A Peer Driven Technology Adoption Model:

Using Communities of Practice to Influence Technology Adoption

by

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ABSTRACT

The purpose of this study was to evaluate the role a peer-driven technology acceptance model (PDTAM) in the form of a Community of Practice (CoP) played in assisting users in the acceptance of Trellis technologies at the University of Arizona. Constituent Relationship Management (CRM) technologies are becoming more common in higher education, helping to track interactions, streamline processes, and support customized experiences for students. Unfortunately, not all users are receptive to new technologies, and subsequent adoption can be slow. While the study of technology adoption literature provides insight into what motivates individuals to accept or reject new technologies, used herein was the most prevalent technology adoption theory – the Technology Acceptance Model (TAM; Davis, 1986). I used TAM to explore technology acceptance more spec user's Perceived Ease of Use (PEU) and Perceived Usefulness (PU).

In this MMAR study, I used TAM (Davis, 1986) as well as Everett Roger's (1983) Diffusion Innovation Theory (DOI) to evaluate the impact of the CoP mentioned above on user adoption. Additionally, I added Perceived Value (PV) as a third construct to the TAM. Using pre-and post-intervention surveys, observation, and interviews, to both collect and analyze data on the impacts of my CoP intervention, I determined that the CoPs did assist in more thoroughly diffusing knowledge share, which reportedly led to improved PEU, PU, and PV in the treatment group. Specifically, the peer-to-peer mentoring that occurred in the CoPs helped users feel empowered to use the capabilities. Additionally, while the CoPs reportedly improved PEU, PU, and PV, the peer-to-peer

model and the Trellis technologies still have not matured enough to realize their total value to campus.

DEDICATION

To my boys. You are the inspiration for everything I do. Thank you for going through this journey with me. Over the previous three years, you have evolved from babies to boys to young men. It is astounding the growth all three of us have experienced through this degree. I will never forget the days of sitting around the dining room table together and working on our homework with Skittles, our "math" cat. Thank you for your patience, curiosity, support, and understanding. Though I suspect neither one of you was too sad about the amount of time spent at trampoline parks for the duration of this endeavor. I love you both more than I think any of us will ever comprehend. I promise to continue improving myself as a human to be the best mother and person I can be for you.

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And finally, for my dad. Thank you for treating me like an equal, taking an interest in my opinions, and teaching me to know my worth. Thank you for your humor, extroversion, and for teaching me the power of vulnerability. I love you and miss you every day.

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Finally, thank you to our first-year class of Trellis ambassadors. Thank you for embracing the vision and completely throwing yourselves into supporting your teams.

TABLE OF CONTENTS

Page

Page

APPENDIX Page

LIST OF TABLES

Table Page

Table Page

LIST OF FIGURES

INTRODUCTION

As children, we run as soon as our legs are able; running is play, and running is freedom. Teachers instruct us on how, when, and where to run as we progress through school. However, it is presumed that those who stick with it beyond those gym classes are naturally inclined to it. When it may have less to do with natural ability and more to do with how individuals are introduced to running. Regardless, along the way, some conclude that they "aren't runners," and some believe the inverse. Some have coaches who teach them how to manage their cadence, hold their arms, and use their bodies to their advantage, and some do not. More importantly, some individuals never form an intrinsic connection to running. Some runners find a sense of belonging through running communities that support their love of running and give them a sense of purpose (Schwartz, 2019).

Technology is no different, whereby users prefer solutions they might perceive as valuable and easy to use regardless, perhaps, of "natural ability" (Davis, 1989). Then, perceptions of complexity and value may be less about the actual technologies used and, instead, about how technologies are introduced and supported (Venkatesh, 2000). I have made multiple attempts at running, bought expensive shoes, running clothes, and eventually a treadmill. My running efforts came in fits and starts over several years. I perceived that running would be easy; I just needed to put one foot in front of the other expeditiously. I also perceived running to be useful for one thing: weight loss. For those who enjoy running, the run is the end; for me, it was a means to an end (Shlafer, 2016).

Initially, I was one of those runners who did not develop a connection to the inherent value of running. My running practice lost its value, eventually causing me to

give up (McMillan, 2020). Similarly, users who are taught how to use technology but not how to incorporate it into their context may feel frustrated and convinced that the endeavor is also an inefficient waste of time. Even worse, like a new runner, a user may begin exploring new technology with optimism that fades as they decide it is too complicated and not serving their needs or ends. Understanding why individuals choose to adopt new habits or technologies requires an understanding of the factors influencing their adoption behaviors.

In 1989, Fred Davis introduced a technology acceptance model (TAM) to assess an individual's likelihood to adopt a technology (Davis, 1989). Davis posited that a user's intention to adopt technology is based on their perceived ease of use (PEU) and perceived usefulness (PU) of the technology. PU, he defined as a user's belief that using technology would help the user be more successful at work (Davis, 1989; see also Venkatesh 1999). PEU, he defined as a user's perception of how complex the technology would be to learn (Davis, 1989; see also Venkatesh 1999). These perceptions are not dissimilar to the feelings runners have towards their practice.

In other words, individuals may consider adopting a running habit because they perceive it as an effective way to achieve a health goal; also, there is an element of ease of use, given it does not require special skills or expensive equipment. Similarly, users form assumptions about a new technology's complexity using criteria from previous interactions with other technologies (Venkatesh, 2000). These perceptions are combined with users' beliefs about how capable they might believe they are to execute an action in a new situation (Bandura, 1977). Therefore, user-perceived assumptions and beliefs in terms of self-efficacy are intrinsic motivators. Accordingly, intrinsic motivation, or

perceived enjoyment, significantly impacts a user's PEU (Fagan et al., 2012). Thus, the key to creating comfort with technology is to find ways to make technology more intrinsically motivating (Fagan et al., 2012). The most effective means of influencing a person's PEU is to make the technology enjoyable to use in that PEU influences a user's PU of a technology (Venkatesh, 2000).

Ultimately, helping users understand how to integrate technology into every aspect of their lives is critical for successful technology adoption (Lanzolla &Suarez, 2012). The more valuable a user perceives the technology, the more likely the technology will become an integral part of their work (Venkatesh & Davis, 2000). That value is not unlike the individuals compelled to run because it has become a part of their daily routine (Ziegler, 1991). Similarly, I developed a consistent running practice when I eventually discovered my intrinsic motivations for running (getting outside, listening to podcasts, time to myself). For users, technology is often required to do their jobs, however, mandated adoption does not equate to users perceiving the technology as valuable. When adoption is mandated without the context of usefulness, the technology can be woefully misused or underutilized and eventually abandoned (Harris et al., 2008; see also Venkatesh, 2000).

The Study of Technology Acceptance

There are multiple studies on user acceptance and usage behavior of emerging information technologies. The TAM mentioned above (Davis, 1989) is the most widely applied user acceptance and usage model. TAM evolved from the Theory of Reasoned Action (TRA; Fishbein & Ajzen, 2010). Researchers use TRA to evaluate intention as a mediator between attitude and action (Straub, 2017; Venkatesh, 1999). Despite being

rooted in social theory, TRA contributes significantly to technology acceptance literature. Namely, the TRA contribution comes through the study of an individual's decision to display behaviors towards technology based on their perception of the outcomes of their behavior (Ajzen, 1991; Fishbein & Ajzen, 2010). This concept provided the basis for two central themes of TAM: PEU, and PU, as also described prior (Davis, 1989; see also Venkatesh & Davis, 2000), all of which are discussed more in-depth forthcoming.

Technology is ever-present and has a relatively short development life cycle. The public sector, educational institutions, and others need to develop techniques that encourage efficient and effective technology use (Venkatesh, 2000; Venkatesh & Davis, 2000). Indeed, most technology adoption literature authors attempt to provide prescriptive formulas for predicting who will adopt an innovation. Many of these articles lack a holistic approach or cohesive model that accounts for the numerous factors influencing adoption (Fagan et al., 2012; Hornbaek &Hertzum, 2017). For example, when Venkatesh and colleagues explored the future of technology adoption research, they advised that new research should be undertaken with a social psychology lens and focused on interventions to influence user behavior (Venkatesh et al., 2007). Many researchers are now including sociological factors in adoption research and examining their influence on an individual's intention to adopt the technology (Cheng et al., 2011; Mathieson, 1991; Venkatesh, 2000).

Study Context

As universities seek options for creating unique digital experiences for students, Constituent Relationship Management (CRM) technology in higher education is growing in popularity (Britt, 2018; Musico, 2008; Rigo et al., 2016). CRMs also provide value to

institutions that struggle with strategies for managing communications and effective tracking of interaction data (Meyliana et al., 2017; Lee, 2019; Pignata et al., 2015). Evidence supports CRM technology's value in opening vital communication channels and creating common data platforms better to serve students (Seeman & O'Hara, 2006).

The University of Arizona (UA) purchased a CRM system as a data platform for custom software solutions. These solutions are used by administrative staff, faculty, and students. The CRM implementation program branded Trellis (Trellis CRM, 2019) is the most significant initiative funded by UA's university-wide strategic planning efforts (UA Strategic Plan, 2018). The plan aimed to develop digital tools that eliminate paper processes, create efficient connections via multi-modal communication tools, and reduce information silos through a shared data system (Trellis, 2019). Accordingly, users who choose to adopt the CRM technologies need a high level of proficiency in the tool to ensure maximum benefit for all students.

The Trellis program uses a people-first approach for software development, which relies on collaboration with users throughout implementation efforts. The program is part of UA's University Information Technology Services (UITS), an enterprise-level technology services provider. Traditionally, large-scale IT programs in UITS operate within a command-and-control model. Decisions are typically less about the desire to facilitate change and more about the need to manage the process (Barber, 2009). The truth is real technology adoption reform happens when the decision-makers understand the context of a user's work (Spillane, 2009). Therefore, Trellis’s leadership chooses to take a grassroots approach to influence PEU and PU.

Purpose of the Intervention. Pervasive and efficient use of Trellis products is essential to achieve UA's mission of creating a streamlined and cohesive communication ecosystem for the university (Trellis, 2019). For this study, users are defined as university administrative staff who are new users of Trellis (i.e., the Trellis Events Management Tool, Trellis Scheduling, and Trellis Service). The purpose of the intervention in this study was to create communities of practice (CoPs; see Wenger, 1998) organized around the support and efficient usage of Trellis software products. CoPs provide opportunities to centralize and then diffuse best practices across diverse networks of individuals, in this case, throughout UA. A peer-led community (i.e., CoP) for technical support and adoption encourages a level of ownership from the users, more so than the traditional Information Technology (IT)-driven models in which trainers focus on training users in the technology versus using context to explain the technology (Quitadamo et al., 2009). Building ownership in the user base, for example, via a CoP, significantly reduces the time to adoption (Lanzolla & Suarez, 2012) and can improve communication between IT and users (Lanzolla & Suarez, 2012), and reduces requested changes to technologies. These benefits are attributable to users developing a collective understanding of the overall purpose of the technology (Leonard-Barton & Kraus, 1985).

The purpose of fostering software-specific CoPs at UA was to bring users together via CoPs, to collaborate on support, knowledge sharing, and knowledge creation (Wenger, 1998). CoPs were formed based on different criteria, including, but not limited to, similar roles within the university, such as in the UA financial aid office or groups using the same product, with each CoP led by an ambassador. The ambassador role was voluntary, with individuals agreeing to step up and help to serve as a collaborator and

oversee each CoP. In most cases, the ambassador emerged as an individual within the department or college who was most comfortable in the technology and served as a de facto mentor to others in the organization. The ambassador's role was crucial as CoP leadership also needed to come from within (Wenger, 1998).

As the Director of Implementation Services of the Trellis program, I worked with each CoP ambassador to develop monthly user events, collaborate on sharing and documenting best practices, and manage interactions. The methods and communication among communities were organized and collected in Microsoft Teams. I also organized cross-collaborative community events that provided forums and formats for users to share knowledge with others about their onboarding experience and usage and propose improvements to the technology. The purpose of the research was to lay the foundation for an extensible technology support model that, if deemed successful, might become the support strategy for introducing new technologies, both within UITS and the IT units within colleges across UA.

Purpose of the Study. The purpose of this study was to develop a Peer Driven Technology Acceptance Model (PDTAM), based on Wenger's CoP theory (see more forthcoming), to influence the adoption and efficient usage of the tools. Adoption is defined as the regular use of the software to support or improve the way the user works (Davis, 1989). Efficient usage is characterized by extensive usage of the technology's capabilities, measured, and reported on through the software. More specifically, I examined a peer community's (i.e., CoP's) influence on users' perceptions of this new technology's usability, usefulness, and value via this study. I did so under the guidance of the following three research questions: (1) In a PDTAM, what communication channels

were most effective for diffusing information about the technologies? (2) Did participation in a PDTAM impact a user's perception of the technology's usability (i.e., PEU), usefulness (i.e., PU), and value (i.e., PV) to their work? And (3) Did users feel that participation in the PDTAM helped them become more proficient in the technology?

It is essential to note the goals of the intervention and the study were not to convince users that the university selected the right CRM. All participants in the study were individuals who had already chosen to use the CRM software. Instead, answering these three research questions was to understand better how the PDTAM model impacted users' perceptions of the value and usefulness of the software, leading to the more effective usage of the technology in service to students. Additionally, the findings from this research effort, again, if deemed worthy, could also be used to develop more extensible adoption models for technology implementations in other higher education institutions (HEIs).

LITERATURE REVIEW

Before I discuss the methods, I used to conduct my research, it is important to first lay a foundation, as per the current literature, regarding CRM software in higher education, CRM technology acceptance, and the role of peer networks in technology acceptance. However, it is also important to note a general lack of published literature in these three areas. Researchers have thoroughly studied technology acceptance in higher education; however, their focus has typically been on accepting and using educational technologies in K-12 classrooms. Very little research has been conducted on the acceptance and use of administrative technologies in higher education.

CRM Software in Higher Education

What is CRM Software? CRM software has been a widely used product in the business sector for over two decades (Meyliana et al., 2017; Fjermestad & Romano, 2003). CRM software was developed for managers and marketers to create individualized experiences with their customers or constituents (Hrnjic, 2006; Ko et al., 2008). CRM systems represent more than just a technology strategy, though, in that CRM system usage requires a shift in organizational and analytical strategy (Grant & Anderson, 2002; Musico, 2008). At its core, the value of a CRM system is in its ability to integrate multiple data platforms into one to create a unified 360-degree view of an individual (Gebert et al., 2003; Pedron & Saccol, 2009). Subsequently, leaders can harness multiple data points on an individual and use the data to provide individualized services and communications to that individual (Gebert et al., 2003; Grant & Anderson, 2002; Musico, 2008).

CRM and Higher Education. Many HEIs shy away from referring to students as customers (Guilbault, 2018; see also Mark, 2013). The term denotes a transactional relationship that is not reflective of an educational experience. However, competition for new students has become increasingly fierce (Britt, 2018). Likewise, students and their families have come to expect a personal experience in selecting a college and in their academic experiences as students (Grant & Anderson, 2002; Musico, 2008). In the new world of individualized experiences, interactions have become the currency of education (Arnett et al., 2018). New models of recruiting and retaining students in HEIs require organizational shifts in HEI leaders' ways of interacting with students. As a result, more and more HEI leaders have turned to CRM systems to drive organizational change (Grant & Anderson, 2002; Meyliana et al., 2017).

CRM Usage and Values for HEIs. A review of CRM in the HEI literature reveals that CRM's most common usage is in recruitment and admissions. Many institutional leaders have found value in accessing CRM data to create customized communications and track students in their pipelines from prospects to enrolled students (Britt, 2018; Grant & Anderson, 2002; Rigo et al., 2016). However, CRM usage to track students' interactions throughout their academic careers has increased exponentially in HEIs (Britt, 2018; Grant & Anderson, 2002; Rigo et al., 2016). Financial aid officers, for example, use CRM software to manage communications via logic-driven, multi-channel communication strategies with students (Grant & Anderson, 2002). At UA, students receive emails reminding them to complete a Free Application for Financial Student Assistance (FAFSA), whereby subsequent notifications are based on the actions students take (or do not take). If students do not apply, they will continue to receive email

reminders about deadlines; if they apply, they can opt into text notifications about their application statuses (M. McKenney, personal communication, July 14, 2020).

Accordingly, CRM technology is valuable to HEI leaders when creating improved services for faculty, staff, and students (Britt, 2018; Grant & Anderson, 2002). CRM software provides a clear and complete picture of an individual and their activities (Britt, 2018; Grant & Anderson, 2002). Students are no longer required to travel to several different offices and repeat the exact requests as all pertinent information is now available to individuals working with students. Therefore, CRM software also helps streamline and improve student experiences (Musico, 2008; Rigo et al., 2016). Despite using CRM software in HEIs for almost two decades, many HEI leaders still struggle with successfully integrating the technology into their organizations (Musico, 2008; Rigo et al., 2016). One key to successfully implementing any new technology is understanding what motivates individuals to accept or reject new technologies, which was one of the critical objectives of this intervention, as also noted prior.

Technology Acceptance

The failure to successfully manage user adoption of new systems can lead to significant financial losses, reduced efficiencies, and dissatisfaction among employees (Bagozzi & Warshaw, 1989; Fagan et al., 2012). For decades, practitioners and researchers have pursued a better understanding of why individuals resist adopting new technologies, with adoption being defined as the choice to accept innovation and the extent to which that innovation integrates into any user's context (Straub, 2017). Researchers have also examined the choices individuals make to accept or reject technology (Hornbaek & Hertzum, 2017; Selander, 2011; Venkatesh, 1999; Venkatesh &

Davis, 2000), also concentrating on identifying factors that facilitate technology use (Bagozzi & Warshaw, 1989; Legris, 2003). Acceptance literature provides a focused perspective on change and an analysis of individual attributes that add to the overall success or failure of technology acceptance at the organizational level (Straub, 2017; Venkatesh, 1999, 2000).

The Study of Technology Acceptance. There are multiple studies on emerging information technologies' user acceptance and usage behavior. While the TAM mentioned above (Davis, 1989; see also more forthcoming) is the most widely applied model of user acceptance and usage. It evolved from the Theory of Reasoned Action (TRA; Ajzen & Fishbein 1980). Researchers use TRA to evaluate intention as a mediator between attitude and action (Ajzen, 1996; Davis, 1989; Venkatesh, 1999). Despite being rooted in social theory, TRA provides a significant contribution to technology acceptance literature by studying an individual's decision to display any behavior toward a technology based on the individual's perception of the outcomes of their behavior (Ajzen, 1996; Davis,1989; Venkatesh,1999). This concept provided the basis for two central themes of TAM: PEOU, and PU, as also described prior (Davis, 1989; see also Venkatesh & Davis, 2000), all of which are discussed more in-depth forthcoming.

Nonetheless, technology is ever-present and has a relatively short development life cycle. The public sector, educational institutions, and others need to develop techniques to consistently encourage efficient and effective technology use (Venkatesh, 2000; Venkatesh & Davis, 2000). Indeed, most technology adoption literature authors attempt to provide formulas for predicting who will adopt an innovation. Many of these articles lack a holistic approach or cohesive model that accounts for the numerous factors

influencing adoption. However (Bagozzi & Warshaw, 1989; Fagan, 2012). For example, Venkatesh and Davis (2007) explored the future of technology adoption research. He advised that future research should be undertaken with a social psychology lens and focus on interventions to influence user behavior (Venkatesh & Davis, 2007). Many researchers are now including sociological factors in adoption research and examining their influence on an individual's intention to adopt the technology (Cheng, 2018; Mathieson, 1991; Straub, 2017).

The Role of Peer Networks in Technology Acceptance. Technological development is never a *one-and-done* project or endeavor. Specifically, updates to the technology are typically released in iterative cycles (Lanzolla & Suarez, 2010). The iterative nature of software development is significant to user adoption for two reasons: (1) learning how to use technology is a continuous process, and (2) users have an opportunity to play a role in future iterations (Ramkrishnan & Chesmore, 2003; Sykes, 2009). However, the drawbacks to the dynamic nature of iterative software releases are that they necessitate a process of ongoing learning (Billet, 2010; Edmonson et al., 2001; Harris et al., 2008). Software updates are disruptive (Billet, 2010; Edmonson et al., 2001), and these disruptions leave individuals feeling frustrated, insecure, and vulnerable. Without the proper environment for continuous learning, users may ultimately give up on the technology entirely (Malhotra & Galletta, 1999; Ramkrishnan & Chesmore, 2003).

Adoption is Not Acceptance. Also, in the adoption literature, authors often mistake equating adoption with usage (Cheng et al., 2011; Vannoy, 2010). The key to moving users towards acceptance is creating networks of support where users feel comfortable experimenting, asking questions, and expressing concerns (Billet, 2010;

Edmonson et al., 2001). Another way of creating acceptance and a sense of ownership is by asking users to contribute their voices to development processes and procedures (Malhotra & Galletta, 1999; Ramkrishnan & Chesmore, 2003). Peer networks, such as CoPs, can accordingly provide environments supportive of the participatory, continuous learning needed to meet the needs of software users (Lanzolla & Suarez, 2010; Swan et al., 1999; Sykes et al., 2009).

The Value of Context

It is essential to note that the individuals using the technology are rarely included in the software implementation planning (Cheng et al., 2011; Edmonson et al., 2001). Situating learning and technology support within a peer network, like a CoP, provides valuable context by taking the learning out of an IT classroom and into users' daily environments (Ramkrishnan & Chesmore, 2003; Sykes et al., 2009). In addition to providing valuable context, peer networks (e.g., CoPs) are also psychologically safe places where users feel comfortable asking questions and speaking up while learning alongside other interdependent users (Lanzolla & Suarez, 2010). Additionally, peer networks provide opportunities for daily knowledge sharing and create proximity of support that may not be available from traditional IT support organizations (Harris et al., 2008). This amounts to the need for a user-centered approach to managing technological changes.

Knowledge Transfer. There are two additional and significant benefits to using peer networks to create context-based environments for support: (1) the creation of shared knowledge across multiple units within an organization and (2) a centralized group of technology experts able to provide valuable feedback on improvements to the

technology (Lanzolla & Suarez, 2010; Swan et al., 1999). The merging of multiple members' perspectives and abilities in various units creates new, local, shared knowledge. The collective experience is documented and shared broadly among all users to increase awareness and competencies (Sykes et al., 2009).

The sourcing of knowledge from multiple perspectives is an improvement on the classic *sage on the stage* Socratic methods of training because a peer-to-peer relationship for knowledge sharing transcends individual, technology-centered views and situates learning in any user's context (Cheng et al., 2011; Harris et al., 2008). The same holds for decisions regarding improvements to new or existing software. Opinions on software changes are more valuable when they come directly from software users (Sykes et al., 2009). Accordingly, a robust network of power users can provide much-needed context to software development decision processes and procedures (Lanzolla & Suarez, 2010; Sykes et al., 2009). Therefore, developing a peer network, or a CoP for technology acceptance, is mutually beneficial to users and technologists alike.

THEORETICAL FRAMEWORK

When determining why an individual may or may not adopt new technology, it is essential to understand the motivating factors influencing user perceptions of technology. Through this understanding, the researcher can construct an intervention that supports users adopting the technologies. There are very few studies focusing specifically on adopting CRM technology in HEIs; however, there is some research on the relationship between user behavior and technology adoption.

The following section provides an overview of three fundamental theories that serve as my research framework. First, I present the TAM as a helpful platform for identifying user behaviors that lead to technology usage and adoption. Next, I discuss the CoPs that I used as a model for developing peer-to-peer networks for technology diffusion. Finally, I discuss the critical tenets of Roger's Diffusion of Innovation (DOI), which I applied to measure how the technologies in my intervention diffused through the CoPs. I used these three theories to provide both the framework underlying my intervention and the tools to analyze the relationships between peer networks, user adoption, and technology usage (as more fully detailed in my Methods section forthcoming).

