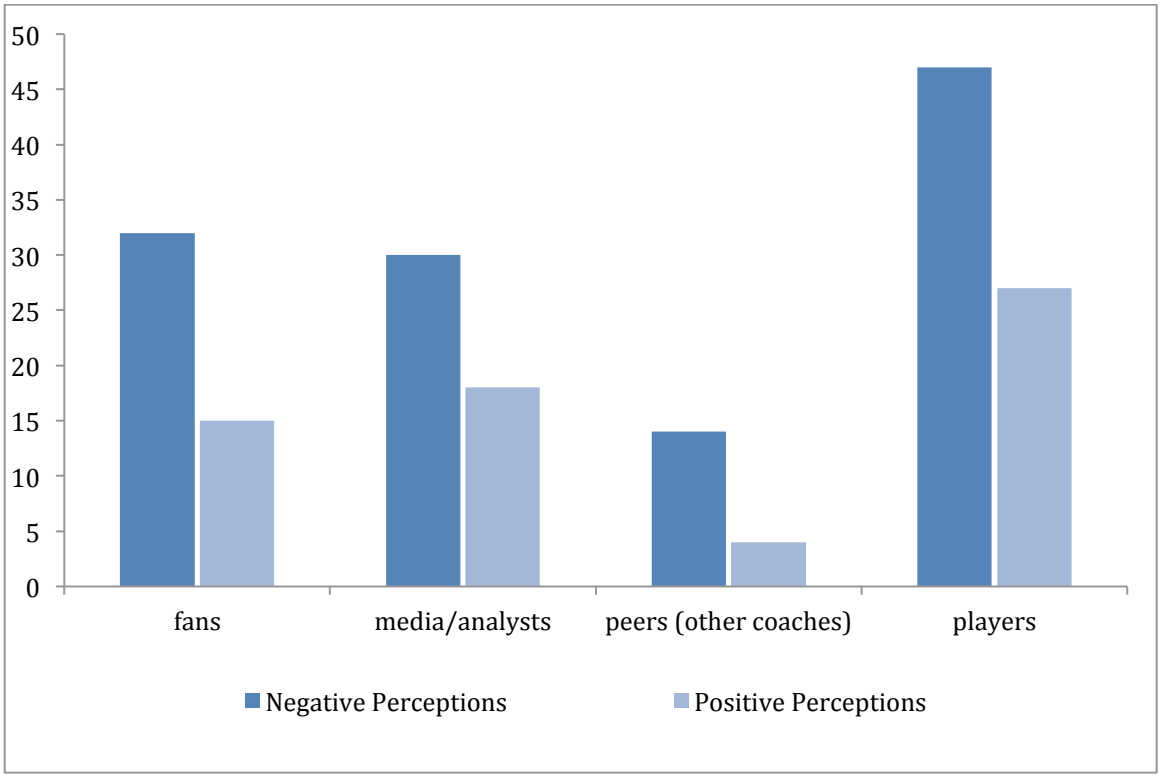

Figure 6. Innovation perceptions & the sources

As the numbers show in Figure 6, more people viewed the innovation as negative than positive, particularly coaches and peers outside of the Pulaski program. Some negative perception responses included:

- "I'd get run out of Dodge," said Notre Dame coach Charlie Weis, who has been second-guessed for more than one fourth-down call. (AP)
- When Bill Belichick went for it on fourth-and-2 in Patriots territory to ice a game at Indianapolis, and the play failed, he was widely ridiculed in the world of sportsyak. (ESPN1)
- He had a lot of skepticism [from fans] that first year—maybe two years. (ADM1)

  You get criticized for not playing 'smart'—you know—that they're saying that that's not the way you should play. (AC1)

- There was a lot of frustration—there were kids on the field that didn't know what was going and were just frustrated and thought…I think a lot of us thought that Coach Kelley wants attention. (P2)

Ironically, while the peers were some of the most critical regarding the no-punt concept, according to the participants' responses, those same peers would begin to mirror what Pulaski was doing and "would go for it [more] on 4th down" and attempt to "try to play [Pulaski's] game" (AC1).

While two of the players had some reservations and frustration with the philosophy, 5 of the 7 players were big fans of the philosophy. Positive comments included:

- I don't like playing it safe, and so I liked it! (P1)
- I think it's great! I kind of take pride…I guess—the team now has become even more kind of different and more unique than it was when I was playing. So I think it kind of gives you a little sense of pride. (P3)
- It never bothered me, cause it gave us a chance to say, 'I'm gonna get it done coach.' And I loved that. (P6)
- Loved it! Cause, you know, it is awesome for kids. You're like, "Okay. Please, please drop back so we can go for it." (P7)

Even the administrators and coaches acknowledged how positively the players reacted to the philosophy. "I was still a teacher and to listen to the kids be excited about it and 'This is what we're going to do and this is going to work awesome and going to be and we're not going to punt' and it was like 'Wow, you are really buying into this'" (ADM1).

Those outside the program, who tended to have the most positive perceptions of the no-punting philosophy, were social media outlets like blogs or other guest columnists on more

traditional news outlets. Some examples included:

- The Pulaski Academy Bruins do not punt and the straitpinkie.com squad absolutely loves it. (SP2)
- Pulaski Academy is providing real-world evidence of the future of football. The most important innovation in years is being field-tested by the Pulaski Bruins, and the test is going quite well. (ESPN2)
- TMQ considers Kevin Kelley of Pulaski Academy the most innovative coach in football. (ESPN1)

Theme 3: Attributes and Attitudes of the Innovators

Theme three provided an important 360-degree view of the attitudes and attributes of the various individuals who participated in the adoption process within the social context of the Pulaski Academy football program. Analysis indicated over 373 coded passages from the interviews. These codes identified several attitudes and attributes of innovators. In the following four subsections, analysis will be provided regarding how individuals perceived themselves in relation to the attitudes and attributes as well as how others perceived how the head coach, the assistant coaches, players, and school administrators demonstrated those attributes.

Coach Kevin Kelley. While many individuals participated in the adoption process, Kelley was the "lead" innovator and was the primary decision maker behind the adoption of almost all of the innovations. More about the innovation-decision type will be discussed in

As the lead innovator, Kelley was an important subject to understand separate from the other interview participants. Table 9 provides a summary list of the 11 characteristics that Coach Kelley self-identified and how he compared himself to others with respect to that innovator attitude or attribute.

Table 9

Innovator Attitudes/Attributes, Mentions, & Participant Self Rating

Attitude or Attribute	Number of Mentions	Self Rating (From Low to High)
Ability to deal with ambiguity	3	Low
Data bias	3	High
Innovative	3	High
Comfort level with failure	8	High
Constantly learning new things	5	High
Contrarian	5	High
Open to change	7	High
Questioning	4	High
Sees coaching objective unlike others	10	High
Take things to the extreme	6	High
Willing to take risk	6	High

A total of 60 codes were identified in Kelley's personal interview where he discussed the 11 characteristics. The three most mentioned characteristics were seeing coaching objective unlike others, comfort level with failure, and open to change. Kelley self rated as high on all of the innovator characteristics except for his comfort level with failure where he rated himself low. Table 10 provides an illustrative direct quote from the Kelley in relation to each of the 11 characteristics.

Several of Kelley's self-assessments were confirmed by the other interview participants. For example, P1 noticed Kelley's tendency to question and be innovative noting that Kelley was "always kind of tinkering with stuff. He was always looking for an advantage." ADM2 saw Kelley's intolerance for failure as one of the main motivators for the head coach because Kelley wants to win "so bad…he figures out ways to do it." In terms of risk taking, ADM1 noted that

Coach Kelley was a "bigger risk taker" than others. P7 echoed that statement calling the head

coach "the biggest risk taker in the world."

Table 10

Innovator Attributes and Attitudes & Kelley's Self Assessment

Attribute or Attitude	Direct Quotes
Comfort level with failure	I don't like failure any…I hate failure, whether it's one instance in the small picture or whether it's the big picture. (KK)
Open to change	I was just talking to our soccer coach about thinking a little bit differently on the field and just be open to new ideas, be open to some new innovation. (KK)
Sees coaching objective unlike other coaches	I'm willing to lose this game to win a championship ten games from now. (KK)
Takes things to the extreme	I probably go to the excess the other way, but uhh, people are doing it [punting] and they shouldn't be doing it. (HERD)
Willingness to take risk	But I am open, way too open to risk. (KK)
Ability to deal with ambiguity	That's my favorite part – dealing with the unknown. (KK)
Data bias	I can tell you for instance on the play 'Jet fly twister' that we completed 15 out of 15 in 2014 for 207 yards and 7 touchdowns on that one particular play. (KK)
Innovative	Then we started thinking, 'Hey, there's a lot of ways this game has not been played that we can play it differently. (KK)
Constantly learning new things	That's how I saw it [the no punting video] in the first place, but you had to be looking for it, you know, you had to go out and look for it. (KK)
Contrarian	Coaches love sayin' that, you know, 'You've got to have the Jimmys and Joes. We've always said you don't. (KK)
Questioning	So I started asking 'why' and that's when we started dabbling around doing some different things as far as my first year in 2003. (KK)

Assistant coaches. The assistant coaches played an important role in the adoption process, particularly AC2. The assistant coaches shared several of the innovator characteristics of the head coach. For example, neither coach dealt well with failure. AC2 was adamant about his feelings regarding failure, saying, "I've never accepted failure…I don't do well with failure. I react harshly to failure." AC1 also rated himself high in terms of his ability to deal with

ambiguity. “I actually like that [ambiguity]. I like that because, you know, it’s kind of the unknown and you can kind of set your own path” (AC1).

While several of the innovator characteristics were similar, some important distinctions existed between Kelley and his support staff. For example, AC1 was very open to change and would “usually embrace it…anything new to me, it’s exciting. And so I just, you know, I love it.” AC2, however, described himself as “a conservative guy when it comes to a lot of things. I don’t like change.” Kelley was also far more willing to take risks than his assistant coaches, who both needed more evidence and needed to feel strongly that “the risk is worth it” or they would be “less inclined to take” (AC1) the risk.

The players. Kelley noted that the getting the players to buy-in to what he was doing was easy. Kelley attributed some of that willingness to uniqueness of what Pulaski was doing and that it was something “nobody else is doing” (HERD). However, the data revealed several attributes and attitudes of the players that may have also contributed and improved acceptance and adoption of the several innovations that Kelley began to experiment with that 2003 season. Player participants were asked to provide a description of a series of attributes and attitudes in comparison to the other teams that they played. The list of characteristics included: (a) experience level in football, (b) mental toughness, (c) openness to change, (d) player intellect and technical aptitude, (e) the willingness to work hard, and (f) the lack of comfort with failure.

Players rated themselves as average in terms of their experience in football. Some of the players started as early as 4th grade, which from P3’s experience was a fairly common time to start playing tackle football. Two of the players didn’t start playing football until 7th grade. P5

started playing in 7th grade not because he didn’t want to play earlier but because his “dad

wouldn't let me play until 7th grade" (P7).

The players rated themselves as above average in terms of their mental toughness. P1 simply stated, "We were just above everybody." Part of that mental toughness came from the way Pulaski practiced. P7 saw the connection between how they practiced and played and their ability to be mentally tough saying, "The more you do something, the easier it becomes. So the more you're in a pressure situation, the more you feel like it's a normal situation."

The responses for players' openness to change were mixed. Some players like P4 were "accepting of change" (P4). But other players like P2 noted that for him "change in general was an uncomfortable thing…as a teenager." In general, players rated themselves as average in their openness to change.

Players at Pulaski viewed themselves as a step above other teams in terms of their intellect and technical aptitude. P1 went so far as to rate Pulaski players as "at the upper echelon." Pulaski is a college preparatory private school and the academic demands are higher than peer schools, so this perception was not surprising.

The players also viewed themselves as above average in their work ethic. One player described his personal efforts to gain weight between his sophomore and junior years explaining, "I went from 130 pounds [in] December 2003 to start of the season [in] 2004 to 176 pounds, and it takes a lot of frikin' work. And I did—I drank more weight gainer…I worked really hard at that." Similar sentiments were expressed from almost all the players.

The only area where the players felt like they were below average was in terms of their ability to deal with failure. The general consensus was that nobody "did really well with failure" (P3). In fact, not a single player mentioned being okay with losing in any shape or form. Pulaski players were used to winning not just in football but in other sports as well, and so failure was

not culturally acceptable. For example, P7 mentioned that a season where the team went 9-3, which for other schools would have been a great season. But from P7's perspective that kind of a record was "not a very good season."

The players were not the only ones to provide an assessment of their attributes and attitudes. The coaches and administrators who participated in the interview process confirmed several of the players' self assessments. The most common assessments from non-players centered on the intellectual ability of the players and the work ethic. For example, ADM2 attributed some of Kelley's success to the players "general academic potential," which enabled Kelley to "throw a lot of stuff at them" and to run "a lot more complex offensive schemes" than other schools could run. AC2 confirmed the players' assessment of their ability to work hard noting "We just —we have kids that work."

School administrators. As noted in the case study timeline, administrators at Pulaski had an impact on the football program. As such, the researcher asked the administrator participants several questions regarding their background, attitudes, and attributes. Their responses provided insight into several innovator characteristics including a willingness to learn new things, openness to change, and willingness to take risks.

Both administrators demonstrated a willingness and even passion for learning new things. AD1 is a voracious reader and reads "a book every two days." While her main interest is historical fiction, she often finds that a fiction book make her "curious" which will get her to "go read other stuff that was actual non fiction to find out how it really happens." AD1 summed up her passion for learning by saying, "It's not a good day if I don't learn something new that I didn't know."

Both administrators noted that they were very open to change. AD2 talked about several

instances of change that he had been a part of or led. One example related to the hiring of a maintenance supervisor. After initial failure using a conventional job description, AD2 "changed the job description (the whole profile of it) to be more of a facilitator of the maintenance guys and of the housekeeping people." The result has been an extremely positive change with the maintenance crew.

Finally both administrators showed a willingness to take risk. ADM1 was very "tolerant" in terms of risk tolerance level. Her willingness to take risks meant she is "always willing to try new things and take on challenges that are huge."

DM2 was a bit more conservative than his peer as it pertained to risk taking. Part of that hesitancy is natural given his job as a "fiduciary to maintain things in a certain way." ADM2 made the direct tie to being more conservative with his role saying, "The responsibilities of this position do cause me to be conservative in many ways." Even with some of those job constraints, he "didn't mind taking risks, because I realize sometimes you're gonna find—you're gonna find that risk turns out [and] you might find a better way of doing things."

While the administrators were both fairly open to taking risk, they noted that the Pulaski Academy community in general tends to be "pretty conservative" and that the head coaching change was driven by a more risk tolerant headmaster who was finally able to pull the trigger and fire a fairly successful coach hoping that Kelley would come through. This conservative nature is more commonly found in non-innovators or later adopters.

Theme 4: Attributes of Pulaski and the Football Program

During the interviews, the researcher asked particular questions relating to the particular attributes of Pulaski Academy compared to other schools that Pulaski played in football. Analysis indicated over 168 coded passages from the interviews. From these coded passages, six

subthemes emerged: access to knowledge, financial results, technical expertise, lack of players, size of the school, top-tier athletes, and outside perceptions. Figure 7 summarizes the frequency of each of these subthemes in the data.

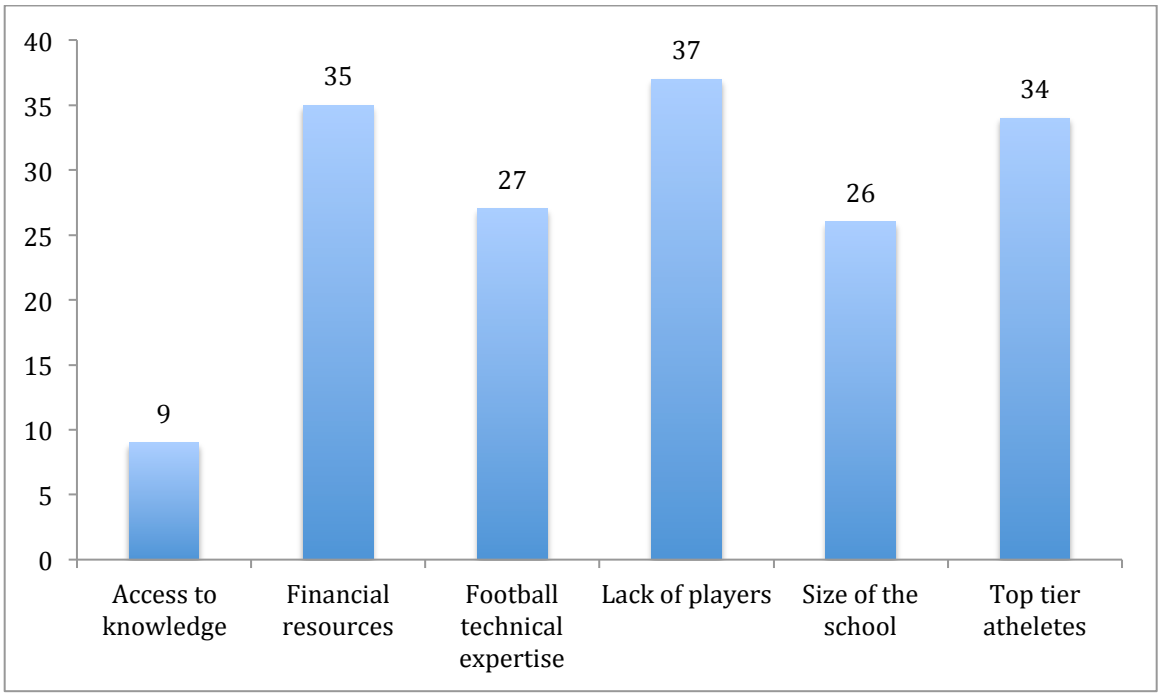

Figure 7. Pulaski Academy organizational attributes

Access to knowledge. Early on Pulaski was in a similar situation compared to other schools in the area as it related to access to knowledge regarding innovations in football. Coach Kelley highlighted the location of the school and the level of play (high school) as contributors to the lack of access to knowledge:

> We're in Arkansas and I'm a high school football coach. I'd say...less [access] than maybe or maybe the same as all the other football coaches at that time at my level…because we're confined to our own little area and I'm stuck in Arkansas. The Internet opens up some things. That's how I saw that [the video on not punting] in the first place, but you had to be looking for it, you know, you had to go out and look for it. (KK)

P2 also noted that the information on not—punting "was there" for everybody and that some "people were already doing that in some situations." P4 however felt that Kelley's innovative efforts "were personal to Coach Kelley." P4 did talk about Kelley's efforts to go find knowledge regarding football innovations and that this knowledge often came from individuals that "weren't in our conference in the state" and were coming from "outside the borders in terms of like a resource of information."

Financial resources. This subtheme produced a range of responses from interview participants and provided insight into the size of the coaching staff, quality of the facilities, school budget, and importance of outside financial support to meet the needs of the program. Some participants saw the school as even with or slightly above most of their competitors. P6 felt that Pulaski was "about even" with the other schools they played in part because the local school district was "one of the worst school districts in the entire country."

Others noted that the lack of resources was evident in the lack of equipment, poor state of the playing field, and smaller size of the coaching staff. P7's comment is illustrative of these responses. He said, "You wouldn't have come to the games then and thought this is a private school that spends a lot of money on their football…We had a dirt field…Our [game] jerseys, our practice jerseys had holes in'em…The biggest piece of junk was our weight room."

The most accurate perspective is provided perhaps by ADM2, who had direct financial responsibilities for both the school and the athletic budget. He spoke specifically about several elements of the school's resources for sports:

- Size of Coaching Staff: "Our coaching staff is usually a little bit smaller than the teams we play. We're a smaller school in a bigger division."
- Quality of the Facilities: "If you'd seen our lights two years ago, you'd have been

embarrassed because they were on wood poles and one of them was kind of leaning over like this, and one corner of the field was really dark. But our operating budget, we could never prioritize lights because there were so many other things that we had to do."

- Football Budget: "I suspect that we're a little bit low…The school budget that we have that's the school operating fund provides for is not very big…But I think public schools spend quite a bit more."
- Outside Financial Support: "From the donor side, we do have good resources there cause people have been willing to give to a program that's like that."

Technical expertise. Pulaski had very capable coaches. ADM2 felt that the Pulaski coaching staff "has been and continues to be exceptional" in comparison to other schools. Coach Kelley, AC1, and AC2 were more conservative in their assessment in comparing their level of expertise as a coaching staff in 2003 to other programs they played. Some of their comments included:

- The 2003 season that was just my second year of coaching football at all…I was very non-expert. I mean you're talking about a second year coach who didn't play college football. (AC1)
- I didn't learn the game like everybody else…I knew what I wanted my guys to do. So technical part [compared] to everybody else – 4 or 3. (KK)
- If I'm looking at the guy in 2003, I'd put it at a 4. (AC2)

In the broader spectrum of football coaching, high school coaches, including Kelley and his coaching staff, are seen as even less technical. P4 related his experience in college where position coaches were "literally experts in that field almost and a lot of times in high school, you get like a fill-in coach or a math teacher will be a coach or something like that. It's not

exactly ideal." Even Kelley recognized the limitations of his technical expertise when sharing with one interviewer that he might punt more often "if he had somebody who really understood the numbers even more and could really dig deep down and get to every nugget that there probably are times when he should punt" (HBO1). But because he didn't have that level of expertise he was forced to take a simpler, all-in approach with the no-punting philosophy.

Lack of players. Pulaski Academy is not known as a talent powerhouse like other larger programs in Arkansas and elsewhere in the South. What this generally means is that Pulaski will have three to six really good players for any given year, and then there is a "huge drop off to the next level" (KK). According to Kelley, Pulaski after those first few good players is "slightly below average" compared to other programs. AC2 offered this hypothetical to illustrate Pulaski's inferior talent pool:

> If you were to line our kids up across the field and line other teams up…across the other side of the field and you were to take somebody that had nothing to do with Pulaski Academy and said, 'Okay, pick which one of these teams you would figure would win this ball game.' I can guarantee you nine times out of 10, they would pick the other team because we don't have kids that are just enormous. We don't have kids that look fast and strong.

P7, who now coaches against Pulaski, made this observation about player comparisons noting that Pulaski's "defensive line averaged 200 pounds, okay. Our offensive line probably averaged 315, you know. And I'm not talkin' about not just fat. You know, we looked like men [in comparison to Pulaski]."

Size of the school. This subtheme is closely related to the Lack of Players subtheme.