Technology Acceptance Model (TAM)

Since its publication in 1989, multiple authors have cited TAM as a foundation for studying the motivations to adopt the technology. Again, Fred Davis proposed the TAM in 1989; he did so as a doctoral student in Information Systems at the Massachusetts Institute of Technology (MIT; Davis, 1989). In 2000, Davis partnered with Viswanath Venkatesh (a fellow pioneer of research on technology acceptance at the

University of Arkansas) on a theoretical extension of TAM that expanded TAM's core principles, as also noted prior: PEU (i.e., perceived ease of use) and PU (i.e., perceived usefulness). They used the model, dubbed TAM2, to expand upon TAM to include social influence and cognitive instrumental processes. Specifically, Venkatesh and Davis (2000) examined the impact of concepts like subjective norms and technology innovations' job relevance. A significant finding in their research was the interactive effect on PU when users felt the technology directly aided in their job tasks. In their final article, they explored the history and future of technology adoption theory, suggesting that future research should be undertaken with a social psychology lens and a focus on interventions to influence user behavior (Venkatesh & Davis, 2007).

While TAM's popularity is attributable to the model's simplicity, many critics feel that the theoretical variables included within the TAM (i.e., PEU and PU) are too simplistic to be predictive or cross-contextually applied in large organizations (Davis et al., 1989; Lucas & Spitler, 1999). Other researchers incorporated a System Usability Scale (SUS), defined as a ten-point Likert-type scale that provides subjective evaluations of an innovation's usability (Revythi & Tselios, 2019). This same set of researchers demonstrated the impact of behavioral intention on student usage of learning management systems, thus, proving a relationship between PEU, PU, and social influence (Revythi & Tselios, 2019). Additional researchers found that PU and PEU dramatically increased when users understood the context for change. Creating opportunities to explore and learn the technology within the context of a user's daily tasks helps draw connections between the technology's value to the user's work (Amoako-Gyampah, 2004).

I chose TAM as my research foundation because of the demonstrable importance of context in the successful adoption of new technologies. I decided not to use TAM's extensions, like TAM2, out of a desire to start with TAM's simplest version. My goal was to expand TAM constructs (PEU and PU) to add a third value, Perceived Value (PV). I define PV as how well the technology improves a user's experience (or their students' experiences). In creating peer-led learning networks, I provided shared environments where users could grow their technical knowledge and confidence, develop a shared sense of PU and PEU, and build consensus on the PV of the Trellis suite of technologies.

Communities of Practice (CoP)

In *Communities of Practice* (1998), Wenger presents learning as a social practice. Specifically, he states that knowledge construction blends what we know and shapes us as individuals (1998). After that, Wenger defines four learning elements: (1) meaning, (2) practice, (3) community, and (4) identity. Wenger combined these elements into a unified learning theory, which he termed CoPs (also discussed prior). There are two central tenets of the CoP framework: (1) knowledge is situated in experience, and (2) experience is understood by reflecting with others who share the experience (Wenger, 1998). CoPs have been used extensively in organizations as a tool for their management and growth. Related, researchers who conducted a study of seven organizations that successfully implemented CoPs determined that organizational CoPs improved employee performance through the connections established by trust, mutual obligation, and developing a shared language and context (Lesser & Storck, 2001).

The CoP framework is also not without its critics, however. One of the most poignant criticisms of a CoP is that many of the strengths of a CoP (e.g., community

identities, shared language, established practices) can also be their weaknesses (Wenger et al., 2002). CoPs are self-organizing with collective governance; therefore, the hierarchies of an organization can permeate and influence a CoP. Even in the most open society, CoPs are subject to Hofstede's Power Distance, a cultural theory used to examine how people's identity influences their perception of power relationships (Matusitz & Musambira, 2013). A power imbalance in a CoP can logically lead to trust issues, which is significant given trust is a critical component of any successful CoP (Wenger et al., 2002). Therefore, organizations with rigid hierarchical structures do not typically provide the suitable environments for the egalitarian systems required of a successful CoP (Kerno, 2008; Roberts, 2006).

Another common barrier to a successful CoP is time (Kerno, 2008; Roberts, 2006), whereby CoPs need time to evolve. In organizations where the pressure of competition influences the pace of innovation, CoPs can struggle to keep up and thrive (Roberts, 2006). Using a CoP as a model for peer-led networks for learning and support presents an ideal framework for growing a culture of collaborative support and knowledge sharing for technology adoption. Remarkably, the CoP model also aligns well to implement a CRM system in an HEI, which is to remove siloed data structures and provide a digital platform for improved collaboration and communication.

The tenets of CoPs, as such, also provided a theoretical grounding for my research. Again, as Director of Implementation Services at the UA, I am responsible for ensuring technology adoption at the individual and community levels. I believe community is key to reaching the individual, like in a CoP where users can share information, develop best practices, and look to each other for support. Similarly, I

believe the peer-to-peer model for technology diffusion is better than the traditional technologist-to-user relationship because it allows for context blending and knowledge creation. Via this research, I tested these beliefs.

Diffusion of Innovation Theory

E.M. Rogers developed the Diffusion of Innovation (DOI) theory. The core purpose of DOI is to explain how innovation in a product or idea spreads throughout a community (Rogers, 1983). The definition of diffusion in DOI is when an individual, as part of a larger whole, perceives any innovation as valuable or useful and incorporates it into their practice (Rogers, 1983; Straub, 2009). The four tenets of DOI that influence the spread of a new idea are (1) innovation (i.e., anything, idea, or concept that is perceived as new by a user), (2) communication channels (i.e., anything that allows the transfer of information from one adopter to another), (3) time (i.e., the passage of time is a necessary component of adoption), and (4) a social system (i.e., any combination of external and internal influences that combine to influence adoption; Rogers, 1968).

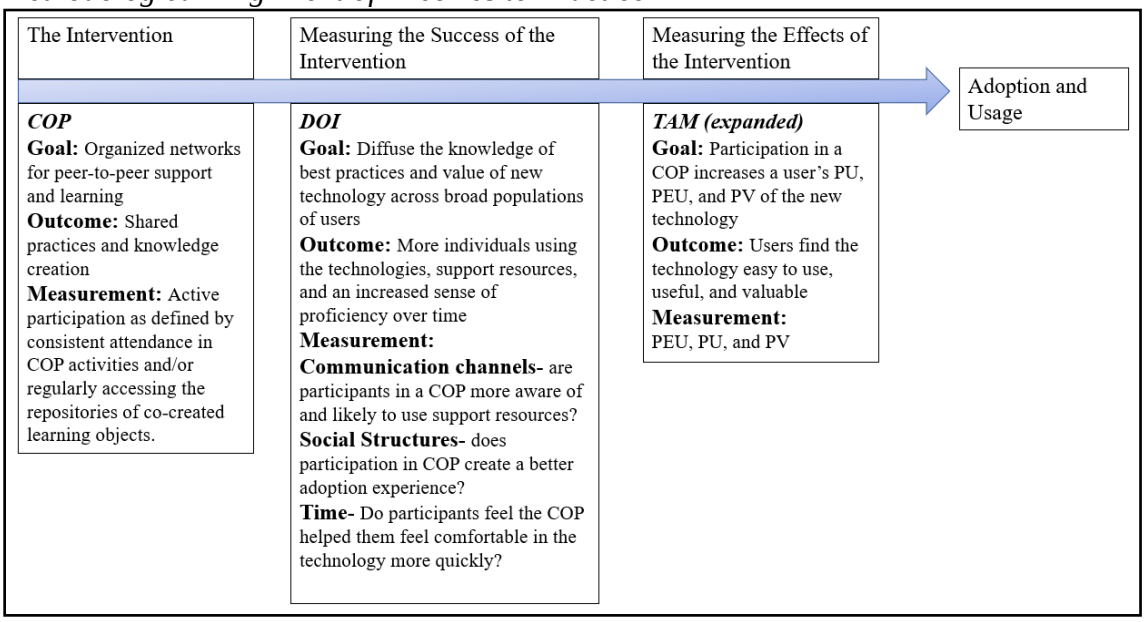
The extant literature on the relationship between DOI and technology adoption broadly supports and validates Roger's (1968) model. When successfully applied, DOI provides a valuable lens for tracking the diffusion of innovation and identifying factors influencing user behaviors and actions (Fichman & Kemerer, 1999). The value of diffusion theory relative to traditional technology acceptance models is that it provides a macro-level perspective on the diffusion of innovation through a social system (Straub, 2009). Whereas traditional adoption theories evaluate an individual's relationship to technology, DOI theory provides a researcher with a broader range of factors that can affect user behavior, like the influence of time and social pressure (Straub, 2009).

However, despite the macro perspective of DOI, some critics feel the theory does not go far enough. Rogers was the first to highlight some of his theory's central limits. The model centers on the belief that all innovation will successfully diffuse through a social system over time (Rogers,1983; Rogers, 2003). In creating the model, Rogers initially did not consider the full range of innovation, particularly understanding why some innovations are discontinued or rejected outright (Rogers, 2003). Another criticism of DOI is that the model rests on a false equivalence of adoption and usage. Like other adoption models, in the DOI model, the value of technology is measured by the number of users versus how it is used (Lanzolla & Suarez, 2012). Again, the belief that adoption equates to usage ignores the organizational actors contributing to the individual decisions to adopt and use technology (Aizstrauta et al., 2015; Lanzolla & Suarez, 2012).

I used the components of DOI to measure how often CoP participants accessed support resources (e.g., via communication channels), seemingly valued their participation in the CoP (e.g., via social systems), and self-assessed their time to proficiency (e.g., over time; Rogers, 1983; Rogers, 2003). Ultimately, I also used DOI to evaluate the efficacy of the CoP for technology diffusion and TAM (extended to include PV) as a measure of the impact of CoPs on a user's perceptions of PEU, PU, and PV. In doing so, I evaluated the overall value of CoPs in increasing the adoption and usage of new technology. Please see Figure 1 to illustrate my perceptions of the relationships among these three theories and their application herein.

Figure 1

Methodological Alignment of Theories to Practice



In Figure 1, I illustrate how all three theories contributed to my overall goal of improving user adoption and usage of Trellis technologies. Specifically, I used CoPs to construct my intervention, which developed peer-to-peer networks for technology adoption and diffusion. After that, I used Roger's DOI tenets to measure how participation in a CoP impacted Trellis technologies' diffusion through a user population. Finally, I analyzed how the diffusion of technologies influenced my extended TAM model's principles via users' perceptions of PEU, PU, and PV technologies. Next, I discuss the practical application of each of these theories in my intervention and my process for data collection and analysis. I also aligned them with these theories.

METHODS

As previously mentioned, I implemented what I call a PDTAM (Peer Driven Technology Acceptance Model) to create improved adoption and usage of the Trellis suite of new technologies at the UA. The foundation for PDTAM is a set of CoPs organized around a peer-to-peer support model. I also used the three research questions noted before to assess the intervention's efficacy and impact on users' PEU, PU, and PV.

Research Design

I conducted a quasi-experimental design for my study. A quasi-experimental design is necessary when it is not logistically feasible or ethical to conduct randomized experimental research (Eliopolous et al., 2004; Stuart & Rubin, 2007). Put differently, participants are randomly assigned to control and treatment groups (Mertler, 2017). This approach was not feasible for my study because my participants (i.e., Trellis users) were aware of the research and chose to participate in or abstain from participation in a CoP, again, with the treatment being a CoP meant to facilitate Trellis use. Instead, I used a quasi-experimental model to analyze my intervention's impacts on my treatment and control groups of Trellis users.

More specifically, I undertook an action research approach for this study. Mertler (2017) describes the difference between educational research and action research, with the latter being "localized and seek[ing] immediate answers or solutions to problems of practice" (p.15). An action research design was ideal, given my dual role as the Director of Implementation Services on the Trellis program and the primary researcher on the effects of the PDTAM, especially given my professional context provided a live laboratory for testing iterating on an intervention.

Also necessary to underscore is that action research is cyclical. The practitioner conducts cycles of planning, action, observing, and reflecting while relying upon and using reformed processes to progressively iterate on innovation or intervention (Creswell & Guetterman, 2019; Mertler, 2017). Accordingly, action research practitioners believe that action, observation, and reflection are the most effective path to a legitimate understanding and improvement of a problem (Bradbury-Huang, 2010). Unlike traditional research, whereas action research does not result in an ultimate solution to a problem, action research provides a model purposely designed around continuous learning. Related to note that I have done two action research cycles informing my study.

In my first research cycle (Fall 2019), I interviewed five colleagues from three different units in different stages of new technology implementation. The biggest frustration for all five was a lack of communication regarding recent technology changes, mainly since my colleagues were not part of the decision-making process (Hodge, 2019). These findings were somewhat surprising as Trellis CRM program leaders hosted several open forums, published articles in multiple university publications, and ensured that the Trellis program had representation among many involved in university strategic leadership meetings. I ultimately learned from this cycle that the complex nature of communication networks, seemingly across HEIs, makes the diffusion of technology very difficult. Invariably some users will feel left out.

For my second cycle of research (Spring 2020), I conducted a survey using questions drawn from the Stages of Concern Questionnaire (SoCQ; George et al., n.d). I chose the SoCQ model because it provides a developmental perspective on how concerns about new technology can influence a user's decision to adopt it (Straub, 2017). Through

the survey results, I found a common theme among survey respondents: a primary concern about what impact learning a new software would have on their work (Hodge, 2020). Additionally, I discovered that while participants were interested in assisting their colleagues in feeling comfortable with new Trellis technologies, they were less interested in learning how to use technology from a peer (Hodge, 2020). These findings were not surprising because while I have witnessed UA users assisting each other in learning new technologies, a formal peer network for technology learning and support is an entirely new concept for the UA. Both action research cycles helped me understand some of the painful technology adoption points. UA (and likely other) users are both curious and receptive to the idea of working collectively to support the adoption of the Trellis technologies of priority here.

In the Fall of 2020, the program management team surveyed all licensed users to determine their general satisfaction levels with Trellis tools and current methods for training and support (pre-intervention). The survey had a total of 160 respondents. While there was a moderate overall satisfaction level, with 62% of respondents agreeing they would recommend Trellis to a colleague, there was a noticeable gap in users' comfort levels with the technology and support resources. Of the 160 respondents, 48% stated that they were knowledgeable about the available resources for training and support. Additionally, 52% of respondents either "disagreed" or "strongly disagreed" when asked if they understood what capabilities were available through the Trellis program. This survey revealed that our users managed well enough in the tools but did not feel knowledgeable or supported in their adoption and usage.

In my third cycle of action research (Fall 2021 through Spring 2022), I used a mixed-method action research approach (MMAR), an approach to action research that incorporates qualitative and quantitative methods to develop comprehensive solutions to complex problems in professional settings (Ivankova, 2015). I used a Convergent Parallel MMAR design using survey, observational, and interview research methods to answer my three research questions. A Convergent Parallel MMAR design is an approach where quantitative and qualitative data collection processes occur concurrently during the research process (Moseholm & Fetters, 2017). The qualitative and quantitative strands are kept independent during data collection (Creswell & Plano Clark, 2011), after which integration occurs at the interpretation and reporting stage. This approach provides a means of obtaining different aspects of the phenomenon (Moseholm & Fetters, 2017).

Expressly, I introduced users to Trellis capabilities using a structured process. The current Trellis technology adoption process consists of (1) the collection of a groups' needs through two one-hour discovery meetings, (2) a development team configures the Trellis capability to meet the group's needs, (3) the groups are then trained in the new tool by a trainer, and after training (4) the group moves into support mode where a support team manages all their needs. These processes and procedures are essentially the same for the individual regardless of participating in a CoP.

Role of the Researcher

In an MMAR study, the practitioner serves the researcher and implementor's dual role (Trondson & Sandaunet, 2009). As such, the action researcher should be concerned with the validity of the data and ensuring the research outcomes to hopefully produce positive changes for participants (Ivankova, 2015). My role as a practitioner and

researcher, as such, had advantages and disadvantages. As the Director of Implementation Services for the Trellis program, my professional success depends on the successful diffusion of Trellis technologies. Added to that, the adoption of the Trellis technologies can improve the student experience and, subsequently, student outcomes at the university. As the research practitioner, I tried to balance my professional goals of widespread diffusion of Trellis technologies with my research goals of developing COPs to increase user satisfaction and technology usage.

An advantage to conducting action research is that the researcher can observe and explore the cultural contexts in which interventions are introduced (Mertler, 2017). This context provides a measure of adaptability in managing the intervention and subsequent analyses that would not be available in research from a traditional laboratory environment (Ivankova, 2015). As the researcher, I also did my best to remain conscious of any cultural biases that influenced my participants' behaviors. I tried to manage cultural bias by avoiding technical jargon when interacting with my users. By presuming a user's knowledge or lack of familiarity with technology, I may have, for example, used exclusionary language to lead participants to self-select out of the technology or intervention from the start (Lincoln, 2019). As the researcher, I ensured that all aspects of the intervention and associated data collection methods were accessible to my participants.

Ultimately, I did not perceive the duality of my roles as researcher and practitioner as a barrier to producing the research that I believe yielded valid findings. Each part, instead, served a specific purpose in support of action research, whereby as a researcher, I care about the analysis of the observational phenomena at hand. I invested in developing

and iterating practices that brought value to my work as a practitioner. The practitioner as a researcher model I followed sets action research apart from traditional methods (Ivankova, 2015; Mertler, 2017).

Finally, I believe positioning my role as a practitioner was the best mitigation strategy to one of the biggest threats to validity and, ultimately, my research's success. The newness of the intervention may have influenced some of my participants' responses. It is not uncommon for new runners, excited by their unique ability, to run too many miles or push themselves too hard when they begin running. New runners are at risk of burnout or giving up entirely once the excitement of running has passed. The risk of burnout is not dissimilar for new processes or programs, such as was the case in this study. The actual test of my research and intervention value will likely be after the program's newness, or the novelty wears off. For the PDTAM to succeed, the CoPs ultimately be self-formed and self-managing entities. As part of the move into support for this study, participants had the option of developing a departmental CoP or were encouraged to participate in a series of broader topic-based CoP meetings and events.

Study Participants

The CoPs were led by individuals serving as ambassadors to the technology. Through the CoPs, users engaged in peer-to-peer training through knowledge-sharing events. As a group, members of each CoP were responsible for sharing knowledge, documenting best practices, and supporting their colleagues in adopting the new technology. Each CoP had a small planning group consisting of the ambassador and a handful of volunteers drawn from the user community. The communities consisted of individuals who attended CoP events and contributed to the development of user content

via group presentations, shared knowledge, or document creation. Figure 2 illustrates the organization of study participants and the timeline upon which they engaged (or abstained) from the intervention.

Figure 2

Quasi-experimental, Convergent MMAR Design

	Study Participants (all users licensed 1/1/21-6/30/21) *n*=117	Control (participants who chose not to participate in a CoP) *n*=73	Treatment (study Participants who chose to participate in or lead a CoP) *n*=44
Pre- Intervention Survey	Sent September 2021	N/A	N/A
Post-Intervention Survey	N/A	February 2022	February 2022
Observations	N/A	N/A	December 2021 and January 2022
Interviews	N/A	N/A	February 2022

The research study is a quasi-experimental, convergent MMAR design. In a quasi-experimental research design, the treatment and control groups are comprised of participants who choose to participate or abstain from the treatment. All users licensed in the first six months of 2021 were invited to complete the pre-intervention survey for this study. These individuals have been labeled study participants for this study. The post-intervention treatment group consisted of CoP participants. The control group was a natural control group, composed of individuals of the same pre-intervention study participants who chose not to participate in a CoP.

In total, there were 43 participants in the two treatment groups and 74 in the control group, for a total of 117 study participants. Of the participants, 21 of 117 (18%) completed the pre-intervention survey instrument, and 33 of 117 (28%) completed the

post-intervention survey instrument (see more forthcoming). As the surveys were anonymous, I could not discern which participants had completed both surveys. I conducted a Pearson's chi-square test of the participants who completed the pre-and post-surveys to ensure no statistically significant differences between the groups. See more forthcoming.

Comparison of Study Participants to Broader Trellis Population. Also, important to note is that I did not randomly select my control and treatment groups. Participants' self-selection into treatment and control groups posed a risk of creating groups that were not reflective of each other or the broader population of Trellis users from which either group came. This is called selection bias in research terms, which can occur when participants are not randomized enough to represent a broader population (Denzin, 1973). As illustrated in Table 1, I evaluated the risk of selection bias by performing a series of Pearson's chi-square tests to compare my control and treatment groups and the overall population of licensed Trellis users. I weighed the independent variable of group participation against the dependent variables, using them as covariates, like age, job function, and gender. In doing so, I assessed the dependent variables' conditional independence to evaluate the randomness of the population (Steiner et al., 2010).

I suspected that the relatively small number of study participants in both the control and treatment groups might significantly differ in the chi-square test results when weighted against the larger population of licensed Trellis users. While chi-square statistics represent relationships between variables, population size can influence the results (Kearney, 2017; Steiner et al., 2010). To evaluate the potential magnitude of the

differences in a disproportionate population, I also conducted Cramér's *V* coefficient analyses (Kearney, 2017). The Cramér's V coefficient is helpful to gain a better understanding of the significance of the differences where they may exist as it measures the strength of association between nominal variables (Kearney, 2017). Illustrated in Table 1 are the Chi-Square results comparing all study participants (*n* 117) to all licensed Trellis users (*n1088).*

Table 1

Pearson's Chi-Square Analyses- Pre-Intervention Study Participants to All Licensed Users

	Study Participants		All licensed Trellis users (*excluding participants*)		Total
	n	%	*n*	%	*n*
Job Function					
Academic Advisor/ing	10	8%	176	18%	186
Administration (College)	11	9%	140	14%	151
Administration (Other)	60	52%	176	18%	237
Event Planning	<5	<5	5	1%	5
Marketing	<5	<5	9	1%	9
Student Services	31	27%	279	29%	310
Other	5	4%	186	19%	190
Total	117		971		1088
Pearson chi-square statistics		χ^2 (7, *n* =1,088) =84.72, *p* =<.001, *V*=≤.01			
Aged					
20-29 Years	58	49%	472	49%	530
30-39 Years	37	32%	230	24%	267
40-49 Years	12	10%	139	14%	151
50-59 Years	8	7%	91	9%	99
60-69 Years	2	2%	39	4%	41

Total	117		971		1088
Pearson chi-square statistics			χ^2 (5, n =1,088) =6.18, p =.280, V=.28		
Gender					
Female	93	79%	702	72%	795
Male	23	20%	261	27%	284
Other/Prefer not to say	<5	<5	8	1%	9
Total	117		971		1088
Pearson chi-square statistics			χ^2 (3, n =1,088) =12.09, p =.007, V=≤.01		

$p \leq .05$

As Table 1 illustrates, compared to the broader licensed Trellis population, participants in the study skewed most significantly to individuals serving in a non-academic administrative job function. At the same time, there was alignment between age and gender. The Pearson's chi-square results indicate significant differences in two dependent variables, specifically gender and job function. But while these differences proved statistically significant at the $p \leq .05$ level, gender ($\chi 2$ (3, n =1,088) =12.09, p =.007, V =≤.01) and job function ($\chi 2$ (7, n =1,088) =84.72, p =<.001, V =≤.01), I do not consider these differences to have practical significance as both effect sizes were well under a level of V<0.20. The low V coefficient levels indicate that while there are significant and observable differences in the two groups, the magnitude at which the differences seemingly occurred renders them inconsequential (Kearney, 2017). Finally, the third participant characteristic, age, was not statistically significant at the $p \leq .05$ level ($\chi 2$ (5, n =1,088) =6.17, p =.280, V =.28).