Pulaski is a smaller school than most of the other schools that they played. The size difference was a direct result of a multiplier rule that was put in place by the Arkansas High School Activities Association (AHSAA). The multiplier is for private schools that play sports governed by the AHSAA and counts each private school student as the equivalent of 1.5 students. This means that a private school that has enrollment of 200 students would be considered to have an enrollment of 300 students. The multiplier often resulted in private schools playing up a classification; Pulaski was no exception and ended up "playing in a division with kids–schools that could have twice as many kids in their high school that we have" (ADM2). Some schools were upwards of "four times bigger" (KK) than Pulaski. The size of a student body does have an impact on the talent pool. Because of the size of the school, Pulaski has to have "a bigger percentage of our kids that are playing" (ADM2). Further the size of school meant that in 2003 there weren't "that many fat boys to play offensive line" (P6) when the school only had about 100 students that it could draw on to for the football team.

Top tier athletes. While the talent pool was smaller for Pulaski, the 2003 team was unusual when it came to the caliber of athletes on the team. Every single participant (n=12) agreed with the sentiment that the 2003 senior class had an abnormal amount of talent. While a normal year would produce one to three Division I caliber players, the 2003 senior class had approximately seven players who received full scholarships to play football at the college level. One of the players felt like the 2003 senior class of players was "one of the greatest class of seniors PA has ever seen…From quarterback, all four wide receivers, and they were stout." Another player added, "We were probably one of the best in the state as far as having the athletes…so we had a lot of talent." AC2 confirmed those perceptions noting, "We had a lot of talent. We had a lot of size, speed. And yes we had a lot of—we had several DI players, strong

D1 players."

Kelley generally agreed the general talent assessment of that 2003 class had a higher level of talent than normal saying, "We had a good talent pool that year of the top three, four, five guys." But he was quick to add, "There was a huge drop off to the next level…but those guys brought our average way up that year."

Theme 5: Innovation-Decision Process

The researcher posed several questions to the participants relating to how they experienced the innovation-decision process. Analysis indicated over 215 coded passages from the interviews, which were then put into five subthemes: knowledge, persuasion, decision, implementation, and confirmation. Two addition subthemes were included in the broader innovation-decision process theme: the innovation decision type and unintended consequences. A total of 23 codes were analyzed for these two subthemes. Figure 8 provides a summary of the number of instances for each subtheme of the innovation-decision process.

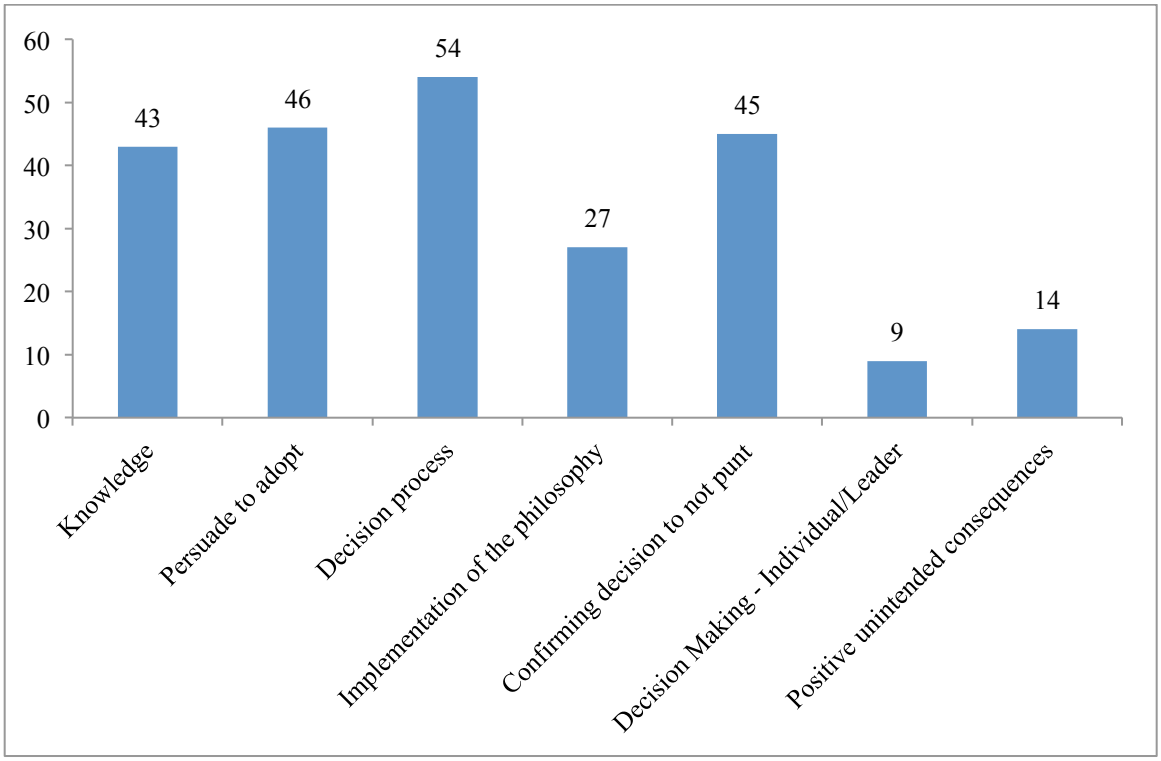

Figure 8. Innovation-decision process participant responses

Knowledge. Interview participants and existing artifacts noted four different sources for knowledge gathering: research studies, peers, coaching staff, and via social media. Figure 9 shows a breakdown of how information relating to the various innovations was acquired during the innovation-decision process.

Coach Kelley's initial exposure to the idea of not-punting came when he "happened to run across that first study the people have asked me about a million times" (KK). As the lead innovator, Kelley tended to always be the first one to get knowledge about an idea. ADM1 recalled that Kelley "was always reading research articles."

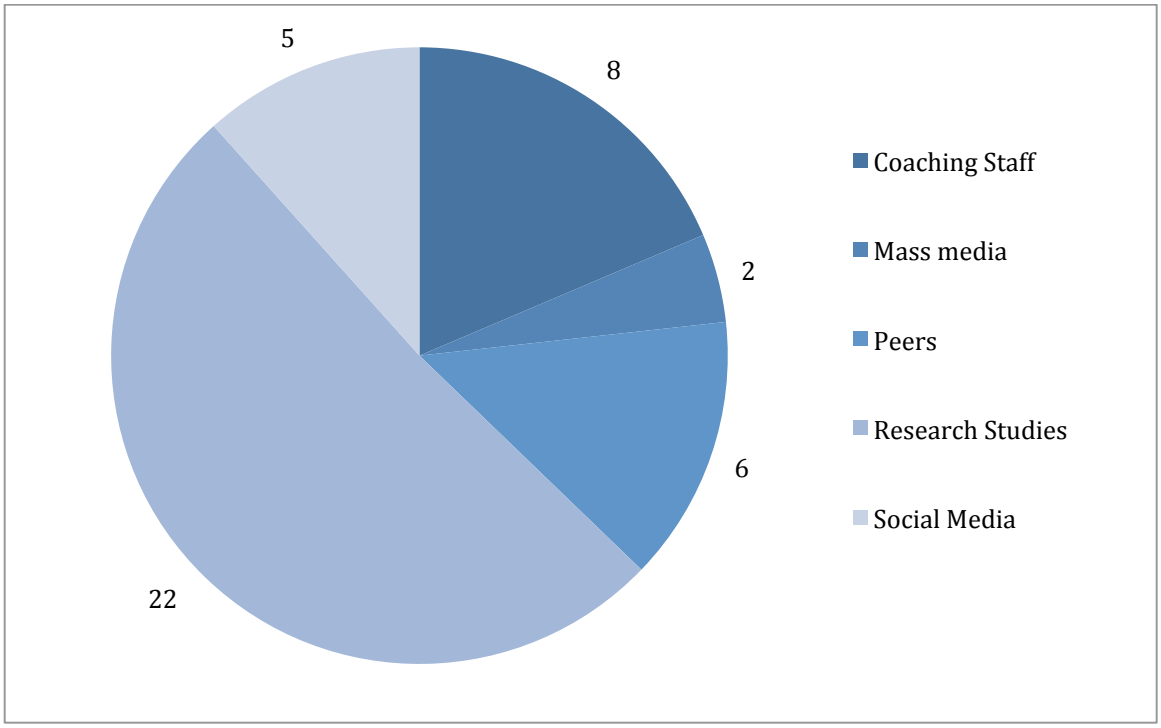

Figure 9. Sources of knowledge for interview participants

Other participants tended to gain knowledge about the no-punting philosophy directly from Kelley or from other members of the coaching staff. They also became aware of the no-punting philosophy after Kelley had already begun experimenting with the concept. ADM2 stated, "Kevin told me. He did. He told me about it, cause I just asked him." When asked how he first learned about the no-punting concept, AC1 said, "basically just Kevin and I having conversations about football." After those initial conversations, AC1 spent time on his own researching the studies Kelley mentioned to confirm what he had learned from Kelley. Now AC1 relies heavily on YouTube to seek out or learn about new ideas. P3 remembered hearing about the no-punting philosophy "in the locker room watching film one day." P5 didn't remember learning about the philosophy until he started hearing about it when he was in college.

Persuasion. Analysis indicated a total of 46 instances in the data where elements of persuasion occurred. Analysis for this code included instances where individuals began to form

stronger opinions or buy into the philosophy, as well as instances where those who already had positive attitudes towards the philosophy made attempts to persuade others to buy into the concept. Examples from the data relating to players, administrators and coaches being persuaded to adopt include:

- The kids are the easy ones to convince. They play video games all the time and they never punt with football games in video games so they were the easy ones. (HLN)
- You have to get the kids to buy in. They players are going to play it. You have to get them to buy into it. (ADM1)
- I really bought into what he did pretty much there was no hesitation. I mean it—just the generation I grew up in was with Madden and NCAA Football and stuff. You just don't punt. (AC1)
- And I remember him [Coach Kelley] speaking, you know, presenting choices of very, you know, well-studied argument. (P3)

Efforts at persuasion were not always immediate or successful. P6 noted that Coach Kelley "had to work a little harder on the seniors maybe even some of the juniors" to get them to buy into the concept. Kelley also admitted his reluctance to be overt about persuasion because he didn't "want to fight" (KK) with interfering parents or deal with upset assistant coaches. P4 talked about not being "totally on board with some of the not punting when it got deeper into our territory" or in situations he thought were "extreme." P2 mentioned a game early in the season where from his viewpoint the no-punting philosophy nearly cost them the game and "just being mad and it really hurting." He noted that it took several players "probably the first half of the season" before they were persuaded to buy into the no-punting philosophy. P2's experience is also interesting to note because his attitudes changed several times during his three years on the

varsity team. P2 bought into the idea by the end of the 2003 season—his sophomore season. But his view shifted during the 2005 season where he became "frustrated" with Coach Kelley's philosophy, particularly because Kelley had not "pulled" the team together and "rallied support around it."