Therefore, when combined, these comparative tests indicate that my participant group does represent the broader licensed Trellis user community for all practical purposes. While there were some significant differences in the groups, the

Cramér's *V* coefficient analyses in conjunction with the *p* levels on age indicate that the participant group can represent the broader Trellis community, especially to evaluate the efficacy of the intervention.

Notwithstanding, it is still important to acknowledge that selection bias may still be present. A few potential factors may have influenced a participant's decision to participate in a Trellis CoP. First, the Trellis team takes a specific approach to recruit and selecting adoption groups. The timeframe during which I conducted my research aligned with a university-level focus on bringing more administrative units into using the Trellis tools; thus, the skewed numbers of participants by job function were observed in the data (see Table 1). Additionally, while the broader licensed Trellis community includes student workers and community volunteers, I did not target these groups for the intervention as their technology usage is typically minimal and sporadic. Finally, early technology adopters tend to be more curious, willing to take on risks, and have an innate desire for technology mastery (Lee et al., 2003). Therefore, logically, those invested in learning new technologies would also be the first to join user communities to achieve proficiency. One could argue that these groups should not necessarily be the target audience for a CoP.

However, the advantage to recruiting early adopters into CoPs is the benefit of starting with embedded knowledge and expertise to help support the less technologically proficient, thus helping to close the adoption gap (Lee & Eastwood, 2003; Rogers, 2003). Therefore, there may be a moderate level of selection bias in the study, yet, again, the lack of magnitude in significance supports that the differences are negligible. The observed bias may have improved the quality of the CoPs for all participants. Having the

CoPs start with a higher population of early adopters can accelerate the learning for all CoP participants early. The quality of knowledge available early on can help users experience value from the communities right away. In future iterations of my intervention, however, I do want to explore the possibility of small-scale CoPs for more niche groups of users.

Comparison of Treatment and Control Groups. As Director of Implementation Services, part of my role is to target strategic areas for onboarding into Trellis capabilities. In 2021 the Trellis team predominantly focused on bringing administrative and student service units (e.g., Registrar, Financial Aid, Tutoring Services). The process of introducing a group to a Trellis capability is called onboarding. At the end of the onboarding process, I spoke with groups about joining or forming a CoP for support. Recall that CoPs should be self-governing entities where individuals come together over a desire to create shared knowledge (Wenger, 1998) as such, assigning users to treatment and control groups felt antithetical to the purpose of my intervention. Therefore, I selected a specific timeframe from which to pull the study participants (2021) and identified the control and treatment groups according to participation in the intervention.

As is illustrated in Table 2, the treatment group contained 44 users, and the control group included 77. Like the findings in Table 1, the treatment group skewed toward younger users, 17 out of 44 (39%), who were predominantly female, 33 out of 44 (75%), and who were in non-academic administrative positions, 20 out of 44 (45%) as their primary job functions. Given the focus on onboarding student service units into Trellis, I was surprised to discover that the treatment group had substantively lower participants from student services, 8 out of 44 (18%) versus the control group, 23 out of

73 (32%). Interestingly, 8 of 44 (18%) users were between 40 and 49, which is a substantively high percentage relative to the ratios in the control group and the overall study. As is evident in the comparisons below, I was pleased to see that the treatment group did not substantively differ from the control in most categories.

Table 2

Comparison of Control and Treatment Groups with Pearson's Chi-Square

	Control		Treatment		Total
	n	%	n	%	n
Job Function					
Academic Advisor/ing	6	8%	4	9%	10
Administration (College)	4	5%	7	16%	11
Administration (Other)	40	55%	20	45%	60
Student Services	23	32%	8	18%	31
Other	<5	<5	5	11%	5
Total	73		44		117
Pearson chi-square statistics			χ^2 (7, n =117) =13.80, p =.008, V =<.01		
Aged					
20-29 Years	41	56%	17	39%	58
30-39 Years	23	32%	14	32%	37
40-49 Years	4	5%	8	18%	12
50-59 Years	5	7%	3	7%	8
60-69	<5	<5	<5	<5	2
Total	73		44		117
Pearson chi-square statistics			χ^2 (5, n =117) =9.33, p =.053, V =.05		
Gender					
Female	60	82%	33	75%	93
Male	13	18%	11	25%	23
Total	73		44		117
Pearson chi-square statistics			χ2 (3, n=117) =9.33, p =.053, V =0.33		

$p \leq .05$

To compare the treatment and control groups, I again employed a combination of Pearson's chi-square tests and Cramér's *V* coefficients to compare my control and treatment groups. Two of the three characteristics were not statistically significant at the $p \leq 0.05$ level between groups; that is, by age ($\chi 2$ (4, n =117) =9.33, p= .053, V =.05) and gender ($\chi 2$ (2, n =117) =2.17, p =.053, V =0.33). While two out of three characteristics were not significantly different, though, the groups did significantly differ by job function ($\chi 2$ (4, n =117) =13.80, P =.008, V =<.01). But again, the weak magnitude of the effect size (V =<.01) indicated that job function differences between the two groups were similar at a practical level (Kearney, 2017).

Next, I describe each method I used for data collection and analysis, organized by the techniques I used to answer my three research questions. These methods included a pre-and post-intervention survey, a set of observations, and post-intervention interviews. A timeline for all methodological activities is available in Appendix B. These results mean, especially in my study, that even though my research design did not allow for an entirely random sample, these statistics indicate that the treatment and control groups were statistically similar in two out of three categories and practically similar in terms of age. Regardless, I still acknowledge that self-selection may still limit my study. However, I believe the statistical analyses I conducted sufficiently support that the differences I observed (see my Results forthcoming) between my control and treatment groups were likely not random based on these data. See more forthcoming discussions on additional threats and my attempts at mitigation to internal validity in my study.

Data Collection – Surveys

Purpose. I used two survey instruments (i.e., a pre-and post-survey tool) to understand the effectiveness of CoPs on participants' technology adoption and diffusion. This data collection effort supported the assessment of my three research questions, again, as focused on users' perceptions of technologies' ease of use (i.e., PEU), usefulness (i.e., PU), and value (PV). Via both survey instruments, I asked both the treatment and control groups to reflect on their experiences onboarding and using Trellis technologies and their opinions on the efficacy of PDTAM support post-intervention. I used the pre- and post-survey instruments to examine how participation in a CoP impacted users' perception, from pre- to post-survey observation.

Survey Instruments. I aligned both my pre-and post-intervention surveys with my research questions and theoretical framework to measure four diffusion constructs: (1) Communication Channels, (2) Innovation, (3) Social Systems, and (4) Time, which I also mapped onto three user constructs of user impact: (1) PEU (2) PU, and (3) PV. The pre-intervention survey included 18 questions ranked on a 5-point Likert-type scale (i.e., ranging from "Strongly Agree" to "Strongly Disagree") and five open-ended questions (see pre-intervention survey instrument in Appendix D). Whereas 23 of the questions directly mapped onto diffusion constructs, I included four additional questions on the survey to collect comparative information about study participants. Specifically, these questions included age (organized by decade), gender with which they most identified, how many years of employment at the university, and their primary functions within the university.

The post-intervention survey consisted of the same questions as the pre-intervention survey; however, I modified the last section regarding CoPs to ask participants to evaluate the efficacy of their participation in a CoP (see post-intervention survey instrument in Appendix F). I also developed what I am calling a Survey Alignment Crosswalk, illustrating the relationships between survey questions from both tools and my research questions, diffusion constructs, and user constructs of use impact in Appendix G.

Before the official administration of the pre-intervention survey instrument, I piloted the tool to identify questions that did not make sense to study participants, identify issues that may have led to biased answers, etc. I asked three current Trellis technology users to pilot the survey instrument and then provide feedback during a 15-minute Zoom interview, one interview per individual, consisting of questions about confusing language or items, unclear terminology, etc. These sessions only resulted in minor changes to the language in the survey, as all three individuals found that the surveys were straightforward to complete.

Survey Administration. I sent an email (Appendix C) and the pre-survey instrument to all active Trellis users onboarded into a Trellis capability during the first six months of 2021 (n =117). I distributed the survey using Qualtrics software (Smith et al., 2002). Recall that users were allowed to opt into the treatment groups as part of my initial recruitment processes. Notwithstanding, at the end of the research cycle, in early spring 2021, I sent an additional email (Appendix E) and the post-intervention survey instrument (Appendix F) to the same group of users regardless of whether they had participated in a CoP. Users who did not participate in a CoP (control) did not fill out

section six (i.e., Peer Networks for Support) on the post-intervention survey instrument. Those questions were for members of the treatment groups. Participants had one week to participate in both surveys, and I sent one reminder email two days before I closed each study.

Data Collection – Observations

Purpose. I observed four CoP monthly meetings facilitated by ambassadors. Accurately measuring normative behavior through a survey instrument can be difficult. Individuals may respond to the survey questions from the lens of their perceived identity instead of reflecting on their actual behaviors (Brenner & DeLamater, 2016). Through observations, I endeavored to capture the participants engaging within their contexts. The observation sessions allowed me to observe participants' non-verbal communications and user interactions and witness firsthand how users interacted with the Trellis technologies (Kawulich, 2005; Turnock & Gibson, 2001).

However, within my role as both practitioner and researcher, and given this is an action research study in which I, as practitioner and researcher, played a central role, I did not observe my intervention's events and happenings from a detached perspective. Invariably, during these observations' participants solicited responses about Trellis's capabilities, best practices, and the like; thus, I conducted overt participation observations. Participants were aware of my comments, and I, as the researcher, did occasionally participate in some activities (McLeod, 2015). To facilitate consistent data collection, I also used an observation protocol developed in alignment with the key concepts and intervention activities of interest in this study.

Observation Protocol. I developed an observational protocol for each session (see Appendix I). I used this instrument to ensure that I consistently (i.e., reliably) documented reflections across all sessions and observed behaviors that aligned with my research questions and theoretical framework. I included an Alignment Crosswalk (see Appendix J) illustrating the relationships between the behaviors I watched and my research questions, diffusion constructs, and user impact.

I conducted a beta test during a Trellis demo session (i.e., mimicking the control group) and a CoP meeting to validate the observation protocol. I documented the participants' interactions and my observational notes using the protocol framework during each session. I wanted to verify that the protocol was an effective tool for capturing participant interactions. The data I caught was sufficiently robust to provide insight into my research questions as evaluated via the protocol. In doing so, I also found I needed to adjust my approach and make notes of observational behaviors instead of fully capturing each interaction's details.

Observation Administration. After administering the pre-intervention survey, I began conducting formal observations in late fall 2021. I completed all observations before issuing the post-intervention survey instrument. I observed four CoP meetings which were components of my intervention. Again, the ambassador set the agenda and facilitated discussions throughout each session. The purpose of the meeting observation was to evaluate the efficacy of the CoP participants in the transfer, creation, and documentation of shared knowledge within each CoP which, again, were reflective of the diffusion of innovation concepts of a social system and communication channels. To ensure a consistent baseline in my comparisons, I chose sessions based on similarities in

the meeting topics (Kawulich, 2005). After I identified the specific meetings, I wanted to observe, I emailed the ambassadors to inform them of my intent to formally attend their sessions (see email request in Appendix H). Because of the Coronavirus pandemic, I conducted and recorded all observations via Zoom video conferencing technology.

Data Collection – Interviews

Purpose. To supplement the findings from the surveys, the open-ended questions on the pre-and post-intervention surveys, and the results from my observations, I used an additional qualitative data source by conducting a set of post-intervention interviews. Interviews provide a lens into an individual's experiences within their contexts as per their perspectives (Kvale & Brinkmann, 2015; Cohen, 2006). More importantly, an interview provides a platform for both the interviewer and interviewee to create a shared approach to knowledge creation. This approach also allows the interviewer and interviewee to think more deeply about their experiences collectively, and for this particular study, in a CoP (Nielsen & Lyhne, 2016).

I interviewed five Trellis ambassadors. In the interviews, I asked ambassadors to reflect on the value of a general CoP to their work and, more specifically, the extent to which their CoPs aided their adoption of Trellis capabilities. I used a semi-structured interview approach, which involved a formal interview informed by the interview protocol; however, I encouraged interviewees to follow or pursue trajectories beyond the guide whenever deviations were needed (Brinkmann & Kvale, 2015; Cohen, 2006).

Interview Instrument. I composed a list of interview questions for my interview protocol, aligned with my research questions, theoretical framework, and best interview practices written by Brinkmann and Kvale (2015) and Cohen (2006). The interview

protocol included eight questions related to the constructs primarily covered in my user surveys. I aligned my interview questions to my survey instruments' constructs to help increase both instruments' validity (Adams, 2015, Galleta, 2013). The more the interview questions followed a specific, measurable framework, the more likely I could collect internally consistent and comparable data (Adams, 2015; Galleta & Cross, 2013). Using this interview protocol also allowed me to be prepared ahead of time and ask constant questions across interviews. See my interview protocol in Appendix L and see yet another Alignment Crosswalk illustrating the relationships between the documented interview responses of the participants, my research questions, diffusion constructs, and user constructs of use impact in Appendix M.

It is also important to note that a semi-structured interview guide is not a static document; instead, I used it as a framework that evolved given participants' responses (Adams, 2015, Galleta & Cross, 2013). Notwithstanding, I piloted the interview questions with two current users (Gilbert & Prion, 2016). The participants discussed the interview questions to evaluate the instrument's verbiage, whether the data I intended to capture matched the proposed constructs, and the like (Mikuska, 2016). Again, I used the pilot results to refine the interview questions before scheduling official interviews and officially collecting interview data.

Interview Administration. After the post-intervention survey and the interview protocol refinements, I scheduled participants for one-on-one interviews. I sent an email invitation to five CoP ambassadors soliciting their interest in participating in short follow-up interviews regarding their experiences participating in a CoP (see email request in Appendix N). Turner (2010) discusses the importance of selecting interview

participants who can provide the most credible information to the study. I chose to interview ambassadors because they represent our early adopters and the strongest advocates for the intervention.

Additionally, they provided a diverse view on the value of the communities and Trellis's benefit to their work. I conducted and recorded each interview via Zoom. It was crucial to record the interview sessions because the semi-structured interview approach allowed for a more organic conversation that occasionally strayed from the interview instrument. Likewise, it was challenging to capture everything in written notes (Cohen, 2006). Table 3 illustrates the interviews and associated content.

Table 3

Interviewees, interview duration, and volume of output

Participant	Duration	Pages in Transcript
Interview 1: Registrar Ambassador	23 minutes	3 pages
Interview 2: Advising Ambassador #1	32 minutes	4 pages
Interview 3: Advising Ambassador #2	27 minutes	3 pages
Interview 4: Law Ambassador	37 minutes	4 pages
Interview 5: Student Services Ambassador	22 minutes	3 pages

Again, given I used a Convergent Parallel MMAR design, I compared the quantitative and qualitative data to interpret and report the results (Creswell & Plano-Clark, 2011). I used the quantitative data to compare the control and treatment groups in my findings. I used the qualitative data from the survey, interviews, and observations to provide context and depth to the results of my survey analyses. I increased the study's rigor by using triangulation methods to test the validity of each of the inferences' I drew

from within my results (Leech & Onwuegbuzie, 2007). Before moving into the results, I will explain how I analyzed the collected data.

Survey Data Analyses -Quantitative

I conducted the survey analysis by comparing the treatment and control group (post-intervention survey) results to the study participants who completed the pre-intervention survey and then comparing the treatment and control groups in the post-intervention survey. While I sent both surveys to a specific population (Trellis users licensed in 2021), I cannot verify if the same participants completed both surveys. To ensure the survey results were statistically significant for my study, Table 4 demonstrates the results of the Pearson Chi-square analysis conducted on the pre-and post-survey respondents. See more forthcoming.

Table 4

Pearson's Chi-Square Analyses- Pre-intervention study participants to post-intervention control and treatment groups combined

	Pre-intervention Survey (*all participants*)		Post-intervention Survey (*control and treatment combined*)		Total
	n	%	*n*	%	*n*
Job Function					
Academic Advisor/ing	6	30%	12	36%	18
Administration (College)	2	10%	2	6%	4
Administration (Other)	4	20%	8	24%	12
Event Planning	2	10%	4	12%	6
Marketing	2	10%	1	<5	3
Student Services	<5	<5	1	<5	2
	<5	<5	<5	<5	3
Other	<5	<5	4	12%	5
Total	20		33		53

Pearson chi-square statistics			χ^2 (7, n =53) =3.49, p =.837, V =.26		
Aged					
20-29 Years	3	15%	5	15%	8
30-39 Years	9	45%	11	33%	20
40-49 Years	7	35%	12	36%	19
50-59 Years	<5	<5	5	15%	6
Total	20		33		53
Pearson chi-square statistics			χ^2 (3, n =53) =1.59, p =.662, V=.17		
Gender					
Female	9	45%	25	76%	34
Male	10	50%	6	18%	16
Other/Prefer not to say	<5	<5	<5	<5	3
Total	20		33		53
Pearson chi-square statistics			χ^2 (3, n = 53) =6.04, p =.049, V=.34		

$p \leq .05$

As before, to compare the pre-and post-intervention survey participants. I again employed a combination of Pearson's chi-square tests and Cramér's *V* coefficients to compare the two groups. Two of the three characteristics were not statistically significantly different at the $p \leq 0.05$ level between groups; that is, by age (χ2 (3, n =53) =1.59, p =.662, V=.17) and job function (χ2 (7, n =53) =3.49, p =.837, V =.26). While two out of three characteristics were not significantly different, the groups differed significantly by gender (χ2 (3, n = 53) =6.04, p =.049, V=.34). In both the pre-and post-intervention survey, the participants predominantly came from the academic advising community. The results make sense as advisors represent the largest population of Trellis users. Participants in the pre-and post-intervention surveys were split equally between 30 to 39 and 40 to 49. As previously mentioned, the groups did differ significantly in the

category of gender, with the post-intervention participants heavily leaning toward female (75%) over the more evenly female/male split 45%/50%) in the pre-intervention survey. While the small *n's* of both groups likely influenced the results, I still feel confident in stating that the differences I observed (see my Results forthcoming) between the two groups were likely not random based on these data. Next, I evaluated the internal reliability of the survey questions and constructs.

As evidenced in Table 5, the survey questions' internal reliability was evaluated using Cronbach's alpha to measure the correlations within (i.e., by construct) and across survey items (i.e., overall) (Goforth, 2015). Internal consistency is essential for a survey instrument because it indicates that the questions included effectively measure the constructs included as intended (Salkind, 2015; Takavol et al., 2011). More specifically, Cronbach's Alpha (α) measures the reliability or internal consistency of a set of test items within a specified group (Salkind & Frey, 2020). The scale of Cronbach's alpha coefficient ranges from 0 to 1, and the closer the coefficient is to 1, the less likely there is error variance in the survey instrument (Salkind, 2015, Tavakol et al., 2011). It is important to note that alpha is affected by the length of the survey, though, so a very high or low score may also indicate that a survey instrument's size needs to be adjusted rather than the questions themselves (Salkind, 2015; Tavakol et al., 2011). Illustrated in Table 5 are the results of a Cronbach's alpha test organized by construct and an overall score.

Table 5

Reliability of Survey Instrument Constructs

Construct	α of Pre-Survey	α of Post-Survey	*n* of items pre/post
Perceptions of Trellis	0.93	0.91	4/4
Support and Usage	0.96	0.88	4/4

Usefulness	0.92	0.88	3/3
Ease of Use	0.92	0.86	4/4
Value	0.92	0.95	3/3
Communities	n/a	0.95	0[a]/3
All Survey Items	0.93	0.98	20/23

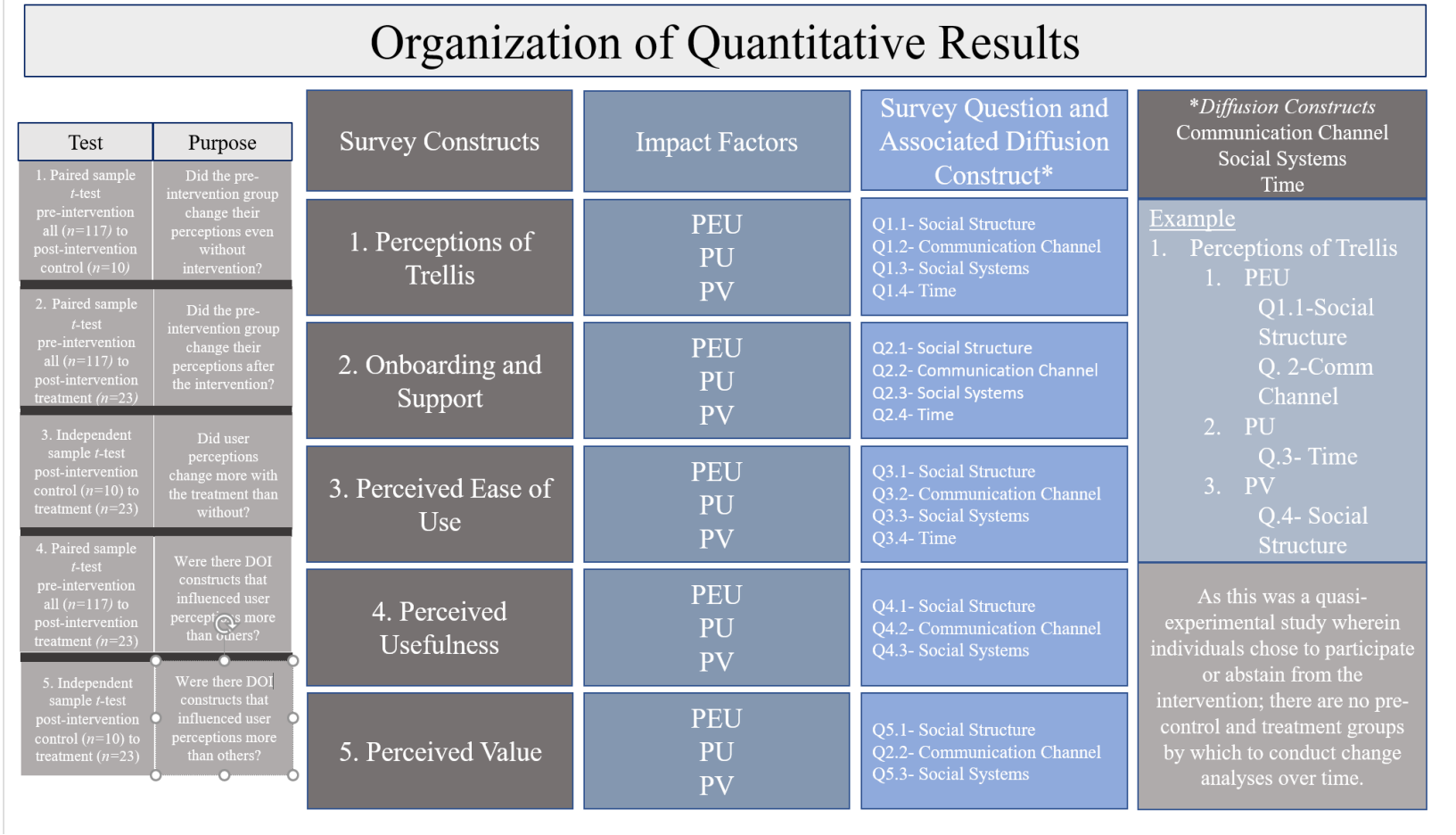
[a] The pre-intervention survey did not have the *Communities of Practice* construct.

Table 5 indicates consistently high reliability across six total constructs. All five constructs on the pre-intervention survey instrument yielded an α =.92 or higher. The moderate difference in scores may be attributable to differences in survey responses, 21 of 117 (18%) in the pre and 33 of 117 (28%) in the post-instruments. Both the pre-survey and post-survey alpha also had very high levels of internal reliability overall (α =.93; α =.98, respectively). The alpha analyses subsequently demonstrated that the data that I collected from both surveys were sufficiently reliable to address my research questions.

I conducted analyses using IBM SPSS Statistics Software (IBM, n.d.) to, again, evaluate the impact of the Trellis CoPs on users' perceptions of technology (PEU, PU, and PV) as they aligned to the survey constructs of "Perception of Trellis," "Support and Usage," "Usefulness," "Ease of Use," "Value," and "Communities" (Eliopolous et al., 2004; Stuart & Rubin, 2007). To accomplish this, I imported the survey data into SPSS to calculate and display descriptive statistics and conduct a series of paired-samples *t-tests* and independent samples *t-tests*. Figure 3 illustrates the processes used to evaluate the survey data and organize the findings

Figure 3

Model of Quantitative Survey Analyses



As illustrated in Figure 3, first, I used paired-samples *t-tests* to evaluate how each group of participants (i.e., pre-intervention all to post-intervention control and pre-intervention all to post-intervention treatment) changed from before and after the intervention (Mertler, 2017). Next, I conducted a series of independent sample *t-tests* between the treatment and control groups in the post-intervention survey to demonstrate the extent to which differences existed between each group's responses (Mertler, 2017). In addition to the *t*-test analyses, I ran a series of Cohen's *d* analyses to standardize the difference between the study participants and treatment group and the control group and the treatment group (Mertler & Reinhart, 2017). Where statistical significance (*p)* demonstrates that a statistically significant effect is present, practical significance indicates (*d*) that the result is substantive enough to be meaningful (Mertler & Reinhart, 2017).

The p-value in any statistical significance analysis, like the *t*-tests, can be substantially impacted by sample size, particularly in small studies. Hence, commonly used alongside measures of statistical significance are measures of practical significance like Cohen's *d*, which is the most used test of practical significance that yields an indicator of an effect's practical versus statistical magnitude (Mertler & Reinhart, 2017). Therefore, I used both alongside one another. However, essential to note is that I also classified Cohen's *d* using the following scale, whereby $d=0.2$ is considered a "small effect size, $d=0.5$ represents a "medium" effect size, and $d=0.80$ equals a "large" effect size.

I also organized the results of the first three tests (paired-sample and independent-sample *t*-tests) using my three user impact values of PEU, PU, and PV to understand

better how the dependent variables interacted and influenced the user impact values (Frost, 2017; Mertler & Reinhart, 2017, Salkind & Frey, 2019). Finally, I organized the paired-sample *t*-test between the study participants (n =117) and the treatment group (n =23), and the independent sample *t*-test by the DOI constructs (communication channels, social system, and time) to evaluate which, if any, construct may have more substantively influenced user perceptions.

Interview and Survey Data Analysis Qualitative

I used a grounded theory approach for initial coding (Saldaña, 2016). Initial coding is ideally suited to a grounded theory approach as it provides an accessible entry point for engaging in further analysis (Saldaña, 2016). For the interviews, I started with Zoom software-generated transcripts. I listened to the audio while reviewing and editing the transcripts to represent the sessions accurately. In doing so, I became more familiar with the material and began to sense high-level themes from within the discussions. I noted my observations in my research journal as I reviewed the material to provide further contextualize my triangulation work (Saldaña, 2016). I uploaded the final transcripts into HyperRESEARH (http://www.researchware.com/) and all the qualitative survey answers for coding and analysis.

In the initial coding, I began with descriptive coding, composing topics by evaluating similarities in language and participants' expressed ideas (Saldaña, 2016). Descriptive coding is the first cycle approach to coding that involves reading through the qualitative passages and identifying topics (Saldaña, 2016, Corbin & Strauss, 2008). In descriptive coding, the researcher identifies topics but does not attempt to derive further meaning from the data (Saldaña, 2016, Corbin & Strauss, 2008). Accordingly, while

coding, I remained conscious of any potential biases that I might possess about the research participants, my local context, my own lived experiences, and the like to avoid organizing the data based on preconceptions instead of my participants' answers (Charmaz, 2014). For a complete list of survey and interview codes, see Appendix O and Appendix P. To develop further the emerging codes, I constructed during the first coding round, I chose Axial coding for the second round.

The process of Axial coding identifies and charts relationships between emerging codes (Corbin & Strauss, 2008). The benefit of using Axial coding is that it can organize the data into a coherent structure. The process makes identifying relationships easier and aligning them to an existing framework (Wicks, 2009). In my case, Axial coding helped to align my survey, observation, and interview crosswalks to my four diffusion constructs and three constructs of user impact. By identifying linkages in the codes, I was ultimately able to derive higher-level topics and code participant passages accordingly.

Observation Data Analysis

I conducted my observation data analyses by first starting with the Zoom software-generated transcript from each observation session. I listened to the audio while reviewing and editing the transcripts to represent the sessions accurately. I then used the session transcripts to complete one observation protocol for each observation session. I then compiled the results from each observation log into a central table for analysis organized by observation session and the seven themes pre-written and organized into the observation log, in terms of participants': (1) discussion of the technology in the context of their work, (2) sharing of ideas or best practices, (3) demonstrations or discussions of connectedness, (4) talk about the technology capability's PEU, PU, or PV, (5) discussions

on being or becoming proficient in the technology, (6) specific comments on the technology, whether positive or negative and (7) User-to-user support.

Triangulation

In the final analysis stage for my action research study, I triangulated the qualitative and quantitative data to understand better all the findings' dimensions and how they converged and diverged. Carvalho and White (1997) propose four reasons for triangulating data from multiple sources: (1) *Enriching:* The outputs of different informal and formal instruments add value to each other by explaining different aspects of an issue; (2) *Refuting:* Where one set of options disproves a hypothesis generated by another set of options; (3) *Confirming:* Where one set of options confirms a hypothesis generated by another set of options; and (4) *Explaining:* Where one set of options sheds light on unexpected findings derived from another set of options.

Accordingly, following the reasons provided by Carvalho and White (1997), triangulation of the multiple data sources was essential as it highlighted intended and unintended outcomes, with the latter being, perhaps, more informative (Fisher & Howell, 2004). Despite using crosswalks to correlate the data, I also took an exploratory approach in triangulating my data. By coupling multiple data sources, I made discoveries that helped enrich and explain this study's results and opened my eyes to opportunities for further research.

RESULTS

Next, I present the key results of my quantitative data analyses from my pre-and post-intervention survey instruments. Then, I offer my findings from my qualitative analyses, namely my observation and interview data, again organized by constructs. I bring the quantitative and qualitative results together for triangulation and reassociation with my research questions. I framed the results using first-person narrative to highlight that I, as the researcher, invariably brought my lived experiences to these analyses. Integrating my lived experiences into the study results is essential because in my role within Trellis and as a researcher, I provide a depth of context to my analytical analyses.

Quantitative Survey Results

Recall from Figure 3 that I first conducted a paired *t*-test analysis comparing all pre-intervention study participants' survey results to the post-intervention control group's survey results. Then, I ran the same paired *t*-test analysis comparing all pre-intervention study participants to the post-intervention survey treatment groups' results. Finally, I conducted independent *t*-test analyses between the post-intervention control and treatment groups' survey results. To align my findings with my research questions more clearly, I also organized the discussion of statistically and practically significant results for each survey construct in five sections that aligned to the critical factors of this study's TAM theoretical framework: PEU, PU, and PV (recall Figure 1). Note, for these analyses, hereafter; I refer to the pre-survey study participants as "study participants" and the post-survey control and treatment groups as "control group" and "treatment group" participants, respectively.

In Table 6, I illustrate the changes in overall perceptions of the Trellis technologies between the study participants (*n =117*) and control group participants (*n* =10) and the study participants (*n =117*) and treatment group participants (*n* =23). Note that for all survey items, I used a Likert Scale of 1 to 6, with one being "Strongly Agree" and six being "Strongly Disagree." Given all questions were formatted with "Strongly Agree" =1 as the most desirable answer, reductions in mean changes over time indicate improvements and vice versa.

Table 6

Perceptions of Trellis in Pre- and Post-Intervention Survey Results Compared via Paired-Samples t-tests

	Study Participants (n =117) to Control Group (n =10)					Study Participants (n =117) to Treatment Group (n =23)				
	Mean Change	SD	*t*	*p*	*d*	Mean Change	SD	*t*	*p*	*d*
PEU										
Time (Q1.1) *I feel comfortable using Trellis capabilities*	0.56	1.54	1.60	*0.060	1.54	0.00	0.82	-0.00	0.500	0.82
PU										
Social System (Q1.4) *I have had positive experiences using Trellis*	0.10	1.83	-0.24	0.405	1.83	-0.50	1.59	-1.00	0.172	1.58
PV										
Communication Channels (Q1.2) *I feel knowledgeable about what services are available through Trellis*	0.15	1.39	0.48	0.317	1.39	-0.80	1.03	-2.45	*0.020	1.03
Social System (Q1.3) *I feel supported in my usage of Trellis capabilities*	0.35	1.53	1.02	0.160	1.53	-0.30	1.06	-0.90	0.197	1.06

Note. Scale: Strongly Agree=1, Agree=2, Somewhat Agree=3, Somewhat Disagree=4, Disagree=5, Strongly Disagree=6
*$p \leq 0.10$

Results illustrated in Table 6 indicate that the control group, compared to the study participants, reported increased dissatisfaction with Trellis from the pre- to post-survey occasions, as evidenced by the scores across all four survey items. Conversely, the treatment group reportedly experienced improvements (i.e., illustrated as negative mean changes) in their perceptions of Trellis capabilities in three of four survey items compared to all the study participants. Next, I discuss the results illustrated in Table 6 by the critical factors written into my TAM framework: PEU, PU, and PV.

PEU. The PEU responses were the most significant for the study participants versus the control group, namely in terms of the control group's relatively large observed mean change score (0.56) on the first survey item (Q1.1: "I feel comfortable using Trellis capabilities"). Noted in Table 6 above is also that I used a $p \leq 0.10$ level to assess statistical significance, given it is not uncommon to use a *p-value* of $p \leq 0.10$ (versus a more standard $p \leq 0.05$) for studies with smaller *n*'s. In doing so, necessary to note is also that this means a change was statistically significant ($p \leq 0.10$) as well as practically significant ($d=1.54$). These results are important as they signify that the standard Trellis support resources (i.e., sans a CoP, which was the treatment in this study) may not be helping general users (i.e., study and control group participants) feel comfortable using Trellis tools.

Regarding the PEU responses for the study participants versus treatment group participants, it is essential to call attention to the lack of change (mean change=0.00) from study participants to the treatment group participants on the same item (Q1.1: "I feel comfortable using Trellis capabilities"). Here, the CoPs did not move the needle on helping treatment group users feel more at ease in using Trellis capabilities. While these

results are not ideal, they are also not surprising considering the relative newness of the CoPs for user support. This response also speaks to time, whereas it may be that not enough time has yet passed to translate into the findings I hypothesized.

PU. Regarding PU, the control group had the least amount of change (mean change=0.10) on the survey item Q1.4: "I have had positive experiences using Trellis." While this same item was not statistically significant ($p \geq 0.10$), it yielded the most apparent effect size observed (d=1.83). Again, a Cohen's d value is a measurement of a practical effect, and when d exceeds 0.80 (i.e., $d \geq 0.80$), it is considered a large, practically significant effect. This result is important because it suggests that while the control group had positive experiences compared to study participants, in general, and with a large effect, they still did not feel comfortable with the tools.

Conversely, treatment group participants on this same survey item yielded the second-highest improvement in perceptions than study participants (mean change =-0.50). Also, with a large Cohen's d score (d =1.58), treatment group responses to this question were practically important while not statistically significant. Moreover, this demonstrates that the CoPs for this study's treatment group participants were likely fulfilling their purpose, providing a specific environment that allowed this set of Trellis users to have reported relatively more positive experiences when using the Trellis capabilities.

PV. The control group's scores in PV are interesting. I observed two increases in dissatisfaction regarding feeling knowledgeable about what services are available through Trellis (mean change =0.15) and feeling supported in participants' reported usages of Trellis capabilities (mean change =0.35). While neither score was statistically significant

($p \geq 0.10$), again, both scores yielded relatively large Cohen's *d* scores ($d = 1.39$, $d = 1.53$, respectively). This means that control group participants, in comparison to all study participants, did not reportedly feel as connected to Trellis enough to feel relatively knowledgeable of or supported in their usage of Trellis.

The mean change scores for the treatment group were more noteworthy (mean change=-0.80, mean change=-0.30, respectively). Of particular interest was Q1.2: "I feel knowledgeable about what services are available through Trellis," as this item was both statistically ($p \geq .10$) and practically significant ($d = 1.03$). This is important because it indicates that treatment group participants reportedly had more access to information about Trellis services than study participants. These scores, in concert with the treatment group's overall scores in PV, indicate that the treatment group participants, again, in comparison to all study participants, reportedly felt more knowledgeable about the tools in Trellis and felt more supported in their usage of Trellis.

Again, one goal of my intervention in this study was to create organic social systems (i.e., CoPs) to provide Trellis users an environment for knowledge creation and an efficient means of diffusion of Trellis information to users. Accordingly, the observed increases in treatment groups' results in this section indicate that the intervention did at least begin to serve its intended purpose.

Next, in Table 7, I illustrate the changes in participants' perceptions of the implementation and usage of Trellis technologies between study participants ($n = 117$) and control group participants ($n = 10$), as well as study participants ($n = 117$) and treatment group participants ($n = 23$). There are no PU values in this table as I used this survey construct only to evaluate users' PEU and PV.

Table 7

Perceptions of Implementation and Usage Experience in Pre- and Post-Survey Results Compared via Paired-Samples t-tests

	Study Participants (n =117) to Control Group (n =10)					Study Participants (n =117) to Treatment Group (n =23)				
	Mean Change	SD	*t*	*p*	*d*	Mean Change	SD	*t*	*p*	*d*
PEU										
Time (Q2.1) *Learning to use the Trellis capabilities was easy for me.*	0.25	1.29	0.87	0.200	1.30	-0.60	1.08	-1.77	*0.056	1.08
Social System (Q2.2) *It was easy for me to become skilled in the Trellis capabilities.*	0.95	1.00	4.25	*0.000	1.00	-0.60	0.97	1.96	*0.041	0.97
Communication Channels (Q2.3) *I understand what resources are available to me to support my usage of Trellis capabilities.*	0.35	1.31	1.20	0.120	1.31	-0.90	0.99	-2.86	*0.009	0.99
PV										
Time (Q2.4) *The training provided properly prepared me to use Trellis capabilities.*	0.15	1.31	0.51	0.307	1.31	-1.10	1.37	-2.54	*0.016	1.37

Note. Scale: Strongly Agree=1, Agree=2, Somewhat Agree=3, Somewhat Disagree=4, Disagree=5, Strongly Disagree=6

*$p \leq 0.10$

Consistent with the first construct, results illustrated in Table 7 indicate that the control group, compared to the study participants, reported increased dissatisfaction with Trellis from the pre- to post-survey occasions, as evidenced by the increase in scores across all four survey items. Conversely, the treatment group reportedly experienced improvements (i.e., illustrated as negative mean changes) in their perceptions of Trellis capabilities in all four survey items compared to the study participants. Next, I discuss the results in Table 7 by the critical factors written into my TAM framework: PEU and PV. Again, there are no PU values in this table as the items I included in this survey construct only evaluate PEU and PV.

PEU. The most considerable mean change (0.95) in the control group compared to study participants was on item Q2.2: "It was easy for me to become skilled in the Trellis capabilities." Results for just this item also yielded the only statistically significant ($p \leq 0.10$) results in the PEU category. These results are important because they signify that the control group grew most statistically and practically significantly during this study and compared to the study participants overall ($d = 1.00$) dissatisfied with the resources in place to help them become skilled in the Trellis capabilities.

Inversely, and again, the mean change scores for the treatment group's PEU factors, in comparison to studying participants' perceptions of the same factors, indicate consistent improvement across the board (as indicated by the negative signs in that negative mean changes were desired, as also noted prior). Additionally, all three scores were both statistically ($p \leq 0.10$) and practically significant, yielding large effects ($d \geq 0.80$). This suggests that the treatment group, during this study and compared to studying participants overall, demonstrated increased levels of satisfaction in their access

to support and resources, reportedly increasing their abilities to become skilled in the set of Trellis tools.

The most crucial finding in this set of results was in survey item Q2.3: "I understand what resources are available to me to support my usage of Trellis capabilities." The mean change that I observed (-0.90), again, with a statistically significant value of $p \leq 0.10$ and a practically significant value of d =0.99, means that the treatment group, in comparison to the control group and study participants overall, reportedly experienced a substantive improvement (as indicated by the negative mean change) in their ability to connect into the resources as to feel more supported in the Trellis tools.

This is important because, again, the purpose of the CoP in this study was to create an environment for better diffusion of information and resources of Trellis capabilities for the treatment group. The strengths of these scores and all other scores across the board in terms of treatment versus study participant results indicate positive gains overall. This shows that the treatment group's perception of feeling supported significantly and meaningfully improved given their involvement within a CoP.

PV. Compared to the study participants, the control group experienced a minimal change in the survey item associated with PV (i.e., Q2.4: "The training provided properly prepared me to use Trellis capabilities"). With a mean change of 0.15, it is reasonable to suggest that the control group's feelings, as part of this study and compared to the study participants overall, remained consistent regarding the available training. The p score was $\geq$0.10, so the mean change could not be considered statistically significant. However, Cohen's d =1.31 indicated that it was still practically significant even though the mean

difference was not sizeable. This is important because it suggests, again and for this study, that existing Trellis training may not be sufficient to help participants like those in the control group gain proficiency in the technologies.

Compared to the overall study participants and in contrast to the control group, the treatment group presented the most considerable mean change in PV on this same item (mean change =-1.10). Not surprisingly, they were also statistically ($p = \leq 0.10$) and practically significant ($d = 1.37$). These values indicate that the treatment group, within the context of this study and compared to study participants, experienced a substantial improvement in feeling that the training resources provided via my treatment better prepared them for using the Trellis tools. This finding is also important because the CoP offers a soft-landing spot for Trellis users after their training. The CoPs seemed to have provided an opportunity to deepen the treatment groups' understanding of using the tools through context-based learning.

In Table 8, I illustrate the perceptions of the ease of use of Trellis technologies between the study participants ($n=117$) and control group participants ($n=10$) and the study participants ($n=117$) and treatment group participants ($n=23$). There are no PU values in this table as I used this survey construct only to evaluate users' PEU and PV.

Table 8

Perceptions of Ease of Use in Pre- and Post-Survey Results Compared via Paired-Samples t-tests

	Study Participants (n=117) to Control Group (n=10)					Study Participants (n=117) to Treatment Group (n=23)				
	Mean Change	SD	*t*	*p*	*d*	Mean Change	SD	*t*	*p*	*d*
PEU										
Time (Q3.2) *Trellis capabilities make it easier to do my job.*	-0.30	1.26	-1.06	0.150	1.26	-1.40	1.43	-3.10	*0.006	1.43
Social System (Q3.3) *I find Trellis capabilities easy to use.*	0.20	1.15	0.78	0.223	1.15	-1.00	1.33	-2.37	*0.021	1.15
Communication Channels (Q3.4) *I found it easy to find support when I needed help in Trellis.*	0.25	1.59	0.71	0.245	1.59	-0.60	1.43	-1.33	0.109	1.43
PV										
Time (Q3.1) *Trellis capabilities enable me to accomplish tasks more quickly.*	0.10	1.65	0.27	0.395	1.65	-1.00	1.25	-2.54	*0.016	1.25

Note. Scale: Strongly Agree=1, Agree=2, Somewhat Agree=3, Somewhat Disagree=4, Disagree=5, Strongly Disagree=6
*$p \leq 0.10$

Results illustrated in Table 8 indicate that the control group, compared to the study participants, reported increased dissatisfaction with their PEU of Trellis capabilities from the pre- to post-survey occasions. These results are confirmed in three out of four survey items, evidenced by the collective increase in scores. Conversely, compared to the study participants, the treatment group reportedly experienced substantive improvements (i.e., illustrated as negative mean changes) in their PEU using Trellis capabilities across all four survey items. Next, I discuss the results in Table 8 by the critical factors written into my TAM framework: PEU and PV. Again, there are no PU values in this table as the items I included in this survey construct I only used to evaluate participants' PEU and PV.

PEU. The most notable mean change (-0.30) in the control group compared to study participants was on item Q2.2: "It was easy for me to become skilled in the Trellis capabilities." This item also yielded the only improvement in results in the PEU category among control group participants. While this result is not statistically significant ($p \geq .10$), it does have a Cohen's *d* of 1.26, indicating that it is practically significant. These results are important because they signify that the control group grew more satisfied with Trellis's capabilities in making their job easier during this study compared to study participants overall.

Consistent with the first two constructs, the treatment group experienced directionally positive mean change scores for the treatment group's PEU factors compared to study participants' perceptions of the same factors. These scores indicate consistent improvement across the board (as indicated by the negative signs that negative mean changes were desired, as noted prior). Additionally, two of the three scores were

both statistically ($p \leq 0.10$) and practically significant, yielding large effects ($d \geq 0.80$). These results suggest that the treatment group, during this study and compared to study participants overall, demonstrated increased levels of satisfaction in their perceptions of PEU in using Trellis tools and finding support for their usage.

The most critical finding in the treatment group results was in survey item Q3.3: "Trellis capabilities make it easier to do my job." The observed mean change (-1.40), again, with a statistically significant value of $p \leq 0.10$ and a practically significant value of $d = 1.43$, means that the treatment group, in comparison to the control group and study participants overall, experienced a substantive improvement (as indicated by the negative mean change) in feeling that Trellis capabilities make it easier to do their jobs.

The role of my intervention in this study was to help treatment group participants feel more confident using Trellis technologies. The strengths of these scores and all other scores across the board in terms of treatment group versus study participant results demonstrate positive gains overall. Generally speaking, this indicates that the treatment groups' ability to feel more confident using Trellis capabilities improved meaningfully given their involvement within a CoP.

PV. In comparison to the study participants, the control group, once again, reportedly experienced a minimal change in the survey item associated with PV (i.e., Q3.1: "Trellis capabilities enable me to accomplish tasks more quickly"). With a mean difference of 0.10, it is reasonable to suggest that the control group's feelings, as part of this study and compared to the study participants overall, remained consistent regarding experiencing time savings using Trellis tools. The p score was ≥ 0.10, so the mean change could not be statistically significant. However, a Cohen's $d = 1.65$ indicates that it was

still practically substantial even though the mean difference was not sizeable. This is important because it suggests, again for this study, that in the absence of the CoP, the control group did not feel as though they experienced any efficiencies while using the Trellis capabilities.

However, when compared to the overall study participants and in contrast to the control group, the treatment group presented a mean change of -1.00. On this same survey item, their perceptions were also statistically ($p = \leq 0.10$) and practically significant ($d = 1.25$). These values indicate that the treatment group, within the context of this study and compared to the study participants, experienced a significant improvement in feeling as though the Trellis technologies could help them be more efficient in their roles at work. Again, the significance of all the treatment groups' results suggests that the CoPs seemed to have provided an environment that allowed the treatment group to quickly become more proficient in the technologies, even to the point that the CoPs positively affected their work contexts.

In Table 9, I illustrate the changes in perceptions of the ease of use of Trellis technologies between the study participants ($n = 117$) and control group participants ($n = 10$) and the study participants ($n = 117$) and treatment group participants ($n = 23$). This table has no PEU values as I used this survey construct only to evaluate users' PU and PV. Additionally, this construct had only three survey items.