Decision. Analysis indicated a total of 54 instances in the data where decision actions occurred. Decision actions included instances where interview participants identified times where the philosophy was experimented with, tried out, or begun use. For example, Coach Kelley noted that after he bought into the idea he still "toyed with it when I became a head coach six years ago, but not to the extent I had the last few years." ADM1 acknowledged that while the no-punting philosophy was started in 2003 "it took much more years" to fully adopt the idea. Several players had similar recollections of the philosophy just being tested or tried in certain circumstances that 2003 season including:

- I mean, my senior year it was, you know, we started implementing the no-punt, but we punted my senior year. (P1)
- We still—that process [not punting] was starting my sophomore year and solidified my next two years and I'd even say the year after that. (P3)
- I still think we punted in 2003, but definitely the percentage of 4th down tries was increasing and the amount of tries that were deeper into our own territory being we were closer to the goal line—that was increasing. (P4)

Two pivotal moments in the decision phase of adoption occurred during Kelley's first season as head coach. The first one occurred when Pulaski played Springdale, one of the top ranked schools in Arkansas, in the opening game of the 2003 season. During that game, Kelley made the first deliberate decision to not punt in a more extreme situation. That decision helped

Kelley cross an important mental threshold. He explained, "The very first time we had the ball…we had a 4th and 7…and there was a little bit of what the heck's going on. But I knew if I'm gonna try it [not punting], I need to try it on a big stage, in a big game" (KK). Even though the initial win/loss results were not where people connected with the program wanted them to be, Kelley experience during that first game prompted him to continue experimenting with the concept.

The second decision instance occurred during the state championship game. Pulaski faced a 4th down and 10 on their own 25-yard line in the second quarter. According to Kelley, that was a situation where "everybody thought you've got to for sure pun here back then and we went for it and made it, thank goodness." For Kelley that moment was the final tipping point "to go all" in on the philosophy noting that "if you did it when it mattered most, then you should commit to it, because you believe in it" (KK).

Implementation. Analysis indicated a total of 27 instances in the data where elements of implementation actions were noted. The implementation subtheme captured recollections that highlighted Pulaski's shift from testing the philosophy to making full individual and organizational commitment to the innovation.

Based on the participants recollection it wasn't until the 2007 season when Kelley finally said, "That's it. Screw it. We ain't punting no matter what the rest of the year" (KK). The final decision came after a game in which Kelley had decided to follow conventional wisdom and punt the ball to the opposing team. When Kelley decided to punt, the "crowd cheered and it pissed" (KK) Kelley off. The opposing team ended up scoring three plays later and won the game.

As he reflected on the game, the result, and the reasoning for his decision, he came to the conclusion that if he was going to lose or win, he was going to do it "with what I believe in" (KK). As a result of that decision, Kelley "went completely the other direction" and did not punt again that year. The first season that Kelley did not attempt a single punt was in 2008, which also was the year the team won its second state title. It was a history-making year because according to football historians, Pulaski was "the only school in history of the United States (high school wise – maybe anywise) to win a state championship and not punt" (KK). From 2008 to 2015, the Pulaski program punted a total of eight times and the decision to punt was because Pulaski was so far ahead that it would have been un-sportsmen-like to not punt it back to the other team.

Several other participants confirmed Kelley's recollection of when the team made a complete adoption of the no-punting philosophy. AC2 noted, "2007 was really the first time that I heard Kevin Kelley say 'We're not punting anymore.'" P2 recalled that the team had only fully adopted the idea "the past five, six, seven years."

While full adoption did not occur until 2007, the team had been making steady changes through the years that enabled that transition to occur. P4 recalled that he "became more familiar with [not punting] with I guess just by repetition. It just became where it was just kind of like operating procedure and I understood that's how it was going to be done." When the team did punt during the years leading up to 2007, it used a signal that was meant to show that "we had choked" as an offense, that "the other team had beat us on the first three downs." This signal was "interesting" to P3 but he saw how it helped to "develop that mindset that…if you're not moving the ball and scoring touchdowns…it's offensive failure" – a mindset that was critical to enabling full adoption.

Confirmation. Analysis indicated a total of 45 instances in the data where interview participants and existing artifacts noted various confirmation attitudes or behaviors. These ranged from referring back to the data and success of the philosophy as reasons to continue to not think about it anymore and from the school community expecting the team to go for it to taking pride in being different.

A sample of participants comments regarding confirmation include:

- Now our crowd and our players expect us to go for it and get excited when no punting team comes onto the field. When my 10-year-old son sees NFL teams punting on short yardage on television, he gets upset because he's grown up with the idea that punting is usually bad. (ESPN1)
- When he won that state championship is when I like to think is when he got the ability to say this is what I want to do and this is why. (P1)
- It's just a totally different dynamic as far as the way the team things about it; the way the football community at Pulaski Academy things about what they do. (P2)
- He's gotten so confident with it that it's like his…it's part of him now. Like "That's stupid. Why would I ever punt?" (P5)
- Now it's just a way of life. (ADM1)
- We're known for our offense and some of the crazy things we do. We're known for our onside kicks and we're known for not punting. (ADM2)

How the decision to adopt was made. Based on the responses from all participants (n = 12), the decision to adopt the no-punting philosophy was an authority innovation decision made by the head coach, Kevin Kelley. ADM2 simply stated that in terms of the not punting or any of the other innovations the team adopted, "Kevin made those decisions on his own." P2 was

equally as blunt noting that Kelley just "told us to do it." He added, "It wasn't like 'Hey guys get together' and have a meeting and talk about how he was going to experiment with it. I mean there was no discussion with the members of the team about the fundamental changes and things that were going to happen as you understand football, you know, been accepted. It was just something he did."

Part of the reason the decision was made just by Kelley was that Kelley "didn't want to tell my defensive coordinator, because I didn't want to hear him gripe." Kelley wasn't just worried about his coaching staff. He also didn't want to tell his players because he didn't want "them to tell their parents and some idiot calling me…I didn't want to fight all that. And sometimes I think we're better off when we don't worry about something and just have to do it spur of the moment" (KK).

Unintended consequences. One final subtheme relating to the innovation-decision process is the notion of unintended consequences. Instances of positive unintended consequences appeared (n = 77) times in the data and appeared in every type of artifact and by all types of participants. It is important to note that these unintended consequences were not the reason for Kelley's decision to adopt. Kelley noted, "I wasn't looking for it to help that way. It just happened." During the interview, Coach Kelley mentioned several times what he called the "butterfly effect" of the no-punting philosophy. AC2 also noticed the butterfly effect when analyzing the no-punt philosophy. He said, "It's [not-punting] not a tweak, because no punting doesn't just have an impact of maybe we get to keep the ball."

Some of the unintended consequences that arose from the adoption of the no-punting philosophy included greater flexibility in play calling, enticing more players, increased in-game

momentum, more efficient and focused practice time for the offense and defense and increased pressure on opposing teams.

First, the unintended consequence with the most direct impact on coaching strategy was that keeping the offense on the field for an additional down gave coaches a level of flexibility in their game planning. This allowed Pulaski coaches to be "more creative" (RA) with their play calling because "third-and-7" was no longer "necessarily a passing down, and third and inches" was no longer "necessarily a running down" (NYT).

Second, the no punting philosophy also had a positive impact on Pulaski's ability to get more students to come out for the football team. Because Kelley's offense was exciting and involved a greater number of players "more players were wanting to play" (P5). AC2 noted that the team went from about 45 players per year (15 or so from each grade level) to "anywhere between 50, 60, 70 kids" some seasons.

Third, the no-punting philosophy had an impact on the momentum of each game. Pulaski players began to notice "the other team get defeated when you get 4th down over 4th down. You can kind of see them start to question their coaching staff" (P1). Fans also noticed that once the team was successful in converting on a 4th down "the momentum is incredible" (ADM1). The momentum of converting on 4th down wasn't just based on perception. The numbers validated what the players and fans were seeing. The statistics showed that Pulaski would score "like 60 to 70 percent of the time" (AC2) if they converted a 4th down during a given drive.

Fourth, the no-punting philosophy had an impact on how Pulaski practiced. While most teams would spend time during practice running punt drills, Pulaski spent "time on things that

are meaningful" (HERD). This meant that practices were "much more efficient" (AC1) because the team was able to spend more time on its offense and defense compared to other teams.

Finally, the no-punting philosophy had an impact on the other teams psychologically because of the increased pressure the philosophy placed on the other teams' defenses. One coach was fairly blunt in his assessment of what happens to him when he doesn't "see the other team's punter take the field on fourth down, my first thought is, "Aww $h!t!" (SBN1). Pulaski coaches observed the powerful impact the philosophy had in "the mental wearing out that not-punting does on people…physically you can watch it" (AC2). On the flip side, the no-punting philosophy served to strengthen the mental toughness of the Pulaski players because "while a crucial fourth-down play can raise the heart rate of most players, for Kelley's guys it's just another play" (AP).

Theme 6: Leadership Style of the Lead Innovator

One of the themes that emerged from the data was the impact of certain leadership attributes of the lead innovator: Kevin Kelley. From the artifacts, the researcher identified three subthemes regarding the leadership attributes of Coach Kelley: big picture thinker, motivator, and relationship builder. These attributes not only seemed to have an impact on the adoption process but also on the overall performance of the team. Figure 10 provides the data instances of each of these subthemes in the artifacts.

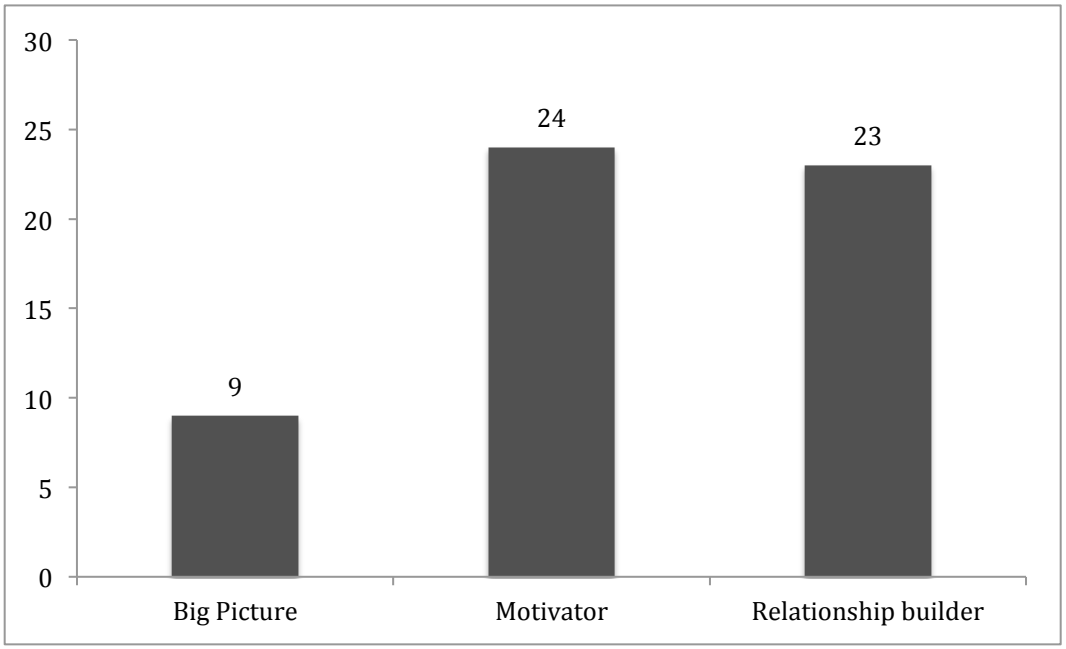

Figure 10. Leadership attributes of the head coach

Big picture thinker. The introduction of something new and unproven like the no-punt concept inherently increases the potential for failure for a football program. This probability created one of the apparent contradictions that emerged in the data where players and coaches consistently spoke of their inability to deal with failure on the one hand and willingness to risk on the other. In terms of reaction or ability to deal with failure, AC2's comments capture the general sentiment of the players and coaches' tolerance level for failure. He said, "I don't like failure. I don't have any kind of acceptance level of failure. I don't do well with failure. I react harshly to failure." Kelley also noted his "intense need to win and when I say need, I think the words – water, food, and air as a need. I have a need to win…I hate failure."

But Kelley was able to reconcile this intense need to win (or avoid failure) by keeping the big picture in mind. Kelley said, "I think big picture. Always think bigger than that moment…I'm willing to lose this game possibly to win a championship ten games from

now…I'm willing to experiment and lose a game if it might help me find something to do or not to do later on in the season."

Motivator. The subtheme of leader as motivator appeared 24 times in the coded data. P1 noticed Kelley's ability to motivate his team: "you want to succeed for him…He got the best out of you. You didn't want to let him down." ADM2 described an instance where Kelley was able to motivate a player that had no real football ability to become the player that recovered more onside kicks that anyone else on the team:

> He [Kelley] had one kid that graduated…Short kid, not real fast. I don't know how he covered anybody to be honest. I mean he tried and sometimes they just threw it over his head and there wasn't anything you could do. But he recovered more onside kicks than anybody. It was like he lived for that, you know. And so Kevin got him to buy into what, and it was a big part of our game. (ADM2)

Kelley's ability to motivate was one of the main differences that players and coaches cited when comparing Kelley to Pulaski's previous coach. P5 talked about this difference when he said, "Coach Norwood, just his personality was kind of dry…But with Coach Kelley…his personality was kind of like—was definitely one of the big things on who he is today and his coaching style and why he can get so many players to, you know, perform more than they think they are capable of."

Relationship builder. Five of the former players, AC2, and both administrators noted Kelley's ability to build relationships and the subsequent impact that ability had on enabling trust, improving performance, and securing buy-in for innovation adoption from those involved with the program. ADM1 highlighted Kelley's ability to make "football at PA a true community, a family event." ADM2 discussed how his relationship with Kelley was more than just a work

colleague: “He’s also a friend,” said ADM2. “I like talking to him, cause I like listening to his ideas. Sometimes I just go ask him for advice, because he’s a good listener and he’ll talk you through stuff.” P1 also poke of the breadth and depth of the relationships that Kelley built across the PA community:

> Everybody loved Coach Kelley…He interacted with everybody…He’s working out with us. He wasn’t afraid to wrestle if somebody thought they were big, we’d break out the mat. He had good relationships with the other sports programs, so they were excited. (P1)

It was Kelley’s recommendation, following his confrontation with AC2, to “take a trip together. We actually went to Tunica…we put our differences aside…and things were a lot better” (AC2). Kelley’s efforts to build relationships created a high level of loyalty and trust both with coaches as well as players. Some examples of this are:

- I’m extremely loyal to him…I would trust Kevin Kelley with anything that I have and my entire family. (AC2)
- Having someone actually in there [the weight room] going through it with you, talking to you about your diet, how many times you need to lift, what you need to be doing outside – that just made the difference to the kids and their loyalty. (AD1)
- So you, you kind of get this relationship with him that, you know, I want to say the cliché is going to war. You’ll jump in front of him, but we really would go to war for him that year. (P1)
- He was, you know, he was good at making the players—getting the players behind what the team was doing, made it easy for us to buy into what we were doing. (P4)

Kelley’s ability to build relationships with his players and coaches proved to be very important in creating a level of trust that enabled Kelley to quickly get buy-in and maintain the

confidence of his players, even when the early part of the 2003 season did not go well for the team. “We all believed in him,” said P1. P3 commented that for him “there was never any second guessing the system or second guessing him as a coach.” P4 relied on Kelley’s track record in instilling trust and confidence in what Kelley was trying to do noting, “We knew, like I said, reaching back from when he was offensive coordinator and he was good at what he did. And so there was credibility in what he was implementing.”

While credibility existed for what Kelley was doing offensively, there were still questions and concerns in the minds of the defensive players and coaches about not punting. The no-punting philosophy often put Pulaski’s defense “in a bad situation” (AC2). Kelley dealt with this potential hazard by using his good relationship with all of the defensive players by helping them see that his confidence to use the no punting was him “saying that he believed in us that we could go make that defensive stop even if we gave them the ball on our 30” (P1). AC2’s past relationship with Kelley had shown him that Kelley always put the team and winning as first priority, and so he also had confidence, that even though the implementation of the no-punting philosophy even might not have been best for him personally as the defensive coordinator, Kelley “was doing what was best for the team.”

Summary

In conclusion, the themes (the nature of the innovation; the range of innovation perceptions; the nature and attributes of the innovator; the nature/attributes of Pulaski and the football program; the innovation-decision process; and the leadership style of the lead innovator) and findings discussed in this chapter provide the basis for the conclusions the researcher will present in the following chapter. In addition, the researcher discuss a set of research implications and recommendations that emerged from an analysis of the findings presented in this chapter.

Chapter 5: Study Conclusions, Implications and Recommendations

In 2003, the Pulaski Academy football team achieved something that no other team had been able to accomplish. It won the school's first football state championship. But a high school team winning its first state championship is not in and of itself newsworthy beyond the local community. New teams win state titles every year in a variety of sports. What makes the Pulaski story noteworthy was the way in which the team won that first title and the team's continued level of success (four additional state titles) while playing against schools that are much larger in size (both in terms of enrollment and in total team size), have more financial resources, and boast a greater number of physically gifted athletes.

Pulaski was the first football team to fully adopt the radical innovation of the no-punting concept. Most of the initial information gathered by this researcher regarding the Pulaski Academy football team focused on the adoption of that radical innovation and impact that adopting the philosophy had on improving the team's performance. Further, most of the stories regarding the program relied almost exclusively on the perspective of head coach Kevin Kelley.

This case study took a different approach compared to previous efforts to tell the Pulaski innovation adoption story. First, this case study sought perspectives and lived experiences from a broad range of participants not just from Kelley. Second, this case study applied two theoretical frameworks in order to understand the attributes, attitudes, and innovation decision-process of participants of the Pulaski high school football program while acting as a first adopter (innovator) for a series of radical innovations relating to play-calling strategy and game management.

The remainder of this chapter provides a report of that research project and includes a restatement of the issue and study significance, the theoretical frameworks used by the

researcher, and the methods employed to answer the study's research questions. This chapter also presents a summary of the key findings followed by a discussion of the conclusions that arose from data and the relevant implications for practitioners and recommendations for further research. Finally this chapter includes a few closing remarks that discuss the researcher's interest in innovation adoption and personal connection to sports as well as his hopes for what impact the findings and conclusions from this research project may produce.

Issue & Study Significance

Who are first adopters? In the current literature, a conflict exists regarding the answer to that question. Christensen (2000) and other innovation scholars have argued that adopters of disruptive innovation are characterized as resource poor, willing to accept inferior products, and focused on lower cost. On the other hand, innovation diffusion scholars, such as Everett Rogers (2003), have posited that first adopters, or what they call innovators, are resource rich, have complex technical knowledge, and can deal with a high degree of uncertainty about the innovation and its adoption.

Rogers' (2003) theory and description of innovator characteristics has been validated in multiple studies (Mahajan et al., 1990; Mahler & Rogers, 1999; Martinez & Polo, 1996; Smith & Findeis, 2013). But Christensen (2000) has also demonstrated the existence of a different type of innovator when disruptive innovation is present. The sports social context provides multiple examples of innovation adoption of disruptive innovations including:

1. Basketball: the extended use of the full court press (Gladwell, 2013).
2. Football: the spread offense developed by Rusty Russell.
3. Baseball: the Oakland A's and the implementation of saber metrics in player evaluations and team composition.

Contrary to Rogers' typology, these adopters were either resource poor, seeking for a simpler solution, or willing to use what may be perceived as an inferior system in order to level the playing field and compete with more resource rich and technically superior organizations.

The importance of this study is three-fold. First, this study explores innovation diffusion in a high school sports setting, which to date has been largely unexplored respect to diffusion of innovations when compared to other social system contexts. The researcher conducted a brief review of diffusion studies in high school sports on scholar.google.com. The review yielded only 11 results. Most of 11 studies focused on the diffusion of injury prevention programs, particularly with regard to concussions and treatment protocols. However, none of the studies reviewed looked at innovation diffusion in relation to innovations in playing schemes and strategy in high school football. This study fills that void.

Secondly, this study is the first study to combine Henderson and Clark's innovation typology with Rogers' diffusion framework. By incorporating the Henderson and Clark innovation typology into Rogers' framework the researcher was able to better understand the attitudes, attributes and innovation-decision making process of an innovator moving through the process of adoption of a radical innovation type.

Finally and most importantly, this study provides an argument for a potential theory extension to Rogers' framework where an innovation typology is included. The inclusion of an innovation typology in this study helped to create a more holistic understanding of the nature of first adopters, explain why a certain innovation type may have an impact on the innovator prerequisites and innovation decision-making process, and create a bridge between the two lines of scholarly inquiry and their varying characterizations of first adopters.

Theoretical Framework

This case study employed what is considered to be one of the most prominent theoretical frameworks used to study the process by which an innovation spreads within a social system: the diffusion of innovations framework posited by Everett Rogers (2003). The framework has been used in a wide range of disciplines thus raising the theory's profile in both the academic and practitioner circles and has been valuable in helping researchers better explain the flow of information, ideas, practices, products, and services within a variety of settings and contexts (Gatignon & Robertson, 1985).

The diffusion of innovations framework consists of four components where diffusion is "the process by which (1) an innovation (2) is communicated through certain channels (3) over time (4) among members of a social system" (Rogers, 2003, p. 11). Rogers' framework has improved insight into adopter types (Rogers, 2003), the influence and impact of various types of communication channels (Song & Parry, 2009), the role of innovation characteristics in the rate and ease of adoption (Davis et al., 1989; Kumar & Kaur, 2014; Park et al., 2007), and the role of opinion leadership (Vedel et al., 2013) and change makers in facilitating diffusion (Gatignon & Robertson, 1985).

The diffusion of innovations framework, however, does not use a comprehensive innovation typology. The simplistic definition used in the framework appears to be a contributing factor to the apparent disagreement in the literature about the prerequisites and characteristics of first adopters. While Christensen (2000) argued that innovators tend to be the most resource constrained and lacking in technical knowledge, Rogers (2003), on the other hand, argued that prerequisites for being an innovator include above average access to financial resources, the ability to apply complex technical knowledge, and the ability to deal with a high degree of

uncertainty about the innovation and its adoption. To address this conflict, this researcher used the typology posited by Henderson and Clark (1990) to create a more holistic view of innovation that includes four fundamental innovation types: incremental, modular, architectural, and radical. While the term *type* is helpful, it is important to note that Henderson and Clark recommend looking at these types in terms of degrees and that an innovation may share elements of each category.

Methods

The case study design was selected as the method best suited to enable the researcher to explore the research questions and accomplish the purpose of the study. Data for the study came in two sources: existing public artifacts, and a series of semi-structured interviews. A total of 25 existing artifacts were collected (12 textual and 13 audio/visual) that served as a representative sample of the existing artifacts about the Pulaski football programs innovation adoption process. The artifacts were from various mass media and social media outlets and were published between 2007 and 2015. Following the collection of the existing artifacts, the researcher conducted an initial review of the data to identify themes, and then used HyperRESEARCH (a qualitative software platform) to document, code and analyze the data.