Table 9

Perceptions of Usefulness in Pre- and Post-Survey Results Compared via Paired-Samples t-tests

	Study Participants (*n*=117) to Control Group (*n*=10)					Study Participants (*n*=117) to Treatment Group (*n*=23)				
	Mean Change	SD	*t*	*p*	*d*	Mean Change	SD	*t*	*p*	*d*
PU										
Time (Q4.1) *I find Trellis capabilities to be helpful in my job.*	-0.15	1.35	0.59	0.312	1.39	-1.20	1.23	-3.09	*0.006	1.23
PV										
Social System (Q4.2) *I understand how Trellis capabilities support our business processes.*	-0.25	1.29	-0.87	0.199	1.29	-1.30	1.06	-3.88	*0.002	1.06
Social System (Q4.3) *I believe Trellis capabilities have led to improved processes.*	-0.15	0.93	0.68	*0.055	0.93	-0.30	1.16	-0.82	0.217	1.16

Note. Scale: Strongly Agree=1, Agree=2, Somewhat Agree=3, Somewhat Disagree=4, Disagree=5, Strongly Disagree=6

*$p \leq 0.10$

Results illustrated in Table 9 indicate that the control group, compared to the study participants, reported increased satisfaction in PU and one survey item in PV from the pre- to post-survey occasions, as evidenced by the decrease in scores across these items. Equally, the treatment group reportedly experienced substantive improvements (i.e., also illustrated as negative mean changes) in their perceptions of Trellis capabilities' usefulness compared to all the study participants across items. Next, I discuss the results in detail, illustrated in Table 9 by two critical factors written into my TAM framework: PU and PV. Again, there are no PEU values in this table, as I used the items I included in this survey construct to evaluate only PU and PV.

PU. The control groups' mean change (-0.15) as compared to study participants on item Q4.1: "It was easy for me to become skilled in the Trellis capabilities" was notable in the group's improvement of sentiment (as evidenced by the negative mean change noted). While this result is not statistically significant ($p \geq .10$), it has a Cohen's *d* of 1.39, indicating practical significance. These results are important because they signify that the control group found it relatively easy to become proficient in Trellis capabilities during this study compared to study participants overall.

Again, the treatment group experienced directionally positive mean change scores in the PU factors compared to study participants' perceptions of the same factor. These scores indicate consistent improvement, particularly given the score is statistically ($p \leq 0.10$) and practically significant, yielding a large effect (d =01.23). This suggests that the treatment group, during this study and compared to study participants overall, increasingly demonstrated improved perceptions of the usefulness of Trellis tools.

PV. Compared to the study participants, both the control and treatment groups experienced improved mean changes in the survey items associated with PV (i.e., Q4.2, Q4.3). More notably, when compared to study participants, the control group noted improved perceptions with a mean change of -0.25 on Q4.2: "I understand how Trellis capabilities support our business processes." While this score is not practically significant ($p \geq .10$), it yielded a Cohen's *d* of 1.29, making it practically significant. The practical significance of this survey item is notable because, despite a nominal mean change, it still suggests that the control group, for this study and in comparison, to the study participants, was able to incorporate Trellis capabilities into their business processes successfully.

Compared to the study participants and in contrast to the control group, the treatment group presented a mean change in both survey items in PV. Of particular interest are the results, again from survey item Q4.2. The control group demonstrated a substantive mean change of -1.30, a statistically significant *p*-value ($p = \leq 0.10$), and a practically significant Cohen's *d* (d=1.06). These values indicate that the treatment group, within the context of this study and compared to study participants, demonstrated a unique understanding of the value of Trellis technologies to their work. The significance of these results is that it would appear that the CoPs seemed to have provided the treatment group with a peer-based social system that allowed them to develop a comprehensive understanding of the usefulness of the technologies.

In Table 10, I illustrate the changes in perceptions of the value of Trellis technologies between the study participants ($n=117$) and control group participants (n=10) and the study participants ($n=117$) and treatment group participants (n=23). There are no PEU values in this table as I used this survey construct only to evaluate

users' PU and PV. Akin to the prior table, I included only three survey items for this construct.

Table 10

Perceptions of Value in Pre- and Post-Survey Results Compared via Paired-Samples t-tests

	Study Participants (*n*=117) to Control Group (*n*=10)					Study Participants (*n*=117) to Treatment Group (*n*=23)				
	Mean Change	SD	*t*	*p*	*d*	Mean Change	SD	*t*	*p*	*d*
PU										
Social system (Q5.2) *I believe Trellis capabilities can lead to better outcomes.*	0.65	1.35	2.16	*0.022	1.35	0.10	1.79	0.18	0.430	1.79
PV										
Communication (Q5.1) *I would recommend Trellis capabilities to someone else.*	0.50	1.05	0.21	0.417	1.05	-1.30	1.64	-2.51	*0.017	1.64
Social system (Q5.3) *I think Trellis capabilities have added value to the university in general terms.*	0.70	1.26	2.48	*0.011	1.26	0.50	1.27	1.25	0.122	1.26

Note. Scale: Strongly Agree=1, Agree=2, Somewhat Agree=3, Somewhat Disagree=4, Disagree=5, Strongly Disagree=6

*$p \leq 0.10$

Results in Table 10 indicate that the control group, compared to the study participants, reported overall decreased satisfaction in PU and PV from the pre- to post-survey occasions, as evidenced by the increase in scores across these three survey items. The treatment group reported mixed improvements (i.e., illustrated as negative and positive mean changes) in the PV construct. Next, I discuss the results presented in Table 10 by the critical factors written into my TAM framework: PU and PV. Again, there are no PEU values in this table, given the items I included in this survey construct are related only to users' PU and PV.

PU. The control group experienced a sharp decrease (mean change =0.65) in their belief that "Trellis capabilities can lead to better outcomes" (i.e., Q5.1). These results are compounded by their statistical ($p \leq .10$) and practical significance ($d = 1.35$). A Cohen's *d* value is a measurement of a practical effect, and when *d* exceeds 0.80 (i.e., $d \geq 0.80$), it is considered a large, practically significant effect. These results are important because they indicate that the control group, during this study and without the intervention, reportedly experienced a sharp decline in seeing specific value in the Trellis capabilities, mainly when students were concerned.

Additionally, while demonstrating directionally positive mean change scores in the PU factor, the treatment group only did so nominally (mean change =0.10). While these scores were not statistically significant ($p \geq 0.10$), they were decidedly practically significant ($d = 1.79$). These results suggested that during this study and compared to study participants overall treatment group demonstrated a slightly decreased set of perceptions of the general outcomes of the Trellis.

PV. When compared to overall study participants, the control group continued to express decreased disappointment in their PV of Trellis capabilities, specifically, with a mean change of 0.70 on Q5.3: "In general terms, I think Trellis capabilities have added value to the university." These results were statistically significant ($p \leq .10$) and practically significant with a Cohen's *d* of 1.26. The dual significance of this survey item is notable because, again, it speaks to the control groups' reported discontent with the value of Trellis capabilities within the parameters of this study.

Additionally, compared to the overall study participants and the control group, the treatment group presented similar dissatisfaction in Q5.3 (mean change =0.50). While these scores were not statistically significant ($p \geq 0.10$), they were practically significant ($d = 1.26$). These scores are interesting, especially when contrasted with the mean change (-1.30) on Q5.1: "I would recommend Trellis capabilities to someone else." Within the boundaries of this study, the treatment group did not seem to see the broader value of Trellis capabilities, but that would not prevent them from recommending Trellis to others.

Overall, across the five survey constructs, the control group generally demonstrated a decline in perceptions of the Trellis capabilities (again, as evidenced by an increased mean change). While the control group did experience some improvement in perceptions within a few items within a few survey constructs, I generally observed that within the confines of this study, the control group did not perceive the Trellis capabilities to be valuable, useful, or practical overall. Alternately, while the treatment group did experience dissatisfaction in a few specific survey constructs, generally within the parameters of this study and in comparison, to the study group, after participating in

the intervention, the treatment group demonstrated an improvement in their perceptions of the value, usefulness, and ease of use of the Trellis capabilities.

Next, as reflected in Table 11, are the results of a series of independent samples *t*-tests that I conducted to examine changes in perceptions of the value of Trellis technologies between the control group participants (n=10) and treatment group participants (n=23). As I did for the last set of analyses, I, again, organized the discussion of statistically and practically significant results for each survey item by the critical factors of this study's TAM theoretical framework: PEU, PU, and PV (recall Figure 1). Again, I formatted all questions with "Strongly Agree" =1 as the most desirable answer; therefore, lower scores indicate improvement and vice versa. Also, as with the analyses above, I refer to the post-survey control and treatment groups as "control group" and "treatment group" participants, respectively.

Table 11

Perceptions of Trellis Pre- and Post-Survey Results Compared via Independent Sample t-tests Aligned to TAM Framework.

	Treatment (n=23)		Control (n=10)					
	M^1	*SD*	M^2	*SD*	Mean Difference	*t*	*p*	*d*
PEU								
Q1.1: *I feel comfortable using Trellis capabilities*	2.13	0.97	2.30	0.67	-0.17	0.50	0.310	0.89
Q2.1: *Learning to use the Trellis capabilities was easy for me.*	1.91	0.85	2.40	0.84	-0.49	1.52	*0.070	0.85
Q2.2: *It was easy for me to become skilled in the Trellis capabilities.*	1.65	0.71	2.70	0.95	-1.05	3.50	*0.001	0.80
Q2.3: *I understand what resources are available to me to support my usage of Trellis capabilities.*	2.09	1.04	2.70	0.95	-0.61	1.59	*0.060	1.01
Q3.2: *Trellis capabilities make it easier to do my job.*	2.39	1.08	3.20	0.92	-0.81	2.07	*0.024	1.03
Q3.3: *I find Trellis capabilities easy to use.*	2.43	1.16	2.80	0.92	-0.37	0.88	0.193	1.10
Q3.4: *I found it easy to find support when I needed help in Trellis.*	2.17	1.11	2.80	0.92	-0.63	1.56	*0.065	1.06
PU								
Q1.4: *I have had positive experiences using Trellis*	2.09	1.31	2.20	1.03	-0.11	0.24	0.405	1.24
Q4.1: *I find Trellis capabilities to be useful in my job.*	1.87	1.10	2.50	0.85	-0.63	1.61	*0.059	1.03
Q5.2: *I believe Trellis capabilities can lead to better outcomes.*	1.78	0.85	2.40	0.70	-0.62	2.01	*0.026	0.81
PV								

Q1.2: *I feel knowledgeable about what services are available through Trellis*	2.17	1.19	2.60	0.52	-0.43	1.08	0.144	1.04
Q1.3: *I feel supported in my usage of Trellis capabilities*	2.22	1.04	2.80	0.79	-0.58	1.58	*0.063	0.98
Q2.4: *The training provided properly prepared me to use Trellis capabilities.*	2.04	0.93	2.80	0.92	-0.76	2.16	*0.019	0.93
Q3.1: *Trellis capabilities enable me to accomplish tasks more quickly.*	2.61	1.16	3.30	0.82	-0.69	1.70	*0.049	1.07
Q4.2: *I understand how Trellis capabilities support our business processes.*	2.39	1.08	3.20	0.92	-0.81	2.07	*0.024	1.03
Q4.3: *I believe Trellis capabilities have led to improved processes.*	1.96	0.98	2.60	0.97	-0.64	1.75	*0.045	0.97
Q5.1: *I would recommend Trellis capabilities to someone else.*	2.09	0.95	2.50	0.97	-0.41	1.14	0.131	0.96
Q5.3: *In general terms, I think Trellis capabilities have added value to the university.*	1.83	0.83	2.70	0.95	-0.87	2.66	*0.006	0.87

Note. Scale: Strongly Agree=1, Agree=2, Somewhat Agree=3, Somewhat Disagree=4, Disagree=5, Strongly Disagree=6

*$p \leq 0.10$

Based on the paired-sample *t*-test findings illustrated, the substantive differences in the results between the control and treatment groups that I anticipated were, indeed, evident. Specifically, the treatment group demonstrated both statistically and practically significant and desirable differences in their general perceptions of the Trellis capabilities over the control group. So much so that statistical significance was observed for 15/18 or 83.3% of the items and large practical effects (i.e., $d \geq .80$) for all 18/18 or 100% of the survey items compared. It is evident, given these results, that the treatment group demonstrated increased positive perception changes consistently across all three TAM constructs. Next, I discuss the effects in Table 11 by the critical factors written into my TAM framework: PEU, PU, and PV.

PEU. As part of this study and compared to the control group, the treatment group presented significantly statistical results that reflected improved perceptions of Trellis capabilities in four out of six (66.7%) items under the PEU construct. A survey item worth noting is Q2.2: *"*It was easy for me to become skilled in the Trellis capabilities." The treatment group scores (M =1.65, SD =0.7) were statistically and practically significant ($p \leq 0.10$, d =.80) when compared to the control group's scores (M =2.70, SD =0.95, mean difference =-1.05). The mean difference is notable as it represents the greatest perception shift between the two groups. This finding is crucial as it confirms that for this study, the treatment group, when compared to the control group, reportedly found the CoP to be a supportive environment for gaining skills in the technologies.

An additional survey item worth calling attention to is Q3.4: "I found it easy to find support when I needed help in Trellis." In this survey item, the treatment group's scores (M =2.17, SD =1.11) again were both statistically and practically ($p \leq 0.10$, d

=1.06) different and better when compared to the control group (*M* =2.80, *SD* =0.92; mean difference =-0.63). These results are noteworthy because, again, the sizeable mean change in perception represents, in this study, that the treatment group reportedly found the CoPs to be a reliable resource for support when using Trellis technologies.

PU. As part of this study and compared to the control group, the treatment group presented statistically significant results demonstrating improved perceptions of the usefulness of Trellis capabilities in three of four survey items. Here, the results for survey item Q5.2: "I believe Trellis capabilities can lead to better outcomes*"* are interesting; specifically, the statistically and practically significant results ($p = \leq 0.10$, d =.81) demonstrate that within this study, participation in a CoP may have led to the treatment group *(M* =1.78, *SD* =.85) seeing the broader value of Trellis technologies, more so than the control group (*M* =2.40, *SD* =0.70; mean difference =-0.60).

An equally interesting survey item in the PV construct was Q2.4: "The training provided properly prepared me to use Trellis capabilities." Again, the treatment groups' scores (*M* =2.04, *SD* =0.93) compared to the control group's scores (*M* =2.80, *SD* =0.92), (mean difference =-0.76) demonstrated statistically and practically significant differences ($p \leq 0.10$, d=0.93). Again, the difference in mean change coupled with the statistical and practical significance is exciting because it may indicate that within the parameters of this study, the treatment group found the CoPs to be an effective resource for supporting the learning of the Trellis technologies.

Overall, the results of the independent *t*-test analysis discussed prior were consistent. For the most part, treatment group participants reported the positive changes in their perceptions as anticipated and desired. In addition, across the three TAM

constructs, the treatment group, when compared to the control group, consistently improved their perceptions of Trellis, as evidenced by lower mean scores in the independent *t*-test analyses. Additionally, the treatment group had statistically and practically significant results compared to the treatment and control group participants after the intervention. These results suggest that the treatment group, during this study and compared to the control group, demonstrated increased satisfaction levels in their perceptions of Trellis due to participating in a CoP.

Next, in the following tables, I combine my prior analyses from my paired- and the independent-sample *t*-tests. In doing so, I illustrate the demonstrate the impact of my intervention on the three DOI constructs (i.e., communication channels, social system, and time) between study participants (n =117) and treatment group participants (n =23) and then control group (n =10) and treatment group participants (n =23). This final analysis aimed to evaluate if there were DOI constructs that suggested more substantive impacts than others, again, as key to this intervention. I organized results by DOI construct across *t*-tests. I formatted all questions with "Strongly Agree" =1 as the most desirable answer; therefore, lower scores were the most desirable.

Within each of the DOI constructs, observed were specific examples of statistically and substantively significant changes between the treatment group and the study participants over time and between the treatment group and the control group on the post-test occasion. Overall, the results in these tables suggest that my intervention seemed to have had the most impact on the DOI constructs of communication channels and time; however, my intervention also seemed to have had a positive impact on the social systems construct in a few key areas.

See below for more detailed analyses by DOI construct, beginning in Table 12 with Communication Channels. In DOI, and as defined prior, communication channels are the channels that allow the transfer of information through a community (Rogers, 1986). The following results found that the treatment group consistently demonstrated improvements in the perception of the CoP as an efficient mechanism for the transfer of information.

Table 12

Perceptions of Trellis pre- and post-Survey results as aligned to communication channels

	Study Participants (*n*=117) to Treatment Group (*n*=23)					Treatment (*n*=23)		Control (*n*=10)					
	MC*	*SD*	*t*	*p*	*d*	M^1	*SD*	M^2	*SD*	MD*	*t*	*p*	*d*
Comm Channels													
(Q1.2) *I feel knowledgeable about what services are available through Trellis*	-0.80	1.03	-2.45	0.020*	1.03	2.17	1.19	2.69	0.52	-0.52	1.08	0.144	1.04
(Q2.3) *I understand what resources are available to me to support my usage of Trellis capabilities.*	-0.90	0.99	-2.86	0.009*	0.99	2.09	1.04	2.71	0.95	-0.62	1.59	0.060*	1.01
(Q3.4) *I found it easy to find support when I needed help in Trellis.*	-0.60	1.43	-1.33	0.109	1.43	2.17	1.11	2.85	0.92	-0.68	2.10	0.065*	1.06
(Q5.1) *I would recommend Trellis capabilities to someone else.*	-1.30	1.64	-2.51	0.017*	1.64	2.09	0.95	2.51	0.97	-0.42	1.14	0.131	0.96

Note. Scale: Strongly Agree=1, Agree=2, Somewhat Agree=3, Somewhat Disagree=4, Disagree=5, Strongly Disagree=6

*$p \leq 0.10$

*MC=Mean Change *MD=Mean Difference

Communication Channels. As illustrated in Table 12, across *t*-tests, I found that the treatment group consistently demonstrated a higher level of satisfaction with the communication channels available through the intervention compared to both the study participants and the control group. Specifically, Q5.1: "I would recommend Trellis capabilities to someone else" yielded the most substantive improvement between study participants and treatment group participants over time (mean change =-1.30). These scores were also both statistically and practically significant ($p = \leq 0.10$, $d = 1.64$, respectively) is essential as it indicates that peer-to-peer communication seems to have been the most substantive communication channel within the confines of this study. Although, again, important to note are the desired changes across all four items in this construct in the treatment group compared to all study participants over time (-0.60 $\geq$mean changes $\geq$-1.30). All but one of which were statistically significant (i.e., $p \geq 0.10$ on Q3.4), and all of which yielded large effect sizes (i.e., $d \geq 0.80$).

As with the findings above, the independent samples t-test results also demonstrated consistent improvement between treatment and control groups' responses to all survey items on the post-test occasion. Perhaps most notable was what I observed for Q3.4: "I found it easy to find support when I needed help in Trellis" (M =2.17, SD =1.11 treatment vs. M =2.85, SD =0.92 control; mean difference=-0.68). Again, these results were statistically and practically significant ($p \leq 0.10$, d =1.06, respectively). More notably, the results overall demonstrate that in this study, on average, treatment group members seemed to have consistently felt that the communication channels provided by the intervention (e.g., CoP) helped them feel more knowledgeable on where to find support in using the Trellis capabilities. Moreover, all mean differences between

treatment and control group participants across the board demonstrated desired changes in favor of treatment group participants (-0.42 ≤mean differences ≤-0.68). All but two of four of these results by survey item were statistically significant (i.e., p ≥0.10 on Q1.2 and 5.1), and all four survey items yielded large effect sizes (i.e., d ≥0.80).

Next, in Table 13, I evaluate the pre-intervention and post-intervention results aligned to the DOI construct of social systems. In DOI, social systems combine external and internal influences on a user's decision to adopt new technology (Rogers, 1986). Reviewing the survey items' associations with the social structures was accordingly necessary to illustrate if my intervention impacted the diffusion of Trellis capabilities.

Table 13

Perceptions of Trellis pre- and post-Survey results as aligned to social systems

	Study Participants (*n*=117) to Treatment Group (*n*=23)					Treatment (*n*=23)		Control (*n*=10)					
	MC*	*SD*	*t*	*p*	*d*	M^1	*SD*	M^2	*SD*	MD*	*t*	*p*	*d*
Social System													
(Q1.4) *I have had positive experiences using Trellis*	-0.50	1.59	-1.00	0.172	1.58	2.09	1.31	2.24	1.03	-0.15	0.24	0.405	1.24
(Q1.3) *I feel supported in my usage of Trellis capabilities.*	-0.30	1.06	-0.90	0.197	1.06	2.22	1.04	2.81	0.79	-0.59	1.58	*0.063	0.98
(Q3.3) *I find Trellis capabilities easy to use.*	-1.00	1.33	-2.37	*0.021	1.15	2.43	1.16	2.88	0.92	-0.45	0.88	0.193	1.10
(Q4.2) *I understand how Trellis capabilities support our business processes.*	-1.30	1.06	-3.88	*0.002	1.06	2.39	1.08	3.26	0.92	-0.87	2.07	*0.024	1.03
(Q4.3) *I believe Trellis capabilities have led to improved processes*.	-0.30	1.16	-0.82	0.217	1.16	1.96	0.98	2.65	0.97	-0.87	1.75	*0.045	0.97
(Q5.2) *I believe Trellis capabilities can lead to better outcomes.*	0.10	1.79	0.18	0.430	1.79	1.78	0.85	2.43	0.71	-0.65	2.01	*0.026	0.81
(Q5.3) *In general terms, I think Trellis capabilities have added value to the university*.	0.50	1.27	1.25	0.122	1.26	1.83	0.83	2.74	0.95	-0.91	2.66	*0.006	0.87

Note. Scale: Strongly Agree=1, Agree=2, Somewhat Agree=3, Somewhat Disagree=4, Disagree=5, Strongly Disagree=6

*$p \leq 0.10$

*MC=Mean Change *MD=Mean Difference

Social Systems. As illustrated in Table 13, compared to the study participants, the treatment group demonstrated a noticeable improvement in Q4.2: "I understand how the Trellis capabilities support our business processes" (mean change =-1.30). The statistical and practical significance ($p \leq 0.10$, $d=1.06$) of these results is also notable because it demonstrates that the treatment group, over time and more so than the study participants, experienced a distinct improvement in their context-based learning as part of participating in a social system (e.g., a CoP). Although, important to note are the desired changes in six out of eight survey items (75.0%) in this construct in favor of the treatment group compared to all study participants over time (-0.30 $\geq$mean changes $\geq$-1.30), and while only three items (i.e., Q2.2, Q3.3, Q4.2) were statistically significant ($p \geq 0.10$), all items yielded large effect sizes (i.e., $d \geq 0.80$).

The treatment to control group results equally demonstrated marked improvements across all survey constructs in this construct. The best example of this was in Q2.2: "It was easy for me to become skilled in the Trellis capabilities." (M =1.65, SD =0.71 treatment vs. M =2.76, SD =0.95 control; mean difference =-1.11). These statistically and practically significant ($p \leq 0.10$, d =0.80) results are noteworthy as they indicate that the treatment group, more so than the control group, reportedly felt that their participation in the social structure of a CoP helped them become more confident in their usage of Trellis capabilities. Moreover, and again, across the board all mean differences between treatment and control group participants demonstrated desired changes in favor of treatment group participants (-0.15 $\leq$mean differences $\leq$-1.11), all but two of eight of these results by survey item were statistically significant (i.e., $p \geq 0.10$ on Q1.4 and 3.3), and all eight survey items yielded large effect sizes (i.e., $d \geq 0.80$).

Overall, the results within this construct illustrate improved outcomes of user perceptions in favor of the treatment group. These results are notable and valuable as they indicate that the treatment group felt more empowered than their colleagues in both the study participant and control groups in their usage of Trellis capabilities, primarily due to interacting with others within the social system of a CoP.

Next, in Table 14, I evaluate the pre-intervention and post-intervention results aligned to the DOI construct of time. As mentioned prior, the efficiency of technology diffusion is measured in time, defined in this study as how long it takes for new technology to diffuse within a community fully. For this analysis below, again, I noted which survey items demonstrated the most notable expediency improvements in Trellis proficiency.

Table 14

Perceptions of Trellis pre-and post-survey results as aligned to time

	Study Participants (*n*=117) to Treatment Group (*n*=23)					Treatment (*n*=23)		Control (*n*=10)					
	MC*	*SD*	*t*	*p*	*d*	*M*[1]	*SD*	*M*[2]	*SD*	MD*	*t*	*p*	*d*
Time													
(Q1.1) *I feel comfortable using Trellis capabilities*	0.00	0.82	0.00	0.500	0.82	2.13	0.97	2.36	0.67	-0.23	0.50	0.310	0.89
(Q2.1) *Learning to use the Trellis capabilities was easy for me.*	-0.60	1.08	-1.77	*0.056	1.08	1.91	0.85	2.41	0.84	-0.50	1.52	*0.070	0.85
(Q2.2) *It was easy for me to become skilled in the Trellis capabilities.*	-0.60	0.97	1.96	*0.041	0.97	1.65	0.71	2.76	0.95	-1.11	3.50	*0.001	0.80
(Q2.4) The training provided properly prepared me to use Trellis capabilities.	-1.10	1.37	-2.54	*0.016	1.37	2.04	0.93	2.84	0.92	-0.80	2.16	*0.019	0.93
(Q3.2) Trellis capabilities make it easier to do my job.	-1.45	1.43	-3.1	*0.006	1.43	2.39	1.08	3.23	0.92	-0.84	2.07	*0.024	1.03
(Q3.1*) Trellis capabilities enable me to accomplish tasks more quickly.*	-1.00	1.25	-2.54	*0.016	1.25	1.61	1.16	3.33	0.82	-1.72	1.7	*0.049	1.07
(Q4.1) *I find Trellis capabilities to be useful in my job.*	-1.20	1.23	-3.09	*0.006	1.23	1.87	1.10	2.54	0.85	-0.67	1.61	*0.059	1.03

Time. As is evident in Table 14, the treatment group demonstrated improved scores in five out of six (83.3%) of the survey items included within this construct. Survey item Q3.2: "Trellis capabilities make it easier to do my job" yielded the most pronounced change. Recall, in the survey response scale, an answer of 1 equated to "Strongly Agree;" therefore, a lower score indicated an improvement. Thus, in the case of Q3.2, the mean change=-1.45, with a *p*-value $\leq$0.10 and a Cohen's *d* =1.43, shows a marked improvement in treatment group participants' perceptions of Trellis capabilities. These improvements are remarkable as they suggest that the treatment group became more efficient in the technologies through their participation in the intervention, leading to time savings in their work. Again, essential to underscore are the desired changes in five out of the six (83.3%) items included in this construct in favor of the treatment group compared to all study participants over time (-0.60 $\leq$mean changes $\leq$-1.45). All but one item was statistically significant (i.e., $p \geq$0.10 on Q1.1), and all items, once again, yielded large effect sizes (i.e., $d \geq$0.80).

The treatment group consistently scored higher than their study peers across survey items in this construct compared to the control group. However, the most striking result was in Q3.1: "Trellis capabilities enable me to accomplish tasks more quickly." Specifically, with an *M*=0.61 and *SD*=1.16 compared to the control group's results of *M*=3.33 and 0.82, this yielded the most significant difference in mean perception scores (mean difference=-2.72) throughout the entire survey instrument. This difference is further compounded by its statistical and practical significance ($p \leq$.10, *d*=1.07, respectively). Accordingly, these results are pertinent because they indicate that the treatment group reportedly experienced a dramatic difference in their perception of their

savings in time over the control group, given their participation in this study's treatment (i.e., the CoP). Moreover, across the board in this construct also essential to note is that all mean differences between treatment and control group participants demonstrated desired changes in favor of treatment group participants (-0.23 $\leq$mean differences $\leq$-2.72). Five out of six of these results (83.3%) by survey item were statistically significant (i.e., $p \geq 0.10$ on Q1.1), and all six survey items yielded large effect sizes (i.e., $d \geq 0.80$).

Altogether, the results of these *t*-test analyses yielded consistent results, all of which favored the positive impacts of my intervention. More specifically, within each of the DOI constructs, the treatment group, compared to the study participants over time and the control group on the post-test occasion, reportedly improved their perceptions of all Trellis factors as measured by the survey items individually collectively, as noted above. These improvements were evidenced by lower mean changes in scores between treatment group participants over study participants over time, most of which were statistically significant and all of which were practically significant. Additionally, there were lower mean differences in scores between treatment group participants over control group participants on the post-test occasion, most of which were statistically significant and practically significant. Overall, these results strongly suggest that during this study, and primarily due to the intervention, the Trellis capabilities successfully diffused through the treatment group via all three DOI constructs.

Qualitative Survey Results

I used open-ended survey questions to collect qualitative data from my pre-intervention study participants and my post-intervention control and treatment groups. Unlike the quantitative analysis, I conducted the qualitative research with only the post-

survey responses. The purpose of the study is to evaluate the impact of the intervention on participants (n =23) as compared to non-participants (n =10); therefore, I was singularly interested in how the post-intervention survey qualitative results would provide more context to their quantitative counterparts. Recall the seventh survey construct (re: CoP) was only available to treatment group participants.

After I collected, cleaned, and then applied my qualitative coding schema (e.g., descriptive coding in round one and axial coding for refinement, as described in my Methods section), I used my initial and focused codes (see Appendix O and Appendix P) to develop overarching themes that encompassed the wide range of Trellis user opinions in both the control and treatment groups. The themes are Trellis impacts at the individual, department, and university level, and then a fourth theme centered on the CoP specifically. I identified similar topics within each theme and organized the participants' reflections around those topics. Table 15 illustrates the four themes and associated topics organized by control and treatment groups. The table is for illustrative purposes; a detailed analysis follows.

Table 15

Qualitative survey responses by theme and participant group

Trellis Impacts at the Individual Level		
	Control (n=10)	Treatment (n=23)
The complexity of the tools	"There are too many clicks to navigate in Trellis [capabilities], and it is not intuitive."	"I am still in the early stages of learning Trellis, so I have not made up my mind about many things. Trellis looks like it has many valuable features, but it does feel a little confusing at times and doesn't look or feel like a [UA] tool."

Investment of time	"I just need more time to use those features more regularly (e.g., reporting) to get more comfortable with it, but showing me one time has not helped me retain this knowledge."	"[Trellis has] added value, but it requires (intense) dedicated time and effort on those using Trellis to use the tools like we're supposed to."
User misunderstandings	"The lack of the following capabilities makes the use of Trellis inefficient: no email notification when assigned a case, no view to see all cases when a case is assigned, [and] the switching of email senders instead of using a generic email."	N/A
Expressed Optimism	"I can see how when everything is customized, and everyone has access to what they need that it will be useful, but right now, it is not more useful to my job than the previous system [e.g., advising notes in the student administrative system]."	"Trellis does not make it easier to do my job YET [emphasis in the original], but I anticipate that it may in the future."
	Trellis Impacts at the Department Level	
	Control (n=10)	Treatment (n=23)
Changes to Process	"Centralized communication sharing is something new to campus. Student and community stakeholders may not understand that when they email one unit, the whole university community utilizing the system will have access to the correspondence"	"I think a centralized system is great in theory and could be useful to better bring better efficiency and communication to our unit.
Withholding Judgement	"It's hard to say if it's [Trellis capabilities] improved our processes yet as our college is not fully integrated into the system; it's still too early to tell."	"There are many tools that would streamline tasks and allow teams to collaborate, but more thinking about how we conduct our business is needed."
Sense of Optimism	"While I am excited by what this means in terms of [tracking	"Historically, I've hated CRMs, but I have had a very positive

	conversations with and] serving our students, I think [UA] campus[es] will be slow in their willingness to share information outside of their department."	experience with Trellis. Needless to say, there are things that would make it better, but it's very user friendly and they [Trellis trainers] did a great job training our team"
Trellis Impacts at the University Level		
	Control (n=10)	Treatment (n=23)
The pace of technology delivery	"The product release cycle takes too long."	"It's frustrating how slow the [product release] process has come from Trellis."
Future Implications	"Trellis seems like a terrific platform to bring all of the UA pieces together with a focus on students."	"Many times, one office has no idea what another office has said to a student. I think these tools can help with that."
Impact of the Intervention		
	Control (n=10)	Treatment (n=23)
The role of the CoP	N/A	I'm new to the university, but I have never worked somewhere where they [sic] had a whole community devoted to helping users learn new technology. Most users probably feel like they should just be able to use the technology without [such] a community.
Gaining Proficiency	N/A	"The user communities have gently "forced" me to schedule time in my day to focus on Trellis. Without the meetings, I don't know if I would dedicate this time to the system on my own."

The three overarching themes for control and treatment groups centered around participants' perceptions of: (1) Trellis impacts at the individual level; (2) Trellis impacts at the departmental or college level; and (3) Trellis impacts at the university level. Via a fourth theme, (4) Impact of the Intervention, I explicitly address the treatment group's

perceptions of the intervention (e.g., the CoP) and how the three prior themes may have influenced them. Within these analyses, I also note when user observations directly aligned to the TAM framework; however, the overall integration of my findings with my theoretical framework is forthcoming in my Discussion section.

Trellis Impacts at the Individual Level. Participants' self-reported perceptions of the value (PV) and impact of Trellis capabilities on their work (PEU and PU) varied widely across treatment and control groups. Essential to note is that both groups' perceptions did not necessarily align with participants' places in the study (e.g., not all control group participants were necessarily negative in their comments, and not all treatment group participants had positive feedback). A small number of participants even held strong negative sentiments toward Trellis, regardless of their group affiliation. For example, a control group participant wrote, "I wish we could have 100% adoption of Trellis now!" At the same time, a treatment group member noted that "There is a huge discrepancy between what I was told Trellis would do and what it actually does." Trellis is an enterprise CRM. It is a powerful tool for managing interactions on campus and decidedly more complex than most of the technology it is replacing (e.g., Mailchimp for email campaigns or a combination of Qualtrics surveys and Excel sheets for managing events). Admittedly, the early delivered user experience in the Trellis capabilities is not inherently user-friendly, as evidenced by post-treatment comments collected from both the control and treatment groups regarding "too many clicks" and the "pages take too long to refresh." These comments reflect an additional commonly expressed frustration, investment of time.

Some survey respondents expressed frustration with the complexity of the Trellis tools expressing feelings of being "overwhelmed" by the capabilities and "not knowing where to start." They vented having to "learn a new tool,", particularly in concert with already having "too much work and not enough time." Where the two groups diverged was in the tone of the comments. While both groups expressed frustration, I found that the treatment group, more so than the control, coupled their remarks with expressions of understanding or patience.

Among the control group, several users expressed frustration with Trellis capabilities or features that demonstrated a lack of understanding of what's available. For example, a user stated that they had been "…waiting for Trellis Events forever" and that it "[Trellis Events] is still not here." The Trellis Events capability has been available for over a year. Other control group participants noted issues of "a lack of awareness" in understanding "what's available in Trellis" and what "support" is available through Trellis. This may indicate that users who did not participate in the treatment struggled to understand that resources are available as users of the tools in this study. Note that the treatment group did not indicate confusion on what Trellis capabilities are available within the qualitative survey responses.

It is essential to note that many users expressed optimism regarding the Trellis tools individually. Several users recognized that the Trellis program is "still in its early stages" and that the Trellis devices may improve as the "program matures." Again, there was a distinct difference in tone between the control and treatment groups. For example, control group participants expressed optimism about the possibilities. Still, they consistently pointed out the barriers to those possibilities like "campus resistance" and

"departmental siloes." In contrast, I found treatment group participants expressing optimism from a perspective of "Trellis isn't there yet" but excited about "the prospects."

Overall, these findings indicate a healthy mix of user opinions on the Trellis capabilities and resources to support using these tools. While some users reported being generally unhappy, others reportedly perceived long-term value (PV) and possibilities, some need to be better connected to better resources to assist their concerns. I would posit that most, if not all, of the expressed opinions, would be appropriately served or nurtured by participation in a CoP (a more detailed exploration of this is forthcoming). This, as also noted prior, was the main reason I adopted and implemented this very intervention.

Trellis Impacts at the Departmental or College Level. Participants from the control and treatment groups expressed a mixture of opinions about the impact of Trellis within their departments or colleges. Some control group members shared concerns about "learning new process[es]" and the ability of other units to "see their interactions with students." Similarly, treatment group participants reflected on the changes that may be necessary for their department to adopt Trellis capabilities fully. However, like above, the treatment group's observations were more about what needed to be done versus the control group talking more about barriers to adoption.

Users in both the treatment and control groups expressed a desire to withhold judgment on the benefit to their departments or colleges until "more work is done." In general, the perception was that departments had not been using the Trellis capabilities long enough to evaluate the overall impact of the tools on their work. However, again, participants in both groups communicated that while they saw the "potentials of the tools," they still felt that there were "features and processes that need[ed] refining." These

sentiments are unsurprising. A CRM provides a platform for centralizing all interactions, representing a sizeable shift in paradigm for many campus units.

As in the individual impacts before, both the control and treatment group participants spoke about the potential value of Trellis with varying levels of optimism. Both groups identified the need for "more training," "improved communications," and "better training" to help ease issues with PEU and PU. Finally, a commonly stated perception was the desire to hold off on formulating an opinion on the value and usefulness of Trellis until users had "been in the systems longer" and the capabilities had matured.

Trellis Impacts at the University Level. The groups offered fewer user reflections about Trellis at the university level than at individual, departmental, and college levels. However, some user observations were noteworthy and insightful. As noted in Table 15, expressions of frustration with how long it takes to add new functionality to the capabilities. The Trellis team is constantly developing the technology, which means the team regularly releases improvements and new features to the capabilities. The Trellis team relies on user feedback on what features should be added. I deemed comments regarding the release cycles as shared above essential because they indicated a vested interest in supporting the evolution of the technology (PV).

However, as combined with this set of users' supplementary opinions, others simultaneously wrote of the possibilities for the university's potential value (PV) and usefulness (PU) as the Trellis program matures. For example, users across both groups expressed that Trellis would be an effective tool (PU) for managing "campus information silos" and "helping students." These results are significant as they indicate that the user population within this study, regardless of their participation in the intervention,

reportedly saw long-term value in this CRM, despite some of the adoption and implementation issues noted.

Impact of the Intervention. Finally, in terms of treatment group participants' perceptions of the treatment in and of itself, there were mixed perceptions on the purpose of the CoP as an intervention, with more than one treatment group participant expressing frustration that, outside the intervention, "the Trellis team [would not otherwise] provide support," and that the Trellis team "expects the user community to handle all the support." Given the UA typically does not invest focused effort or time into ensuring users feel ownership and proficiency in such new technologies, this seems to have influenced participants' perceptions of the CoPs as a model for support as unfamiliar or (too) unique, also possibly adding some confusion too, or tainting of participants' perceptions about my intervention overall.

It is, however, essential to note that treatment group participants, regardless of some of their expressed points of confusion regarding Trellis and the CoPs, still and almost universally acknowledged the CoPs as helpful to them in becoming proficient in the new technologies. Related, multiple treatment group participants stated that the communities were "important" and a "saving grace." In addition, many treatment group participants felt that the CoPs were valuable if only for carving out dedicated time for a "commitment to learning" the Trellis tools.

Ultimately, the intervention played a role in supporting a level of cautious optimism as expressed by treatment group participants. Others underscored this thinking, with a few sharing that the CoPs were valuable in "providing shared experiences" and empowering individuals to become "Trellis mentors" for their colleagues. Adopting an

enterprise CRM such as Trellis represents a sizeable change in how universities like UA and colleges and departments manage their interaction data. This naturally requires a shift in both leaders' and users' adopted policies, processes, and general and strategic ways of thinking. Fortunately, some, if not most, of my treatment group participants felt as though the CoPs in which they were involved were good-to-excellent mechanisms for tackling such challenges.

Observation Results

I observed four CoP meetings organized around three of the Trellis capabilities: Trellis Events (event management tool), Trellis Service (a tool for creating and tracking cases on students), and Scheduling (calendar management and scheduling tool). The Service and Scheduling users were combined to make a single CoP (thus creating an Events CoP and a Service and Scheduling CoP). The agendas for these meetings were organized by an ambassador group ahead of time and generally followed the same format: (1) A presentation by a user (e.g., typically the topics included how the individual was using the tools or tips and good practices), (2) Question and answer on the presentations, (3) Capability updates or roadmap discussions, and (4) Open discussions. I could not passively observe these meetings; instead, I observed from the perspective of a participant-researcher, providing information when asked and adding input to questions and answers when needed. The gender of the participants is irrelevant within this context, and I use the singular “they” and plural “they and them” when referencing the participants to avoid making assumptions about an individual’s gender.

To ensure consistency in my observations of these meetings, I used my afore-described observation protocol (Appendix I), on which I took observational notes. I also

used the transcripts from the Zoom recorded sessions of these meetings to complete the observation protocols. Table 16 contains the combined results of all four observation sessions. Each of the rows reflects a possible behavioral event aligned to my three research questions, and within each column is a tally of the number of times that event occurred within a meeting. I did not include the user presentations in the counts in that I began tracking at the post-presentation question and answer stage.

Table 16

Observed behaviors organized by CoP meeting

Observation	Trellis Events CoP #1 *n*=8	Trellis Events CoP #2 *n*=6	Trellis Scheduling and Service CoP #1 *n*=16	Trellis Scheduling and Service CoP#2 *n*=32
Discussion of the technology in the context of their work	6/8 (75%)	6/9 (67%)	9/16 (56%)	19/32 (59%)
The sharing of ideas or best practices	5/8 (63%)	7/6 (116%)	11/16 (69%)	22/32 (69%)
Demonstrations or discussions of connectedness	2/8 (25%)	2/6 (33%)	2/16 (13%)	5/32 (16%)
Users talk about the capability's PEU	0/8 (0%)	2/6 (33%)	4/16 (25%)	8/32 (25%)
Users talk about the capability's PU	4/8 (50%)	3/6 (50%)	8/16 (50%)	11/32 (34%)
Users talk about the capability's PV	1/8 (13%)	0/6 (0%)	3/16 (19%)	3/32 (9%)
Discussions on being or becoming proficient in the technology	2/8 (25%)	4/6 (67%)	3/16 (19%)	7/32 (22%)
Specific comments on the technology-positive	5/8 (63%)	2/6 (33%)	6/16 (38%)	8/32 (25%)
Specific comments on the technology-negative	3/8 (38%)	0/6 (0%)	4/16 (25%)	7/32 (22%)

	4/8	7/6	5/16	12/32
User to User Support	(50%)	(116%)	(31%)	(38%)

Trellis Events CoP #1. The Trellis Events ambassador led the first CoP meeting (i.e., Trellis Events CoP #1); it included a presentation from an Events user on how they might use the capability to manage their student workshops. The meeting was not heavily attended (*n*=8), but that was quasi-expected as Trellis Events is a relatively new tool, and the population of users is not large. I hoped to see users' problem-solving in the meetings and share tips and best practices. I was less concerned about explicit expressions of PEU, PU, PV as the idea was that participation in a CoP would naturally influence those perceptions. Users predominantly shared how they used the Trellis Events technologies within the context of their work (75%). Users embedded positive comments on this technology (63%) in sharing the use of technologies. For example, one user said, "I think what is best about [Trellis Events] is that 85% of our mission is to be able to offer students these [academic support] workshops, and this tool has made that easier" (PU).

The purpose of the CoP was also to provide an environment for users to share their context-based practices, and 63% of users spontaneously shared tips or best practices about the platform. Learning the tools from the lens of context is far more effective than a content-based session led by a trainer (Sabramowicz, 2016). Considering this was the first CoP meeting for the treatment group members using Trellis Events, users were seemingly eager to jump in and share their knowledge. I did not have to contribute much to this meeting to keep the discussion going, as the users were comfortable using each other as a resource.

Trellis Events CoP #2. The agenda for the next CoP meeting (i.e., Trellis Events CoP #2) was similar in structure to the first. The campus web services team user shared using Trellis Events to manage instructional workshops for a campus-wide website upgrade (PU). Despite lower attendance than the first meeting (n =6), the ensuing user discussion was lively, with the presenter receiving many questions from participants. These exchanges accounted for the relatively higher sharing of best practices (116%) and user-to-user support (116%). I observed that the users did not require much intervention from the Trellis team to answer questions for the most part.

As with the first Trellis Event CoP meeting, users were forthcoming in sharing how they were incorporating Trellis Events into the context of their work (67%). As part of sharing their context, I was pleased to hear the number of users who also remarked on their burgeoning proficiency in the tool (67%). One individual even attributed it to the first Events CoP meeting (i.e., Trellis Events CoP #1), stating,

> "I appreciated some of the [tips and best practices] you guys shared in the last meeting. It helped me understand what I was doing when I went to do my event," (Meaning setting their Event up in the system-PEU).

The success of any CoP is predicated on it becoming mostly self-sustaining (Wenger, 2002). The Events participant group was responsible for keeping the momentum of the communities by continually evolving their purposes and roles within their larger communities. Accordingly, it was (and still is) my goal as both a researcher and Trellis employee to ultimately work myself out of these (and hopefully future) Events CoP meetings. Removing myself from these meetings seems possible in that my

observations from these sessions indicate that this community is seemingly capable of taking ownership of its CoP.

The Service and Scheduling CoP meetings (i.e., Trellis Scheduling and Service CoP #1) were similarly organized by the Trellis Service and Scheduling ambassadors. They followed a similar model to the Trellis Events CoP format noted prior. The broader population of Service and Scheduling users is sizeable, so I had hoped for a larger audience for the CoP meetings. However, both meetings had low attendance. There are likely two causes for the low attendance. First, more than half the Service and Scheduling users are academic advisors. The academic advisors have their own Trellis CoP and are probably less likely to attend the Service and Scheduling CoP. Note, I chose not to include the Advising CoP in this study as I started that CoP in March of 2021, and for this study, I decided to focus on new users and the development of new CoPs. Second, and as previously mentioned, CoPs are a relatively new concept, so slow growth is not surprising.

Trellis Service and Scheduling CoP #1. The first Trellis Service and Scheduling CoP had just 16 attendees; however, there was still a good amount of information sharing amongst participants. In the first Service and Scheduling CoP meeting, a presenter from the registrar's office shared how their department uses Trellis Service (recall, cases for tracking support on a specific student). The presenter had been using Trellis for over a year, so they had a great deal of new information for the audience of new users. After the presentation, there was a full round of sharing ideas and best practices (69%) back and forth between users and the presenter.

The nature of the presentation by the registrar's office and the user response, more specifically, led to an in-depth conversation about how Trellis tools currently are and can be used to support students. Multiple participants (56%) talked about how they were either now using the tools (i.e., Trellis Service and Scheduling) or how they might adapt their usage of Trellis Service and Scheduling within their work contexts. (PU, PEU). As part of these conversations, I observed several individuals (50%) make remarks regarding how these Trellis tools (i.e., Trellis Service and Scheduling) had also helped streamline processes or allowed for better tracking of participants' interactions with students (PU). I also found that during these meetings, I had to contribute a fair amount to the discussions, with many participants often directing questions directly to me (likely out of habit). Before the next Trellis Service and Scheduling discussion, I spoke with the Trellis Service and Scheduling ambassadors about removing me from the interactions and, instead, encouraging users to work with each other.