A total of 12 interviews were conducted with various individuals associated with the football program: coaches (n = 3), administrators (n = 2), and players (n = 7). As of Spring of 2016, two of the coaches were still coaching the football team, and one of the assistant coaches interviewed was coaching for another school. Both administrators are still employed at the school as of Spring 2016. None of the players interviewed were employed at the school as of Spring 2016, but several reported being in contact and maintaining an ongoing relationship with the head coach. The participants were recruited by initially securing a list of contacts from Coach

Kelley with additional recruiting through that first set of contacts. A total of 20 individuals were invited to participate.

The semi-structured interviews were conducted in two ways: over the phone (n = 5) and in-person (n = 7). The interviews lasted anywhere from 35 to 75 minutes. Participants were asked a series of questions to better understand personal attitudes and attributes, comparisons between Pulaski and other programs in the area, and their lived experience relating to the adoption of a set of innovations during the 2003 season. Following the interviews, the researcher transcribed all of the interviews, conducted an initial review of the data to confirm the initial themes that arose from the coding of the existing artifacts and to identify additional themes (e.g., player descriptors). The researcher then used HyperRESEARCH to document, code, and analyze the data.

Key Findings

This study provided a detailed case study timeline as well as the identification of six themes. In addition to the summary of the case study timeline, this section includes a discussion wherein each of the six themes is summarized considering the data gathered and includes a connection to associated research.

Case study timeline. Innovation diffusion occurs over a period of time (Rogers, 2003). This case study enabled the researcher to create a more holistic picture of the organizational context in which the adoption of the radical innovation of not-punting took place. From the data gathered from the existing artifacts and participant interviews, the researcher was able to construct a detailed case study timeline that began from the hire of one of the assistant coaches (AC2) in 1994 up through the current state of the Pulaski football program.

Over the course of that 22-year period, the Pulaski football team experienced multiple changes and phases of evolution. These phases included the Coach Norwood era, the hire of Coach Kelley as an offensive coordinator, Kelley's promotion to head coach, and the post-2003 Kelley era.

The no-punting philosophy was not the first radical innovation adopted by the program. The first radical innovation was Kelley's implementation of the spread offense during his tenure as the offensive coordinator. The pace of innovation adoption began to accelerate when Coach Kelley took over as head coach in 2003. Among the several innovations that were part of Kelley's initial "dabbling" (KK) that year were: 7-on-7 practices, offseason workout programs, player management, and the no-punting philosophy.

With the state championship win in his first year as head coach, Kelley was emboldened to begin an ever increasing cycle of innovation adoption that has become the hallmark of his program, and the results have been impressive. During his tenure as head coach, Kelley has been in the state playoffs each year, won five state championships and played in two other titles games (nearly winning both of those as well).

Theme 1: The attributes of the innovation. Henderson and Clark (1990) posited that there are four types of innovation: incremental, modular, architectural, and radical. Rather than distinct types of innovation, their framework views the distinctions between the four types of innovations as a matter of degree. Henderson and Clark note that radical innovation often creates difficulty for established firms because a radical innovation undermines existing capabilities, destroys the usefulness of existing knowledge sets, and changes the fundamental design components and nature of the product, process, or system.

Based on the findings, the no-punting philosophy is a radical innovation as described by the existing artifacts and interview participants. The philosophy was highly disruptive for established teams and has "caused us to question the way the game is played" (GC). P7 has tried to get the same series of innovations adopted at other schools but has been unable to because the innovations are "still radical." Kelley also discussed the difficulty for him in initially adopting the concept because the no-punting innovation "was so different that I didn't want to jump into it." The innovation also aligns with Henderson and Clarks assertion that radical innovation destroys the usefulness of existing knowledge sets. ADM2 noted that the no-punting philosophy "is different than most teams play" and is a departure from what players have been taught "since 3rd grade."

Theme 2: Innovation perceptions. One of the phases in the innovation decision process is persuasion where adopters form opinions relating to the innovation (Rogers, 2003). According to Van den Bulte and Lilien (2001) near-peer networks are important during the persuasion stage. This was not what interview participants experienced at Pulaski.

Those most likely to be critical or to view the no-punting philosophy were peer coaches and peer players. Coaching peers were often critical of the data and questioned the academic researchers' lack of direct experience because the researchers have "never coached a day in [their] life" (NFL). Player peers from other teams viewed Pulaski as arrogant and attributed the success of the program to the caliber of players not the innovations. Rather than near-peer networks providing support and helping to form positive views of the innovations, the program has received the most positive reaction from outside observers who consider Kelley the "most innovative coach in football" (ESPN2).

Theme 3: Attributes and attitudes of the innovators. According to Rogers (2003), three of the fundamental attributes of innovators posit that: (a) innovators are resource rich, (b) they have a high degree of technical knowledge, and (c) they can deal with a high degree of uncertainty relating to a given innovation. The findings in this case only support Rogers' third assertion.

Participants consistently noted how much they enjoyed "dealing with the unknown" (KK). As subthemes of ambiguity, the researcher also looked at risk tolerance and openness to change of the organization and interview participants. The results were mixed. As an organization, Pulaski tends to be "pretty conservative" (ADM2). But in terms of players and coaches, the data revealed a high tolerance level for risk and a general openness to change especially when it came to football. P1 exemplified this risk-taking attitude and attributed his level of tolerance for risk to "my DNA or whatever, but I like taking risks for big gain. You know, if it's there even if you fail. I like going for it. I don't like playing it safe." As for openness to change, AC1 found change "exciting. And I just, you know, I love it."

Theme 4: Attributes of Pulaski and the Pulaski football program. Innovation happens within a social context (Rogers, 2003), and so it was important to gain a better understanding of that context, particularly the organizational context. As noted previously Rogers posited three of the fundamental attributes of innovators. It is at the organizational level where the data show a clear departure from two of Rogers' innovator characteristics: innovators are resource rich and they have a high degree of technical knowledge.

Pulaski and its football program rated average or below average on six different organizational resource comparisons: (a) access to knowledge, (b) financial resources, (c) football technical expertise, (d) lack of players, (e) the size of the school, and (f) top tier athletes.

This lack of institutional resources was one of the primary drivers for Kelley to seek innovative solutions to help level the playing field. ADM2, who had budget responsibilities for the school and was a primary contact with the athletic department, provided the most comprehensive analysis of the school relating to several of these areas:

- Size of Coaching Staff: "Our coaching staff is usually a little bit smaller than the teams we play. We're a smaller school in a bigger division."
- Quality of the Facilities: "If you'd seen our lights two years ago, you'd have been embarrassed because they were on wood poles and one of them was kind of leaning over like this, and one corner of the field was really dark. But our operating budget, we could never prioritize lights because there were so many other things that we had to do."
- Football Budget: "I suspect that we're a little bit low…The school budget that we have that's the school operating fund provides for is not very big…But I think public schools spend quite a bit more."
- Lack of Players: "We're playing in a division with kids–schools that could have twice as many kids in their high school that we have."

Theme 5: Innovation decision process. Rogers' framework identifies five specific phases in the innovation-decision process: (a) knowledge about the particular innovation, (b) persuasion about the benefits of the innovation, (c) decision to adopt the innovation, (d) implementation of the innovation, and (e) confirmation from continuing implementation of the innovation (Henderson et al., 2012).

The findings from this case study support this framework. Participants shared lived experiences that align with each of the five steps. The data also provided two additional insights into the innovation-decision process. First, contrary to Rogers (2003) assertion that mass media

plays a major role in the knowledge and persuasion phases, no participants identified mass media as playing a role in disseminating information. Second, the innovation decision process is fluid, and participants migrate between phases in a more iterative versus linear pattern. This iterative finding would seem to provide additional support for Seligman's (2006) sensemaking framework versus Rogers' (2003) more linear model. P2's experience provides an example of the iterative adoption process noting that his attitudes changed several times during his three years on the varsity team. While he was initially persuaded to buy into the idea by the end of the 2003 season —his sophomore season, his view shifted during the 2005 season where he was often "frustrated" with Coach Kelley's philosophy.

In addition to the five phases, this theme also looked at how the innovation decision was made and unintended consequences that came as a result of adoption. Rogers (2003) discussed three types of innovation decisions. The case study is an example of the authority-innovation decision. ADM2 provided the most direct assessment of how the decision to adopt the no-punting philosophy or any of the other innovations was made noting, "Kevin made those decisions on his own."

The final subtheme of the innovation-decision process is the idea of unintended consequences. Rogers (2003) noted that all innovation has unintended consequences. According to Goss (1979), these unintended consequences fit into three categories: (a) desirable versus undesirable, (b) direct versus indirect, and (c) anticipated versus unanticipated. The adoption of the no-punting philosophy lead to several unanticipated but desirable unintended consequences including: greater flexibility in play calling, enticing more players, increased in-game momentum, more time to work on offense and defense, and increased pressure on opposing teams. Most importantly it created an avenue for Coach Kelley to overcome his initial lack of

access to knowledge from being "confined to our own little area" and instead have access to "people I never would have gotten to speak to ever in my life" (KK).

Theme 6: Leadership style of the lead innovator. Rogers' framework provides some guidance and insight into what types of leadership attributes may be most impactful to facilitate the innovation decision—namely openness to change and charisma (Rogers, 2003). Howell and Higgins (1990) found that lead innovators or champions were also higher risk takers, more innovative, and more influential with others (but not necessarily more powerful than others in the organization). Participants and existing artifacts showed that Kelley fit the characteristics noted by Rogers and by Howell and Higgins. For example, P7 noted that Kelley was "the biggest risk taker in the world." According to the interview participants and the existing artifacts, Kelley was also known for his openness to change, being highly innovative, and charismatic.

While the data from this study confirm the characteristics noted by Rogers and by Howell and Higgins, it also added to and further clarified the attributes of lead innovators or champions. Participants noted three leadership characteristics that were most important to facilitating adoption: big picture thinker, motivator, and relationship builder. The motivator and relationship building attributes appear to be natural extensions of the charismatic and influential characteristics. Kelley's ability to motivate and build relationships was enhanced by his noted charisma. The leadership quality of big picture thinker is a clear addition and played an important role in enabling Kelley to overcome his initial fear of failure as well as the persuading his other coaches and players to overcome their strong aversions to failure and buy into a radical innovation.

Conclusions & Implications

This study posits four conclusions based on the findings. These conclusions provide important theoretical and practitioner insight into the nature of innovation and the attributes, attitudes and innovation-decision process of an innovator. For the practitioner, the discussion of insights provides recommendations for consideration. The results also led to several recommendations for future research.

Conclusion one: Radical innovation requires unique innovator attributes. Rogers (2003) posited in his diffusion of innovations theory that there is a universal definition of innovation and that there is a standard set of attributes for innovators. The findings of this case study run contrary to Rogers' assertion. This case study showed that various types of innovation do exist and that the adoption of a certain innovation type (radical) necessitates a unique set of innovator attributes.

Roger's (2003) defined innovation as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (p. 36). This case study showed that innovation is a much more complex construct, and that there are varying degrees or types of innovation, which confirms what Henderson and Clark (1990) and Christensen (2000) have argued relating to multiple innovation types. When asked to describe or compare the no-punting philosophy as well as other innovations that Kelley adopted, the existing artifacts, players, coaches, and administrators consistently talked about the radical, disruptive nature or extreme nature of the innovations with one sports analyst calling the no-punting philosophy "the most significant football innovation we've seen since the veer option" (ESPN2).