Trellis Service and Scheduling CoP #2. The second Trellis Service and Scheduling CoP meeting had twice the attendance (*n*=32). There were a few factors that may have contributed to this jump in attendance: (1) word of mouth regarding the quality of the information gleaned from the first CoP meeting, and (2) a targeted email push by the Trellis team to the licensed Service and Scheduling users encouraging them to attend. Regardless of the reason, the attendance was still small relative to the broader licensed Service and Scheduling community throughout the University of Arizona.

The ambassadors chose to focus the second Service and Scheduling meeting on the experiences of a new user. The presenter for this session was an individual from the

New Student Success office who presented their department's service cases to manage questions from new students. They shared:

> [By using Trellis Service and Scheduling,] we do not have to worry about going between Outlook and our main dashboard [which is a university reporting system for tracking student data]. All of those emails [from students] are still going in the same place, which is rad. So, this allows us to respond to these students and categorize these [student questions] as part of our more extensive campaigns about student outreach (PU). We can account for student concerns, but [Trellis Service] also ensures that no kind of student communication is going undocumented, which will enable us to look at trends [i.e., on the types of questions students are asking].

After the Student Success Office presenter shared their experiences, there was a full back and forth among the CoP participants about the Trellis tools (i.e., Trellis Service and Scheduling) and how they were using the tools within the context of their work (59%).

Like the first Trellis Service and Scheduling CoP meeting, the bulk of the conversation centered on sharing ideas and best practices (69%) and how users applied the tools to the context of their work (59%). Users were open to sharing ideas on how the Trellis Service and Scheduling capability could also be integrated into their work context to help support students. Conversely, unlike the first meeting, the Trellis ambassadors actively worked to steer user questions back into the community for answers resulting in my having contributed far less to the discussion.

As with the Events CoP, the Service and Scheduling CoP had strong leadership in its ambassadors. Unlike the Events CoP, the Service and Scheduling group will still likely

need continued support in helping to grow the community to a point where it can be self-sustaining, should it (hopefully) continue. The large population of Trellis Service and Scheduling users need more work to help more Trellis Service and Scheduling users see the value and engage with the Trellis Service and Scheduling CoP.

Interview Results

Email invitations (Appendix N) were sent to five Trellis CoP ambassadors requesting an interview to discuss their perceptions of the value of CoPs in the implementation and usage of Trellis capabilities. All five ambassadors agreed to an interview. I conducted interviews remotely and used Zoom's transcription feature for my interview transcriptions. I collected, cleaned, and then applied my qualitative coding schema (e.g., descriptive coding in round one and axial coding for refinement, as previously described in more detail in my Methods section). I used my initial descriptive and axial codes (see Appendix P) to develop overarching themes that encompassed the wide range of Trellis ambassador opinions, again, as per control and treatment group participants after the treatment. The three overarching themes from these discussions are provided in Table 17 and then explored further below. These themes are (1) Change management, (2) Expectation management, and (3) Empowerment. The gender of the participants is irrelevant within this context, and I use the singular "they" and plural "they and them" when referencing the participants to avoid making assumptions about an individual's gender.

Table 17

Ambassador Interview Responses by Organized by Theme

Change Management: The process of managing users' receptions of and reactions to the changes associated with Trellis technologies.
"And so, having [the CoP] come together and be able to talk about [activities associated with onboarding into Trellis capabilities] that [were] challenging or going well was helpful."
"I think it would be good to bring everybody [i.e., users who have not yet adopted Trellis capabilities] under the same roof. Because I think those holdouts may bring something to the table that we may not know of [e.g., reasons for not using the capabilities that could lead to changes to the tools] and how we can better serve our students."
"I think this has been an educational opportunity for the colleges, but it's also opened the opportunity to really kind of think through what some of the practices are that we can update and change."
Expectation Management: The efforts undertaken to manage users' expectations of the implementation, usage, and support of Trellis technologies.
"I've had a couple of new coworkers come in and complain about Trellis, and I consider it my mission to help them understand how Trellis can help them be better at helping their students."
"I think [the CoPs] are allowing other [Trellis users] who use the tools to connect and to feel more comfortable in sharing their perspectives, expectations, and experience(s) [with each other."
"I think the CoP can be the liaison between those systems [i.e., referring to other university systems and Trellis capabilities] and provide real examples of how to use [the Trellis tools] and how [Trellis tools] can work in our context."
Empowerment: Any activity supporting users in taking ownership of the Trellis technologies helping one another use the Trellis technologies.
"So, I think the [CoPs] maybe have empowered me to feel like I [could] provide guidance or feedback to other people on [the UA] campus and to feel competent in that, because I know in this role [i.e., as CoP ambassador], I know what I'm doing in the tools."
"Something that I didn't think about was that [the CoPs] allowed me to engage with other users in the [UA campus] outside of my own office and more informally."

> "I feel like [the CoP] helped in talking up some of my professional development opportunities, kind of talking about how I've helped build out the opportunities I've created to help other people think about technology and how to utilize technology in their spaces."

Throughout the interview process, all five ambassador participants provided overwhelmingly positive feedback about the CoP and insightful suggestions on how to improve upon the CoPs. Ambassadors were all asked to serve in their ambassador roles because they were all individuals who served as subject matter experts in supporting early design work with the Trellis capabilities. Additionally, they were all individuals who exhibited early curiosity about and proficiency in the tools. Therefore, it is unsurprising that, for this study, they all immediately took to their role as ambassadors and used what they learned through the communities to support their colleagues in the usage of Trellis. As before, within these analyses, I also noted when an ambassador's observation directly aligned to the TAM framework. However, the overall integration of my findings with my theoretical framework is forthcoming in my Discussion section.

Change Management. For this analysis, my definition of change management is the process of managing users' receptions of and reactions to CoPs and the Trellis technologies. Put differently, during the interviews, when an ambassador referenced activities that may have influenced users' perceptions of Trellis; I cataloged those observations as change management. The ambassadors all spoke to the value of CoPs in building a community around the Trellis capabilities (PV). They expressed sentiments of "building connections" and gaining "multiple perspectives" as part of their participation. Across the board, the ambassadors felt that CoPs were effective in building a "network" of users whom they "may not have ever worked with before."

Many of the ambassadors agreed that the networks, connections, and ensuing change management opportunities were an unintended benefit of their participation in their CoPs. Not only did their CoPs reportedly help to support participants in managing change for themselves, but they also seemed to have provided valuable information that could be brought back into users' work contexts, again, as per the perspectives of these ambassadors. Indeed, more than one ambassador suggested that the CoPs would benefit from a more focused effort to explicitly use the CoPs as a mechanism for managing the "frustration," "fear," and challenges that typically come with new changes, specifically new changes in technology.

Expectation Management. For this analysis, the definition of expectation management is the efforts undertaken to manage users' expectations of the implementation, usage, and support of Trellis technologies. Specifically, in the interviews, when an ambassador commented upon their expectations or a user's expectations, I cataloged those observations as expectation management. A few of the ambassadors spoke to the value of their participation in helping to combat frustrations within their departments and dispel misinformation users may have been spreading about the technologies (PV).

Across the board, all five ambassadors felt that the CoPs were vital in helping the users who participated in their CoPs to feel comfortable with the new technologies (PEU). Generally, some of the ambassadors talked about the value of the CoP in "creating understanding" and helping to "develop positive experiences" with users. Additionally, they felt that their role as the Trellis expert in their department helped them create more "awareness" around the technologies and "the benefits of using Trellis."

Therefore, as part of their participation in the intervention, all five ambassadors expressly felt that the CoPs served as an effective mechanism for managing the expectations around the adoption of Trellis capabilities (PU, PV).

Empowerment. The definition of empowerment in this study is any activity that supported users in taking ownership of the Trellis technology or supporting one another in using the Trellis technology. Specifically, in the interviews, when an ambassador made observations regarding their own experiences of feeling empowered or helping others feel empowered, I cataloged those instances as empowerment. Empowerment was a common theme across all five ambassadors' interviews. They each raised the topic of feeling empowered in one way or another. Many of them used terms like "feeling supported," being a "local expert," and "feeling confident" in helping others. They also spoke of the opportunity to network with others as another unexpected benefit of their participation. Related, some of the ambassadors expressed appreciation for the opportunities for professional development that the ambassador role provided.

Ultimately, the ambassador interviews were revealing in that they highlighted unexpected benefits of the CoP. Based on the discussions with the ambassadors, I believe it will be necessary to continue formalizing ambassadors' roles within their CoPs. Of equal importance is ensuring individuals asked to take on the role are leaders in their departments or have a natural propensity to mentorship. Based on the results of these interviews, I believe the Trellis ambassador role will be crucial in helping to continue to ensure sustained successes with these CoPs.

Triangulation

As noted, prior, I created protocol alignment crosswalks for all three data collection instruments (Appendices G, I, and L) to triangulate my data derived via all three of my data collection methods. More specifically, I used the results of my data analyses as per these crosswalks to develop a triangulation matrix, also noted prior (Appendix Q). I used this matrix to evaluate the alignment of my analyses across all three instruments and to evaluate within each RQ where the results of my analysis converged or diverged. For example, I looked to see where the statistically and practically significant data from my survey instruments were supported by or contrasted my qualitative results from my survey, observation, and interview data.

First, for RQ1- "In a PDTAM, what communication channels are most effective for diffusing information about the technologies?" - I looked to see where the results of analyses indicated alignment within and across the three DOI as mentioned above constructs: communication channels, social systems, and time. The data from all three collection methods converged, supporting the user consensus that participation in a CoP provided access to information that treatment group participants may not otherwise have had (communication channels). Additionally, in both the quantitative survey findings and data derived via my observations and interviews, users agreed that participation in a CoP may have helped provide treatment group participants the time they needed to develop comfort within the capabilities (time).

I also observed data divergence in RQ1 regarding treatment group participants' perceptions on the efficacy of CoP as a social system. Specifically, while the treatment group reported what turned out to be practically and statistically significant

improvements in almost all survey questions associated with CoPs as social systems, my qualitative analyses yielded less decisive or supportive results to this end. For example, all four of the CoP meetings paid very lightweight attendance. In my qualitative survey responses and ambassador interviews, multiple participants expressed the need for more robust participation in the CoPs to be considered more valuable. Therefore, while treatment group participants were consistent in their support of the CoPs as social systems for technology diffusion, they (and the ambassadors) seemed to believe there is still not enough CoP participation to experience a substantive benefit.

Second, for RQ2 – "Does participation in a PDTAM impact a user's perception of the technology's usability (i.e., PEU), usefulness (i.e., PU), and value (PV)?" – the data I collected and examined was universally consistent in supporting the idea that participation in a CoP improved treatment group participants' PEU, PU, and PV, albeit to varying degrees. Overall, my quantitative survey data yielded statistically and practically significant results across all three user impact values (i.e., PEU, PU, & PV). Additionally, in my qualitative survey responses, observation sessions, and interviews with ambassadors, multiple individuals underscored the belief that the CoPs helped incorporate Trellis tools into their work context and see their workplace value.

However, there was some divergence in the area of PEU, as briefly noted prior. While my quantitative data yielded consistent statistically and practically significant increases in PEU across treatment group participants' responses, my qualitative data told a different story. In my survey responses, observations, and ambassador interviews, users expressed frustration with the complexity of the Trellis tools. This divergence may have been partly attributable to the context and timing of the survey questions relative to the

user observations. Specifically, I used the survey instrument's PEU questions to address user comfort level using the Trellis tools. In contrast, users' comments regarding PEU are typically centered on the tool's interface (e.g., "too many clicks" to perform a task). So, while data did seem to diverge here, my quantitative and qualitative results may ultimately indicate that although users may consider the tools too complex to use, they were still able to achieve some measure of comfort using them, potentially given their participation in a CoP.

Finally, RQ3 – "Do users feel that participation in the PDTAM helped familiarize them with the technology more efficiently?" – was the only question where there was no substantive divergence in the data. Instead, my survey data demonstrated consistent improvements for the treatment group for all survey items associated with RQ3; while the mean changes were not as relatively substantive as elsewhere in this study, the mean changes were predominantly statistically and practically significant. My interview and observations associated with RQ3 were equally positive. More expressly, many users referenced the potential value of the CoP in helping them become more familiar with the Trellis capabilities in a more efficient way than had they not participated in the intervention.

In total, though, the results from all three data sources provided relatively consistent results indicating a reasonable degree of convergence in results across all three RQs. There was divergence in RQ1 and RQ2; the differences were not substantive as they were nuanced opinions driven, perhaps, by the relative newness of the intervention and Trellis capabilities. Given the consistencies that I observed across results, I feel more than comfortable stating that, as intended, the qualitative data provided the necessary context

to add depth to the quantitative results of the survey. Ultimately this suggests that, for this study, the CoPs did lead to improved PEU, PU, and PV for Trellis users. I provide further exploration of these results in the discussion below.

DISCUSSION

Presented here is a discussion of my summated findings, study limitations, and recommendations for future directions. A more reflective presentation on my future research plans and concluding thoughts in the next section entitled “Okay, so now what?” In this MMAR study, the third in a series of action research cycles, I employed a quasi-experimental research design to observe and measure the effectiveness of a PDTAM, specifically in the form of a CoP, in diffusing technology and influencing user perceptions of PEU, PU, and PV. In evaluating the results of my study, accordingly, I provide logical rather than definitive answers to my research questions.

In general, I found that the PDTAM most likely impacted user perceptions and usage of the Trellis capabilities. Demonstrated in Table 18 are a high-level summary of my quantitative and qualitative results, the goal of the intervention, and the actual results of my study. A detailed discussion, organized by my three research questions, follows in Table 18. Included in each section are also reflections on the conceptual and logistical influence of the intervention as it pertains to my research questions.

Table 18

Organization of Discussion by Research Questions

RQ1: In a PDTAM, what communication channels are most effective for diffusing information about Trellis technologies?	
Quantitative Results	The treatment group demonstrated improved scores over the control group across all survey items and within the DOI constructs. 13/15 survey items were statistically significant, and all were practically significant. *Time* had the most substantive results, with one survey item, Q2.2 experiencing a 1.1 Mean Difference and Q3.1 experiencing a 2.72 Mean Difference.

Qualitative Results	Participants were grateful to have the CoP as a resource for context-based learning and to help them feel more empowered in their usage of the tool. There are still some misconceptions about the role of a CoP, and more work is needed to bring in more participants.
Goal of the Intervention	Determine if the CoP is more effective as a communication channel, a social structure, or a means to reduce time to proficiency.
Actual results	The CoP is most effective as a communication channel, moderately effective to reduce time to proficiency, and shows promise in growing into an effective social system for the diffusion of technology.

RQ2: Does participation in a PDTAM impact a user's perception of the technology's usability (i.e., PEU), usefulness (i.e., PU), and value (PV).

Quantitative Results	The treatment group demonstrated improved PV, PU, and PEU over the control group across all survey items and within the TAM constructs. 13 out of 18 survey items were statistically significant. All survey items were practically significant. While the results were mostly consistent across the board, PEU and PV had survey items with more improved outcomes over PU.
Qualitative Results	Users expressed appreciation for the CoP in creating time to learn more about how to use the Trellis capabilities and how those capabilities can and should be integrated into their work. There were expressions of value in the qualitative responses; however, embedded in the comments was the idea that the value would come after the program and tools had matured.
Goal of the Intervention	Create a collaborative environment where users have access to resources that help them understand the usefulness and value of the Trellis capabilities and support them in their usage of the tools.
Actual Results	While the quantitative results were universally positive, overall, the gains moderate. The qualitative provides the context for these numbers in those users while feeling more optimistic in all three constructs in the PDTAM; most users still feel like the capabilities still need to mature further before they are fully convinced of the ease of use, usefulness, and value.

RQ3. Do users feel that participation in the PDTAM helped familiarize them with the technology more efficiently?	
Quantitative Results	All survey items associated with users' confidence and comfort in using the tools demonstrated positive gains with statistically and practically significant results. Specifically, the survey items related to understanding how Trellis support processes both a positive improvement had of .87; however, both the items that deal specifically feeling comfortable or confident in Trellis (Q1.1, Q1.4) demonstrated the lowest progress across all survey items.
Qualitative Results	The ambassadors spoke very specifically about feeling empowered in their usage of Trellis tools and the positive feelings they derived from supporting their departments and fellow users in the technologies. Some treatment group members did express appreciation for the dedicated time the CoP provided for learning the tools, Still, there were no specific expressions of feeling more competent or coming to competency more proficiently.
Goal of the Intervention	Participation in a PDTAM helps users feel empowered in their usage of the tools, specifically through providing support to peers and colleagues in their use of the technologies.
Actual Results	The CoP was very successful in helping the ambassadors to become leaders both within the community and in their work context. However, the CoP did not demonstrate a substantive improvement in comfort or confidence among the treatment groups overall.

RQ1. The purpose of my first research question – "In a PDTAM, what communication channels are most effective for diffusing information about Trellis technologies?" – was to evaluate the efficacy of a CoP in diffusing Trellis capabilities through a community. In prior research cycles, a common cause of user frustration was an inability to connect to resources for information and feeling unsupported in using the tools (Hodge, 2020). In adopting any new technology, but mainly a technology with high technical complexity and task interdependence like a CRM, successful adoption is

incumbent on supporting users in overcoming knowledge barriers (Halilovic & Cicic, 2013). The purpose of creating a dedicated community, in this case, was to help users feel supported in how and where to find training and information in their Trellis usage.

As referenced before, the quantitative and qualitative were in alignment in demonstrating that participants in the treatment group did use the CoP to learn the tools through context-based discussions and in holding discussions about best practices. Compared to the quantitative results, the qualitative results demonstrated that, as a communication channel, the CoP apparently helped users become more proficient in the Trellis technologies; however, this finding did not translate to users feeling more comfortable with the tools. The lack of comfort was evident in my observations of the CoP meetings; while there were several technology-specific questions, the ambassadors provided most of the answers. It appears, though, that other members of the CoP did not feel confident in speaking up.

RQ2. With RQ2 – "Does participation in a PDTAM impact a user's perception of the technology's usability (i.e., PEU), usefulness (i.e., PU), and value (PV)?" – I intended to evaluate the role of a CoP on users' ability and willingness to use the Trellis capabilities and whether they derived value from the tools. As was evident in the results and summarized above, the treatment group experienced positive gains in PEU, PU, and PV across all survey items. All the responses were practically significant, and the bulk of the responses was statistically significant.

While these results are promising, it is essential to note that aside from a few specific exceptions, most gains were moderate. The qualitative survey responses and CoP observations provided more detailed context to these responses. Namely, users reportedly

saw value in the CoP in helping to learn the capabilities, and rethinking their processes in the context of the capabilities. They were at least beginning to see the broader value of Trellis tools for the university. However, users also consistently expressed that the capabilities and the CoP needed more development and maturity before realizing substantive gains in PEU, PU, and PV.

RQ3. For RQ3 – "Do users feel that participation in the PDTAM helped familiarize them with the technology more efficiently?" – I evaluated the role of a CoP in escalating the process of change management for new technologies. Invariably, upon learning a new technology, users will determine the impact and consequences of the change and make individual decisions about their willingness to invest time and effort into learning it (Lapointe & Rivard, 2005). The goal of my intervention was to help expedite a user's time to proficiency by providing a resource to more accurately evaluate the functions of the new technology and how they might integrate it effectively into their context.

While the quantitative results demonstrated increased confidence among the treatment population, the survey items associated with said confidence represented small gains in the overall study. Some users spoke to being able to master proficiency in the tools more quickly than had they not participated in the CoP. However, where the CoP was most substantively successful in supporting change management was among the ambassadors who felt empowered as localized experts in the technology. Indeed, all five ambassadors spoke to a feeling of empowerment in supporting their colleagues using the tools. Additionally, they all felt that their role as Trellis ambassadors helped them become experts in the tools more quickly.

I believe the results of this study concerning this research question speak to a great deal of potential for the CoP to play a positive role in technology adoption. Given that a CoP model is a relatively new concept for our users, it is also unsurprising there are misunderstandings of the role of the CoP in user support. As was evidenced in both the surveys and observation sessions, work is still needed to help users evolve their approach to participation in a CoP. Again, the purpose of this CoP was to create learning opportunities, build capability, share knowledge, and represent user needs in the development of new enhancements (Webber, 2016). As both the communities and capabilities mature, the CoPs will accordingly and hopefully evolve to satisfy their intended purpose of serving as a robust platform for exchanging ideas, knowledge, and best practices leading to a community of empowered users.

Study Limitations

As I suggest a causal impact of my intervention on the treatment group, I also need to recognize the threats to the validity and quality of my inferences and conclusions, and the steps I took to mitigate such threats. Internal validity refers to verifying causal relationships between variables, analyses, and subsequent inferences and findings (Gebert et al., 2003). Quality in qualitative research refers to the alignment of the qualitative research to a flexible set of end goals for good qualitative research (Tracy, 2010). A complete analysis of internal and external validity, as well as qualitative quality, follows.

Internal Validity. I determined that diffusion, history, and selection bias were most likely the biggest threats to my study's internal validity. Diffusion occurs when aspects of the intervention are made available to control group members (Smith & Glass, 1987). I anticipated diffusion as a threat to internal validity in this study, particularly

considering that a goal of the intervention was the diffusion of information. Likely, members of the control group working in close quarters to the treatment group may have benefited from the intervention. While I acknowledge this may have been a threat to validity, I also recognize that I did nothing to mitigate this as a threat. The value of diffusing helpful information about Trellis to all users dramatically outweighs the possible impacts of diffusion on my study. Additionally, given the small *n* of my treatment and control groups, I also evaluated the threat of diffusion as being very low.

The historical threat to internal validity occurs when external factors like historical events can influence or invalidate the findings pertinent to the dependent variables in a research study (Smith & Glass, 1987). I must acknowledge that this study directly overlapped the COVID pandemic. During my research, the UA moved to an entirely remote workforce; therefore, all data collection occurred online. Additionally, the move to remote put a great deal of stress on individuals on campus who were not used to relying on technology to do all aspects of their job. Invariably, the introduction of new technologies and new methods for supporting adoption may have added additional stress to the participants of this study.

While there were few options to mitigate the historical effect on my study, I attempted to observe the magnitude of the impact. The surveys and observations took place a full year after the pandemic started, so they had adequate time to adjust to a fully remote environment. Zoom fatigue and the reduced quality of online interactions likely affected participants' engagement in the CoP meetings. However, more than one member of the treatment group commented on how great it was to "see new faces" and have the opportunity to "build new connections in uncertain times."

As the research design for this MMAR study was quasi-experimental, in that participants were allowed to self-select into the intervention, selection bias was likely the primary threat to internal validity in terms of the findings of my study. Selection bias occurs when participants are not randomly selected and assigned to the treatment and control groups. Due to the nature of my research design, I could not randomize my participants. Accordingly, allowing participants to opt into the treatment group runs the risk of nonequivalence, which occurs when the participant group is not reflective of the larger population (Smith & Glass, 1987). To mitigate issues with selection bias, I conducted multiple chi-square tests between the study participants, treatment, and control groups and ultimately found that while there were statistical differences between the groups, there were no practical differences. Therefore, while my study's findings may be compromised by non-equivalence, this threat is likely not substantive enough to have impacted my results.

External Validity. I intend to use the PDTAM as a model for large-scale change management beyond the Trellis implementation. Therefore, in addition to internal validity, I must also acknowledge threats to external validity or whether the results of my research may have reflected the broader campus population (Smith & Glass, 1987). The threats to external validity likely include ecological validity and population validity. When sharing similarities with selection bias, ecological bias refers to whether a study's results apply to a broader environment. I conducted my study within the confines of the Trellis CRM implementation program. As Director of Implementation Services for the Trellis program, I understand the program, its users, and the UA campus's relationship with central IT. When I attempt to bring the same model to a different part of campus, in

the absence of that in-depth experience and associated relationships, I may discover that the model is not extensible. However, as this is an Action Research study, I feel confident in my ability to evolve the intervention to adapt to changes in any such new environment.