The notion that innovation is a more complex construct than what Rogers' posited has important implications for his theory. If innovation is a more complex concept, then Roger's

diffusion framework needs to be updated to include some sort of innovation typology. One possible innovation framework is the Henderson and Clark (1990) typology used in this study, which posits that there are four main types of innovation: incremental, modular, architectural, and radical. The use of a typology could help researchers better understand innovators and open up important understanding about how to better influence the adoption of a broader range of innovations.

In addition to demonstrating that varying types of innovation exist, the artifacts and interviews also showed three ways in which innovators of a radical innovation are unique or dissimilar to how previous diffusion studies have characterized them. First, Pulaski was not resource rich. The program often lacked critical talent and financial resources compared to other high school programs, which was one of the driving reasons that Coach Kelley was willing to "try something different" (KK). Further they often had the smallest coaching staff, which meant that Pulaski coaches could not specialize like other teams that had larger staffs. This difference in resources is only magnified when compared to college and professional teams that have large financial resources, expertise and specialization of coaching staffs, and depth of talent. Based on Rogers' theory, these better resourced professional and college level teams should be innovators, not Pulaski.

Second, the general perception of other coaches and experts was that the no-punting innovation was inferior to what was the dominant football strategy regarding punting. The Pulaski coaches were often criticized for "not playing smart" (AC1) and that the philosophy was "crazy" (HBO3).

Finally, the Pulaski program was average to slightly above average as it relates to technical aptitude relating to football. The average coaching staff tenure at Pulaski was just over

five years, and Kelley replaced a well-tenured and successful coach. As with other organizational resources discussed previously, the gap in technical knowledge grows substantially when you start to compare Pulaski's high school coaching staff to college and pro level coaching where coaches are "literally experts in that field" as compared to high school where "you get like a fill-in coach or a math teacher" (P4).

By better understanding internal structures, decision-making, and the organizational attributes required to be an innovator of a radical innovation, practitioners may be more successful in identifying what an organization can do to be in a better position to be an innovator of a radical innovation.

Conclusion two: The no-punting philosophy wasn't enough. The radical innovation of not punting was insufficient by itself to generate the change in organizational outcomes. The researcher initially believed that this research project would validate the prevailing narrative that the no-punting innovation was radical and that the adoption of that philosophy was the primary driver of improved performance. While this study did validate that the innovation was radical in nature, it did not validate the prevailing narrative that the no-punting philosophy was the primary driver of the team's improved performance.

This is not to say that the no-punting philosophy did not have an impact on the improved results. Based on the findings, Kelley and others have the numbers from implementation of the philosophy that demonstrate the impact on number of possessions and improvements in scoring because of using an extra down. AC2 noted, "we score like 60 to 70% of the time if we actually somewhere along the drive, we've made a 4th down." Those numbers indicate that the no-punting innovation had an impact on Pulaski's success.

However, there is always a temptation as a practitioner to look for the silver bullet that one can point to as the reason why organizational performance improved. This case is illustrative of that. As noted previously, the prevailing narrative of the exiting artifacts and of the researcher going into the project was that the impact of the no-punting philosophy was overwhelming and singular. While the findings did make a connection between the no-punting philosophy and improved performance, the case revealed that the no-punting philosophy adoption was just one of several changes that were made in 2003 that all combined to help put Pulaski over the top.

In addition to the positive impact of the no-punting philosophy, the findings showed that several other elements seemed to combine at the right time to help Pulaski clear that initial hurdle of winning a state title. Based on the findings from the participant interviews, additional elements that facilitated an improvement in organizational results included: (a) full implementation of a spread-type offense, (b) a higher than normal level of talent that year, (c) the use of 7 on 7 drills, the leadership style of the head coach, (d) the actual change in head coach, (e) new philosophies around how and where to use players, and (f) the way the no-punting philosophy reinforced an aggressive mindset that became an important mental shift for the team.

Conclusion three: Early access to additional innovation. Once an individual or organization becomes an innovator, that status opens up additional and early access to other innovations.

It is important to note that this organizational benefit was not part of the rationale for Coach Kelley's decision to adopt the no-punting philosophy. Interview participants, including Kelley, provided a fairly consistent rationale as to why the school adopted the no-punting philosophy. ADM2 summarized the prevailing rationale for adoption:

> We just don't have big kids…We didn't match up well with some of the other schools and so our style didn't help that, cause we really needed athletically to be better than they [Pulaski's opponents] were…So from a numbers standpoint, we don't stack up with most teams we play against.

In an effort to overcome the lack of size and athleticism of the other schools, Coach Kelley recognized that he needed to do something different to "put us over the top" (KK), and so he began to ask several why questions about how the program was being operated. The answers to these questions led Kelley to start "dabbling around doing some different things" during his first year as head coach.

While the original intent behind adoption was to increase the odds of wining, this case and participant observations demonstrated that the adoption of the no-punting philosophy did have several unintended consequences. For example, the interview participants noted how the no-punting philosophy had an impact on the way other teams had to practice, the level the team's mental toughness, the ability for Pulaski to entice more kids to play, greater exposure to more innovation, and additional financial resources.

Most importantly this case study shows that once an individual or organization becomes an innovator that status opens up additional and early access to other innovations. Kelley noted that prior to 2003, he did not have access to a lot of information on new innovations in football, and he often had to be very proactive in searching out new information. As time has progressed, his status as an innovator has given him opportunities where:

> Now I'm getting to talk to some really successful people and…I'm getting ideas and I'm coming back and applying [those ideas] here…Now I'm in contact with people I never would have gotten to speak to ever in my life, because I was open to this little idea about

field position…it opens you up extremely to other things that might not happen to you as a result of that [being an innovator].

This case provides additional confirmation to Rogers' (2003) assertion of the existence of unintended consequences any time innovation diffusion is in play. These unintended consequences can be both positive and negative. In this case, the consequences have been highly positive and have enabled the organization to continue to outpace other teams in innovation adoption. For radical innovations, this case gives some potential insight into the kinds of positive impacts that the adoption of a radical innovation can have on an organization including innovators becoming part of a virtuous cycle where they are the first ones to know about new innovations and are able to stay one step ahead of the competition.

Conclusion four: Three leadership qualities matter for a lead innovator. Rogers (2003) noted that there are three main ways that the adoption decision is made: (a) optional innovation-decisions, (b) collective innovation-decisions, and (c) authority innovation decisions. The data responses showed that the decision to adopt the no-punting philosophy was an authority innovation decision. As such, Kelley's leadership style played an important part in others adopting. The data in this case showed that three qualities had direct impact on creating buy-in, overcoming tendencies that would have normally prevented adoption (e.g., being uncomfortable with failure), and mitigating the influence of outside pressure that could have hindered adoption. These qualities included: big-picture thinker, motivator, and relationship builder.

This study confirms the importance of leadership style and adds additional characteristics relating to what Rogers (2003) called innovation champions. This confirmation and identification of additional leadership traits may help practitioners create an organizational profile for the leadership characteristics needed to facilitate early adoption for authority-

innovation decisions, particularly when adopting a radical innovation. For practitioners, this impact of leadership style in the adoption process of a radical innovation provides change practitioners a valuable set of leadership characteristics that could enable practitioners to evaluate how well their leaders match up with or demonstrate the qualities needed to enable successful adoption.

Recommendations for Further Research

Based on the findings and conclusions provided in this research project, several recommendations are relevant for both researchers and practitioners interested in the diffusion phenomenon. The recommendations fit into three categories: broader applicability, identifying additional attributes of innovators, and level of impact.

Broader applicability. This study was conducted in a high school sports social context. Further research needs to be done in conducting similar studies involving the adoption of a radical innovation to see if results are applicable in wider range of social contexts. These studies could explore what/if any differences occur with respect to innovator attitudes and attributes in relation to the other innovation types posited in the Henderson and Clark innovation typology.

Additionally, research could be done to see if the innovator attributes identified in this study are applicable to other instances of radical innovation adoption in both sports and non-sports organizational environments. Also research could explore if in the adoption of a radical innovation, the type of innovation decision (authority innovation decision) is more common and has a significant impact on the success of adoption.

Additional attributes. This research identified three characteristics of innovators of a radical adoption that could help practitioners and organizations identify future customers, policy makers, and leaders who might be most likely to adopt. Practitioners, in conjunction with

researchers, could test these attributes to potentially identify innovator adopters for a radical or disruptive innovation (new product, coaching strategy, public policy, organizational structure, etc.). These real-time tests could help to potentially confirm the three attributes cited in this case study as well as identify additional attributes.

Level of impact. The findings noted several factors that contributed to the improved level of success at Pulaski. Further research could look to provide a more quantitative analysis of the impact of the various factors identified in this study on the organizational performance improvement. Additionally, research could be conducted to evaluate or determine the impact on organizational performance improvement from the unintended consequences that arose out of the innovation adoption process. One possible study recommendation was provided by Coach Kelley, who has been trying to find a way to build an evaluation model that is able to combine the numbers from not-punting with a set of unintended consequence variables to create a truer picture of the total impact of the no-punting philosophy on organizational performance.

Study Limitations

Several limitations are present with respect to the current study. The first limitation is inherent in the choice of a case study design. This is a key case as determined by the researcher, which is meant to be representative of a broader set of instances; however, the single instance of this case represents only one case. Secondly, this case study was conducted in the context of a high school sports team and therefore the results may not be applicable to other sporting contexts as well as other non-sporting contexts. A third limitation of this case study is the problem of recall and sensemaking, which according to Rogers (2003) is a common limitation of a diffusion study because it is virtually impossible to measure diffusion in real time. Several individuals mentioned recall issues during the interview process. For example, AD1 could “not remember

how I learned of it [the no-punting philosophy], but it's always been the way I've known it to be." This instance clearly demonstrates both the recall problem "can't remember" as well as future sensemaking of past events "it's always been the way I've known it to be."

Internal Validity

The validity of a qualitative study rests on an accurate representation of the data (Richards & Morse, 2013); therefore, the goal of the researcher is to establish trustworthiness by using accepted strategies to verify the accuracy of the study. To ensure the internal validity of the current study, the researcher relied upon multiple strategies including:

1. Triangulation: The process of triangulation helped to ensure a diverse range of source data and a broad group of participants with varying degrees of affiliation with the Pulaski program as well as more than 20 existing public artifacts.
2. Expert Panel: An expert panel that included two tenured professors was used to review the interview protocol.
3. Coding Peer Review: The researcher used a peer review process to validate the coding definitions and applications to the data.
4. Reflexivity: The process of reflexivity included the researcher keeping a journal that included a total of 21 entries over a four-month period (February 2016 to May 2016) throughout the data collection process and to capture in real time personal responses to data, additional questions, and initial assumptions and conclusions.
5. Iterative Process: An iterative interview was employed process that included pilot interviews and ongoing reviews of the protocol following each interview.

Closing Commentary

In 2007, I was part of a group leading an effort to bring about the adoption of a radical innovation in the education sector in Utah. The education innovation showed all the promise of being able to revolutionize the education paradigm based on some early experiments and research studies. However, the effort failed in a very public and spectacular fashion at the ballot box.

In the aftermath of that campaign, many individuals weighed in regarding the reasons for failure and on what could have been done differently to create a more positive outcome. While the discussion provided some interesting takeaways, the post-campaign discussion left me with a singular question for which I had been unable to find satisfactory answers: "Why don't great innovative ideas get adopted?" That question has lingered with me for the past eight years and was the question that was the genesis for this research project.

As a lifelong sports fan, I spend several hours each week reading sports articles, listening to sports-talk radio, and watching various sporting events. My four favorite sports are in order: football, baseball, basketball and tennis. During one of my daily sports web scans in 2013, I stumbled across a story on Facebook about a football team and coach that were doing something radical and finding great success. The innovation the team was using was a unique approach to playing the game of football where among other things the team did not punt the football. As both a practitioner in the organizational and management consulting field and as a major sports fan, I had to learn more.

In 2014, I conducted an initial leadership profile of the head coach using the SPELIT (Schmieder-Ramirez & Mallette, 2007) framework. The research project, which included a 90-minute semi-structured interview with Coach Kelley, provided some useful insight that guided

me in the initial formulation of this current research project, but in general it left me with more questions than answers. In evaluating the direction for my dissertation, I went back to that leadership profile study with Kelley and realized that the Pulaski Academy case afforded a unique opportunity to seek answers to my question about why great innovations don't get adopted and do it within a social context where I have a great deal of passion and interest as a fan and long-time observer.

In terms of finding meaningful answers by engaging in this research project, I have not been disappointed. This research project has provided me (as well as other researchers and practitioners) with some important answers to the question I had as a result of that 2007 campaign. Looking back on that experience, I can now see where the findings and conclusions of this research project could have been applied to create a more positive outcome in that public policy debate and innovation-decision process. Some of these changes include early identification of the innovation type, altering the innovation-decision approach, the addition of more tests or experiments with the innovation, and the identification of leaders that demonstrated the big-picture thinking, motivator, and relationship building attributes.

My hope is that when other opportunities arise, like the one in 2007, I, as well as others, will be able to use what I have learned during this project to more effectively lead future efforts to adopt the kinds of radical innovations that can reshape how we live, learn, and progress as a society.

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APPENDIX A

Interview Protocol

Interview Protocol Project – Radical Innovation Adoption at Pulaski Academy

Time of Interview:

Date:

Place:

Interviewer: Lyall Swim

Interviewee:

Position of the Interviewee:

Description of Project: In 2003, Pulaski Academy football team accomplished something no other team at Pulaski had ever done: win a state championship. This research project is an attempt to understand the attitudes, attributes, and innovation-decision process of the various individuals associated with football program at the time of the adoption of a series of radical innovations that enabled such a dramatic improvement in results.

Questions:

1. [Attributes] Provide a general personal background/history – (Example follow up questions will seek to understand personal philosophy, leadership style, risk tolerance, cosmopoliteness, comfort with failure, how he/she is perceived by peers, technical aptitude, and ability to deal with ambiguity)
2. [Attributes] Organizational background – (Follow up example question – How would you compare the Pulaski football program to your opponents – talent pool, financial resources, access to information about radical innovations, risk tolerance, etc.)

3. [Attitudes] Questions to identify attitudes toward innovation. (Example questions – How do you feel about change? What other innovations have adopted and why? Did you have any concerns about the new coaching philosophy?)
4. [Attitudes] Questions to identify the organization's (Pulaski Academy's) attitudes toward innovation.
5. [Innovation Decision-Process] Questions about how participant experienced each stage of the process – Knowledge, Persuasion, Decision, Implementation and Confirmation. (Example questions - Can you describe how you first learned about the series of radical innovations that were implemented?; What were key factors in you being persuaded to adopt the innovation?; Describe the implementation process for the football team? How long did it take for everyone to be on board? How long did it take before you were comfortable with the changes?)

APPENDIX B

IRB Approval

Pepperdine University
24255 Pacific Coast Highway
Malibu, CA 90263
TEL: 310-506-4000

NOTICE OF APPROVAL FOR HUMAN RESEARCH

Date: March 17, 2016

Protocol Investigator Name: Lyall Swim Protocol #: 16-01-178

Project Title: CASE STUDY OF THE PULASKI ACADEMY FOOTBALL PROGRAM'S ADOPTION OF A RADICAL INNOVATION

School: Graduate School of Education and Psychology Dear Lyall Swim:

Thank you for submitting your application for exempt review to Pepperdine University's Institutional Review Board (IRB). We appreciate the work you have done on your 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 46.101 that govern the protections of human subjects.

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 an amendment to the IRB. Since 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 IRB.

A goal of the IRB is to prevent negative occurrences during any research study. However, despite the 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 IRB as soon as possible. We will ask for a complete written explanation of the event and your written 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 IRB and documenting the adverse event can be found in the *Pepperdine University Protection of Human Participants in Research: Policies and Procedures Manual* at community.pepperdine.edu/irb.

Please refer to the protocol number denoted above in all communication or correspondence related to your application and this approval. Should you have additional questions or require clarification of the contents of this letter, please contact the IRB Office. On behalf of the IRB, I wish you success in this scholarly pursuit.

Sincerely,

Judy Ho, Ph.D., IRB Chairperson

cc: Dr. Lee Kats, Vice Provost for Research and Strategic Initiatives

Mr. Brett Leach, Regulatory Affairs Specialist

APPENDIX C

Innovator Characteristics of Coach Kevin Kelley

Innovation	Application	Description
Conditioning	Practice/Off Season	Kelley changed the expectation around offseason. During the summer months, players were *"expected to be at the high school in the weight room four days a week in the afternoons"* (P3). Kelley also started getting the players involved in a *"diet with a lot of protein"* and in having *"a protein shake whenever you work out"* (ADM1).
7 on 7 Drills	Practice/Off Season/Regular Season	According to P5, one of the most memorable changes Kelley made was that the team *"got real involved in 7 on 7…we got real involved in 7 on 7 especially with Coach Kelley and you know – all of our plays."*
Unpredictable Practices	Practice/Preseason/Regular Season	Kelley's predecessor ran a set schedule that he never deviated from. Players and coaches knew *"on Sunday how each practice would go that week…you knew in 10 more minutes we get a water break and then after that we run ten 40's and then we go to offense and then we go to defense"* (P7). Kelley was *"the exact opposite"* (KK). Kelley was *"always trying to innovate and make it not so boring"* (P6). This meant changes in practice that included, *"hitting a lot less"* (KK) and playing other games in practice like *"sharks and minnows in full pads"* (P7).
Mental Toughness	Practice/Preseason/Regular Season	Kelley, contrary to other coaches, was more of a believer *"in mental toughness than a physical toughness"* (KK). P1 noticed the impact of Kelley's efforts *"to build us up. He would break us down, but he was also build us back up and make us stronger…It just wasn't always physical - you know - challenges. He also mentally challenged people. He made you, you know, get some mental strength, which I think helped us later down the road so when we, you know, playoffs and championship."*
Game-Day Preparation	Regular Season	The changes on game day were one of the favorites of AC2. *"I loved the idea of getting to a game 30 to 45 minutes before a ballgame. One of the worst times…it's the 1.5 to 20 hours before a game when there's all this down time…The idea of showing up, getting stuff, get on the field, stretch, boo we're ready to go is – is one of the better things that I've ever been a part of."*
Trick Plays	Practice/Regular Season	According to P1, *"We ran a whole bunch of trick plays under Kelley."* Further Kelley began running a trick play on the first play of every game which enabled the team to score *"7 out of 12 times on the first play of the game…they were triple passes, double pass reverse passes. One all five receivers touched in on play and scored"* (P7).
No Punting	Practice/Regular Season	In the summer of 2003, Kelley *"happened to run across that first study…and I started looking at that."* But unlike the complete adoption of other changes noted above, Kelley was *"reluctant to dabble in the not punting simply because 'What if it doesn't work.'"*

	So Kelley began to use a play on 4th down where the team *"would line up – two receivers on each side and if they put someone back to receive the punt, we'd run a play"* (P7). If the opposing team lined up to play defense, the quarterback would quickly punt the ball.

Appendix D

Innovator Characteristics of Pulaski Players

Attribute or Attitude	Average Self Rating Compared to Others	Direct Quotes
Experience in football	Average	I started playing football in 6th grade. (P2) I think I started playing a little bit later than I think than most of my teammates in high school. I think most started around, I don't know, maybe around 3rd, 4th, 5th grade. My first year playing was 7th grade. (P3) My dad wouldn't let me play until 7th grade. (P5) I started playing when I was in 4th grade. (P6)
Mental toughness	Above Average	We were just above everybody. (P1) I think everybody just used it [the 62-0 loss] as motivation for the next time. (P3) The more you do something, the easier it becomes. So the more you're in a pressure situation, the more you feel like it's a normal situation. (P7)
Openness to change	Average	Change in general was an uncomfortable thing for me as a teenager. (P2) Sometimes I like change and sometimes I don't. (P5) I was accepting of change. Definitely more, I would say, more receptive to change than adverse to change. (P4)
Player intellect and technical aptitude	Above Average	I would say I was at the upper echelon. (P1) I knew all the plays. (P6) We were – everybody on the team had a good technical aptitude, so I mean slightly above average. (P4)
Hard Workers	Above Average	We always knew we had to work hard, because we knew the minor failures and setbacks we experience were enough or had soured us just enough to that feeling [of losing] that we knew that's not what we wanted to experience…on the football field. (P3) I went from 130 pounds [in] December 2003 to start of the season [in] 2004 to 176 pounds and it takes a lot of frikin' work. And I did – I drank more weight gainer…I worked really hard at that. (P6)

Comfort level with failure	Below Average	I don't think anybody did really well with failure. (P3) Nah, I'm not very comfortable with it…I'm not good at dealing with failure when it's all said and done. (P6)

APPENDIX E

Unintended Consequences Summary

Unintended Consequence	Direct Quotes
Greater flexibility in play calling	Kelley's offense thrives because the possibilities are endless. Third-and-7 is not necessarily a passing down, and third and inches is not necessarily a running down. (NYT) Keeping the offense on the field on 4th down allows for more creative play-calling. (RA)
Enticing more players	They wanted to be a part of it, and so now we're lookin' at, you know, anywhere between 50, 60, 70 kids sometimes with everybody. (AC2) It just made things all around more exciting, and more players were wanting to play because it's kind of hard to play as a player when one guy gets the ball the whole time and you're out there blocking. (P5)
Increased in-game momentum	We knew we were going to go out there and when you see the other team get defeated when you get 4th down over 4th down, you can kind of see them start to question their coaching staff. (P1) Kevin will tell you the stat is we score like 60 to 70% of the time if we actually somewhere along the drive, we've made a 4th down. (AC2) Once you get that – you get that 1st down on 4th down and you actually take it, the momentum is incredible. (AD1)
More time to work on offense and defense	We don't even work on punt, which is another benefit in practice. We're not spending time on that. We're spending time on things that are meaningful. (HERD) So now practice is much more efficient because you're able to practice on things that you're going to be doing most of the time. (AC1)
Increased pressure on opposing teams	What it has an impact upon is the mental challenge of the game…The mental wearing out that not-punting does on people is amazing. It's both – it's physically you can watch it. (AC2) And while a crucial fourth-down play can raise the heart rate of most players, for Kelley's guys it's just another play. (AP) When an opposing offense kept the offense on the field on fourth down, I always felt a little concern. I was confident in our players…But seeing a team stay on the field on fourth down makes several thoughts run through my mind, "My guys can't rest yet. The game isn't won yet." (SBN1) I know that sounds like sarcasm, but I mean it very seriously. When I don't see the other team's punter take the field on fourth down, my first thought is, "Aww $h!t!." (SBN1)