Population validity is centered on whether the study participants were reflective of, in this case, the broader university community from which study participants came (Dixon, 2017). Again, given the size of my *n'*s, there is a risk that my results are not reflective of what I may discover when applying the intervention to a larger community of participants. However, essential to note, again, is that the goal of action research is not generalizability. In action research, the researcher is intentionally researching a specific situation (Mertler, 2017). While my study participants were representative of multiple campus units, I acknowledge that adjustments will likely need to be made in the future to meet the needs of more diverse communities of participants.

Qualitative Quality. I have selected the markers of "worthy topic," "credibility," and "significant contribution" as indicators of the quality of my qualitative research methods. A worthy topic is relevant, engaging, and significant (Tracy, 2010). Exploring user-centric practices for improving technology adoption in HEIs is relevant and meaningful for multiple reasons, but most important is the impact a CRM has on student service. CRM systems, when fully implemented, provide a platform for centralizing all student interaction data (Wlosik, 2021). This data can help universities better decide how to serve students and to what extent those services can influence student success (Marcinkevage, 2020). Exploring methodologies for helping CRM users become informed and robust users of the technologies then, by extension, leads to better service to university students.

Some indicators of a credible qualitative data collection are that the researcher provides concrete details, there is pervasive member reflection in the data, and the data can show evidence instead of relying on description (Tracy, 2010). I believe action research is well suited to providing credible qualitative data collection. The proximity of the action researcher to their topic inherently results in a higher level of detail and reflection. Additionally, the usage of interviews and observation as methods for data collection provides an opportunity for the participants to contribute to the research directly. The direct contribution of the user's feelings is more credible than the action researcher describing how the users felt.

Finally, qualitative research is high quality if the study lends a significant contribution to extant literature (Tracy, 2010). While there is a fair amount of research on technology adoption, as previously mentioned, very little research has been done on adopting administrative technologies in HEIs. From a practical perspective, my action research provides a significant contribution to the extant literature based on the uniqueness of the topic. Additionally, the addition of PV expands upon current theoretical models of technology adoption. In summary, while there were multiple threats to the validity of my study, particularly given the relatively small sample sizes, I remain confident the results of my research are significant enough to continue the exploration of the PDTAM as a framework for improving user acceptance of new technologies.

CONCLUSION

I have worked in higher education technology for more than half of my career. I have witnessed, firsthand, the disconnect between the individuals supporting university technologies and the people supporting students. IT staff do not always understand their connection to the student experience, and users do not always appreciate the value of IT systems to a university. I chose technology adoption as my action research project because I wanted to call attention to the connection between technology and the rest of the university. To help facilitate this, via this study, I involved users in the design and support of Trellis technologies via a CoP, wherein I shifted the technology adoption focus from simply logging in to ideally developing strong users who felt ownership over the technologies. Through my study, moreover, I wanted to demonstrate that the opportunities provided via a CoP were the best for creating more informed and empowered technology partners through the community of users, in this case, at the UA (Wenger, 1998).

As noted, action research combines action, reflection, theory, and practice in seeking practical solutions to local problems (Ivankova & Wingo, 2018). The value of conducting an MMAR model for this study was that it allowed me to create an extensible framework and practice, starting with a few simple concepts to develop the CoPs and then using the learning from the research to evolve a more robust network of communities. As also stated previously, there is almost no adoption literature on administrative systems in higher education. Instead, I studied general technology adoption literature, which, in the last decade, has increasingly relied on sociological principles to understand how users move from introduction to intention to adoption.

Through the CoPs I developed, I wanted to study the social effects of a peer network on influencing a user's perception of the Trellis technologies. Through surveys, observations, and interviews, I observed the immediate benefits of the CoP model and what aspects would require more work. Specifically, I learned that the CoPs reportedly improved users' PEU and PU of the Trellis technologies. The individuals who chose to participate in the treatment group expressed appreciation for having a dedicated environment to learn more about their capabilities and ask their peers questions.

A detailed exploration of the needs for future practice is below; however, my research revealed a few issues that will require further investigation to create solid and self-sustaining CoPs. Specifically, one of the most prevalent themes that surfaced from my research was a general lack of understanding as to the roles of the CoP in the Trellis community; for example, some users expressed concern that the CoPs replaced Trellis support. Additionally, I found that users hesitated to engage in their CoPs fully; many attended to learn from the speakers but did not participate in active knowledge-sharing activities. Also, I found that the CoPs did not result in a substantive shift in user perceptions of the value of Trellis capabilities, mainly because participants felt that they wanted to reserve judgment on that specific topic until both the CoPs and the capabilities had matured further. Finally, from a fundamental level, the CoP meetings, relative to the user population, were not heavily attended; therefore, there needs to be more done to help spread the word on the value of CoP membership to help incentivize more participation.

Ultimately, though, the results of my research were very promising. Overall, the treatment group presented with improved scores in PEU (Perceived Ease of Use), PU (Perceived Usefulness), and PV (Perceived Value) and expressed satisfaction with the

role of CoP in supporting their usage of Trellis capabilities. While there is still more work to be done, study results were encouraging enough that I feel confident that the CoPs will serve an integral role in helping our users progress in feeling a sense of ownership over the tools. More importantly, as the CoPs mature, the model may become extensible to supporting technology usage beyond the Trellis capabilities. Ideally, moving forward, a PDTAM could fundamentally change the introduction of new technology for the entire campus.

"OKAY, NOW WHAT?"

I am passionate about technology adoption, and over the last three years, my research has only intensified my desire to create better relationships between users and technology. Based on the results of my study, I firmly believe that a PDTAM is a suitable place to start in making fundamental changes in the approach to technology adoption; however, as previously noted, there is still work to be done. Outlined below are what I believe are the immediate and intermediate implications for future practice in my work with such CoPs at the UA. A brief discussion of implications for the longer-term impact and subsequent future research follows.

The logical next step in evolving CoPs for support is to get more users involved in the groups and more concretely establish the role of the CoPs within their broader user communities. Doing so will require cultivating a culture of cross-training within the meetings. As previously mentioned, most of the interactions in the CoP meetings were primarily transactional. Users had access to information they needed from the presenters, but there was very little problem solving or information exchange among the participants. It is unlikely the CoPs can sustain if the meetings continue in this pattern. In CoPs, participants need to be practitioners with shared experiences, stories, tools, and ways of addressing recurring problems (Wenger, 1998).

The best way to grow the community and establish a foothold in the user base will be to proactively increase the number and diversity of participants. To do so, I intend to conduct user research with current participants to understand better their motivations for participation and ask for their assistance in formalizing a recruitment effort to bring more users into the communities. Additionally, I will work with the current ambassadors to be

more proactive in encouraging and facilitating a user-to-user dialog during CoP meetings. Finally, I will work with my onboarding team to integrate participation into at least one CoP meeting into the formal onboarding activities for new users.

After the CoPs have had time to mature and participants are experiencing higher levels of participation, the next step (e.g., intermediate implications) will be to expand the purpose of the CoP beyond the Trellis capabilities. The university has a complex technology infrastructure to support both administrative and academic support, and I believe broadening the scope of the CoPs to develop knowledge sharing across the entire spectrum of campus technologies would ultimately be beneficial to our student populations. Specifically, the ability to, through knowledge sharing, potentially reduce the number of disparate systems on campus would result in better experiences for our students as it would reduce the volume of technologies of which they need to keep track and learn.

Practically, creating networks of CoPs for all campus technologies will require an alignment across the departmental owners of the technology. Reaching such alignment will likely require a more formal network of technology ambassadors to serve as facilitators and mentors for the new groups. Accordingly, there will also need to be more research and discussion on how best to categorize and organize the communities with questions surrounding, for example, whether it would make sense to manage the CoPs by administrative technologies, learning management systems, and educational applications. Subsequently, and ideally, the process of organizing CoPs for all technologies on campus after that will help to provide diverse contexts for growing the understanding of the types

of external and intrinsic motivators that can influence a user's PEU, PU, and PV in their decision to adopt and use the technology.

Finally, regarding implications for my future research, the long-term goal is to evolve the PDTAM into a peer-driven change management model (PDCMM). I believe the CoP provides a sense of control to the individuals impacted by the change. As I discovered in my first round of research, and as it was further supported by the literature, successful change management requires that individuals feel like the change is happening with them instead of the change happening to them (Bano & Zowghi, 2015). As evident through my research, I evidenced the CoPs as an excellent mechanism in helping users work collaboratively to understand how to incorporate technology change into their context and ultimately benefit from the said change.

Historically, universities underestimate the emotional aspects of large-scale changes for those impacted by the change (Dasborough & Suseno, 2015). Likewise, CoPs also provide an excellent venue for sharing change concerns, influencing emotions, and creating a collaborative enthusiasm for the new changes. I have since been asked to develop my dissertation into a change management curriculum for the President's Strategic Initiatives Office; hence, while I will certainly take on this task, through my work, I will also continue to intend to explore opportunities to conduct similar MMAR studies to evaluate the efficacy of future CoPs in facilitating organizational change initiatives on our UA campus.

Authors of most technology adoption and change management literature approach the topic of resistance to change as something to be managed or overcome. A contributing factor to my decision to study technology adoption was my belief that there

is inherent value in understanding and embracing change resistance. Rather than dismiss individuals resistant to adopting new technology, I believe it is essential to understand their resistance and use that to inform better approaches to introducing the technologies. Observing CoPs as part of my research solidified my belief that working within CoPs is the right approach. The platform of a CoP allowed the technologists and the users in this study to find common ground and engendered a level of shared understanding and transparency that is not available in traditional approaches to technological change. I am inspired and excited to take the next steps in furthering this approach to managing change on my UA campus.

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APPENDIX A

GLOSSARY OF ACRONYMS AND TERMS

Glossary of Acronyms and Terms

TERM	Long Definition	Definition
CoP	Community of Practice	A group of people who share a common interest and work together to gain generate share knowledge and gain proficiencies
CRM	Constituent Relationship Management	A software tool for the tracking of interactions
DOI	Diffusion of Innovation	A theory developed by Everett Rogers that seeks to understand how innovations are diffused through a community
Enterprise	n/a	A technology implementation that encompasses multiple campus departments
HEI	Higher Education Institution	A term encompassing to represent four-year colleges
IT	Information Technology	Technology, processes, and processes to create, store, process, and exchange data
MMAR	Mixed Methods Action Research	The merging of quantitative and qualitative data in a study to lend more credibility to the conclusions
Onboarding	n/a	The process of bringing new users into a technology
PDTAM	Peer Driven Technology Adoption Model	Peer-to-peer networks for fostering technology adoption
Peer Network	n/a	A network of comprised of university colleagues
PEU	Perceived Ease of Use	User's perception of easy a technology will be to use
Power User	n/a	An early adopter of a Trellis technology
PU	Perceived Usefulness	User's perception of how useful a technology is

PV	Perceived Value	User's perception of how valuable a technology is
Study Participants	n/a	All licensed users
TAM	Technology Adoption Model	Fred Davis theory as to why users will or will not adopt a technology (PEU, PU)
Treatment Group	n/a	Users who participated in the CoP for the purposes of the research
Trellis	N/A	University of Arizona branded enterprise implementation of Salesforce CRM
Trellis Ambassador	n/a	De-facto leader of Trellis CoPs
User	n/a	Adopter of a Trellis Technology
TRA	Theory of Reasoned Action	A theory developed by Martin Fishbein and Icek Ajzen that attempts to explain the relationship between attitudes and behaviors within human action
UA	University of Arizona	A research 1 institution located in Tucson, Arizona

APPENDIX B

STUDY TIMELINE

Study Timeline

Time Frame	Actions	Procedures
April 2021	Study approval from ASU IRB, MariCoPa/MCC IRB, Dissertation Committee	Complete dissertation proposal and obtain necessary approvals to proceed with the study
October 2021	Identify participants	Recruit participants by email from CoP and non-CoP groups.
November-December 2021	Phase 1 of the study	Phase 1 includes administering the pre-intervention survey to treatment and control groups and conduct observation of CoP events; including training sessions.
January-February 2022	Phase 2 of the study	Phase 2 includes administering a post-intervention assessment to treatment and control groups.
January 2022	Conduct Interviews	A purposeful sample of 6-8 participants and their leadership from the treatment and control groups will be created and interviews will be conducted via online modality such as Zoom.
January-March 2022	Data preparation and analysis	Prepare data for analysis and analyze quantitative and qualitative data. Bring results of both types of data together for triangulation (convergent MMAR design).
March 2022	Compose findings	Compose the results and findings sections of the study report.
April 2022	Present and defend findings	Present findings to the dissertation committee and others as appropriate.
May 2022 and onward	Reflect and plan for future cycles of action research	Reflect on study results and plan future cycles based on

	results, committee feedback, and peer feedback.

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APPENDIX C

PRE-INTERVENTION SURVEY EMAIL

Pre-Intervention Survey Email

My name is Nikolas Hodge, and I serve as the Trellis CRM Director of Implementation Services. I oversee a team with the responsibility for onboarding, training, and supporting new and current users in the Trellis technologies. Concurrently, I am a doctoral student in the Mary Lou Fulton Teachers College (MLFTC) at Arizona State University. I am working under the supervision of Dr. Audrey Beardsley, a faculty member in MLFTC. My research focuses on improving user comfort with new technologies through peer networks for support.

As such, I am asking you to participate in this survey research study to learn more about users' experiences with Trellis capabilities. Specifically, I am asking you to reflect on your onboarding experiences, your opinions on the usability and value of the tools, and your feelings regarding the usefulness of the support resources and approach.

This survey instrument has six sections, each of which contains a mix of Likert-scale questions and open-ended questions. Each section will appear on a new page while a survey bar will display your progress through the survey. Participating in this survey should take you no more than **10 minutes**.

Please note that your participation is completely voluntary. If you choose not to participate, there will be no penalty. In addition, your confidentiality will be maintained. The results of this study may be used in presentations or publications, but only aggregate, unidentifiable information will be included in such scholarly outlets.
If you have any questions concerning this research study, please contact Nikolas Hodge at glaziern@email.arizona.edu. You can also contact my dissertation chair Audrey Beardsley at audrey.beardsley@asu.edu.

If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the Arizona State University Office of Research Integrity and Assurance, at 480-965-6788 or by submitting this form. (Reference: IRB Study # 00014036)

Thank you so much for your consideration.

Warmest regards,

Nikolas

APPENDIX D

PRE-INTERVENTION SURVEY

Pre-Intervention Survey

This survey instrument has five sections. Each section will appear on a new page and the survey bar at the top will display your progress through the survey. Each section contains a mix of Likert-scale questions and open-ended questions. Participating in this survey should take you no more than 5-10 minutes

Section 1: General Feelings and Perceptions of Trellis Capabilities
This section is intended to collect a high-level evaluation of your implementation, support, and usage experiences with Trellis capabilities.

Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Agree
(1)	(2)	(3)	(4)	(5)	(6)

1. I feel comfortable using Trellis capabilities
2. I have had positive experiences using Trellis
3. I feel knowledgeable about what services are available through Trellis
4. I feel supported in my usage of Trellis capabilities
5. Is there anything more you would like to add regarding your general perception of Trellis?

Section 2: Implementation and Usage
Consider your experiences on-boarding and using Trellis capabilities. This section is intended to learn more about how users onboard, use, and feel supported in Trellis capabilities.

Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Agree
(1)	(2)	(3)	(4)	(5)	(6)

1. Learning to use the Trellis capabilities was easy for me.
2. It was easy for me to become skilled in the Trellis capabilities.
3. I understand what resources are available to me to support my usage of Trellis capabilities.
4. The training provided properly prepared me to use Trellis capabilities.
5. Is there anything more you would like to add regarding the implementation and usage of Trellis?

Section 3: Ease of Use
Consider how you use Trellis capabilities. This section is intended to learn more about how users interact with Trellis capabilities and support resources.

Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Agree
(1)	(2)	(3)	(4)	(5)	(6)

1. Trellis capabilities enable me to accomplish tasks more quickly.
2. Trellis capabilities make it easier to do my job.
3. I find Trellis capabilities easy to use.
4. I found it easy to find support when I needed help in Trellis (e.g., Knowledge articles, Drop-In support, or Chatter)
5. Is there anything more you would add regarding the usability of Trellis?

Section 4: Usefulness

Consider how Trellis capabilities have changed or supported your work. This section is intended to learn more about user perception of the usefulness of Trellis capabilities to their individual responsibilities as well as those of their department.

Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Agree
(1)	(2)	(3)	(4)	(5)	(6)

1. I find Trellis capabilities to be useful in my job.
2. I understand how Trellis capabilities support our business processes.
3. I believe Trellis capabilities have led to improved processes
4. Is there anything else you would like to add regarding Trellis usefulness?

Section 5: Value

Consider how you perceive the value of Trellis capabilities. This section is intended to learn more about user perception of the value of Trellis capabilities to their work as well as the experiences of the individuals their work supports.

Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Agree
(1)	(2)	(3)	(4)	(5)	(6)

1. I would recommend Trellis capabilities to someone else.
2. I believe Trellis capabilities can lead to better outcomes.
3. In general terms, I think Trellis capabilities have added value to the university.
4. Is there anything else you would like to add regarding the value of Trellis capabilities?

General Information Questions

I appreciate the sensitive nature of questions like these, and you are welcome to skip this section. However, the collection of the data may provide insights the that had not previously been considered so I very much appreciate it if you're willing to provide this information. All collected data will be de-identified and reported in aggregate.

Generally speaking, where is your role situated within university?

- Academic Advising
- Administration (College)
- Administration (Other)
- Event Planning
- Faculty
- Marketing
- Student Services
- Other

How long have been with the university?

- 0-5 years
- 6-10 years
- 11-15 years
- 16-20 years
- 21-25 years
- 26-30 years
- 31-35 years
- More than 35 years
- Prefer not to answer

To which gender identity do you most identify?

- Female
- Male
- Transgender Female
- Transgender Male
- Gender variant/non-conforming
- Not listed
- Prefer not to answer

What is your age?

- 20-30
- 30-40
- 40-50
- 50-60
- 60-70
- 70-80
- Prefer not to answer

APPENDIX E

POST-INTERVENTION SURVEY EMAIL

Post-Intervention Survey Email

My name is Nikolas Hodge, and I am Director of Implementation Services for Trellis CRM. Concurrently, I am a doctoral student in the Mary Lou Fulton Teachers College (MLFTC) at Arizona State University (ASU). I am working under the supervision of Dr. Audrey Beardsley, a faculty member in MLFTC. My research focuses on improving user comfort with new technologies through peer networks for support.

Via this doctoral research study, I am seeking to examine how and to what extent, context-based training, and support, facilitated through peer networks, can influence, or improve users' understandings of and comfort levels within the Trellis technologies. As part of my professional and academic roles, I am also collecting feedback on our users' experiences with Trellis software in support of our commitment to a cycle of continuous improvement on our portfolio of capabilities.

As such, I am asking you to participate in this survey research study to learn more about users' experiences with Trellis capabilities. Specifically, I am asking you to reflect on your onboarding experiences, your opinions on the usability and value of the tools, and your feelings regarding the usefulness of the support resources and approach.

This survey instrument has six sections, each of which contains a mix of Likert-scale questions and open-ended questions. One set of open-ended questions is also included at the end. Each section will appear on a new page while a survey bar will display your progress through the survey. Participating in this survey should take you no more than **10 minutes**.

Please note that your participation is completely voluntary. If you choose not to participate, there will be no penalty. Also, your confidentiality will be maintained. The results of this study may be used in presentations or publications, but only aggregate, unidentifiable information will be included in such scholarly outlets.

If you have any questions concerning this research study, please contact Nikolas Hodge at glaziern@email.arizona.edu. You can also contact my dissertation chair Audrey Beardsley at audrey.beardsley@asu.edu. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the Arizona State University Office of Research Integrity and Assurance, at 480-965-6788 or by submitting this form. (Reference: IRB Study # XXXXXX)

Thank you in advance for your participation.
Sincerely,

Nikolas Hodge

APPENDIX F

POST INTERVENTION SURVEY

Post-Intervention Survey

Thank you for your participation. You will find many of the questions are like the previous survey you were asked to complete. The goal of this survey is to understand your experiences with Trellis capabilities after participating in a Community of Practice. Please complete this survey regardless of the extent of your participation in the communities. However, if you have attended a meeting or collaborated with a colleague, please consider these questions within the context of that (those) experiences.

This survey instrument has seven sections. Each section will appear on a new page and the survey bar at the top will display your progress through the survey. Each section contains a mix of Likert-scale questions and open-ended questions. Participating in this survey should take you no more than 5-10 minutes

Section 1: General Feelings and Perceptions of Trellis Capabilities

Regardless of how long you have been using these tools, consider your overall experiences with Trellis Capabilities preferably as a result of participating in community activities. This section is intended to collect a high-level evaluation of your implementation, support, and experiences engaging with Trellis capabilities.

Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree
(1)	(2)	(3)	(4)	(5)	(6)

1. I feel comfortable using Trellis capabilities
2. I have had positive experiences using Trellis
3. I feel knowledgeable about what services are available through Trellis
4. I feel supported in my usage of Trellis capabilities
5. Is there anything more you would like to add regarding your general perception of Trellis?

Section 2: Implementation and Usage

Consider your experiences on-boarding and using Trellis capabilities. This section is intended to learn more about how users onboard, use, and feel supported in Trellis capabilities.

Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree
(1)	(2)	(3)	(4)	(5)	(6)

1. Learning to use the Trellis capabilities was easy for me.
2. It was easy for me to become skilled in the Trellis capabilities.

3. I understand what resources are available to me to support my usage of Trellis capabilities.
4. The training provided properly prepared me to use Trellis capabilities.
5. Is there anything more you would like to add regarding the implementation and usage of Trellis?

Section 3: Ease of Use

Consider how you use Trellis capabilities. This section is intended to learn more about how users interact with Trellis capabilities and support resources.

Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree
(1)	(2)	(3)	(4)	(5)	(6)

1. Trellis capabilities enable me to accomplish tasks more quickly.
2. Trellis capabilities make it easier to do my job.
3. I find Trellis capabilities easy to use.
4. I found it easy to find support when I needed help in Trellis (e.g., Knowledge articles, Drop-In support, or Chatter)
5. Is there anything more you would add regarding the usability of Trellis?

Section 4: Usefulness

Consider how Trellis capabilities have changed or supported your work. This section is intended to learn more about user perception of the usefulness of Trellis capabilities to their individual responsibilities as well as those of their department.

Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree
(1)	(2)	(3)	(4)	(5)	(6)

1. I find Trellis capabilities to be useful in my job.
2. I understand how Trellis capabilities support our business processes.
3. I believe Trellis capabilities have led to improved processes
4. Is there anything else you would like to add regarding Trellis usefulness?

Section 5: Value

Consider how you perceive the value of Trellis capabilities. This section is intended to learn more about user perception of the value of Trellis capabilities to their work as well as the experiences of the individuals their work supports.

Strongly Agree

Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree
(1)	(2)	(3)	(4)	(5)	(6)

1. I would recommend Trellis capabilities to someone else.
2. I believe Trellis capabilities can lead to better outcomes.
3. In general terms, I think Trellis capabilities have added value to the university.
4. Is there anything else you would like to add regarding the value of Trellis capabilities?
5. I have not yet participated in a community but would like to in the future.
    a. Yes (1)
    b. No (2)

Section 6: User Communities

This section is intended to learn more about user perception of the value of Communities of Practice (user communities) in developing a network of users for the support and evolution of Trellis capabilities.

Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree
(1)	(2)	(3)	(4)	(5)	(6)

1. I believe the user communities have helped or will help me become more proficient in the Trellis tools.
2. I believe the user communities have helped or will help me better understand how I can better incorporate Trellis tools into my work.
3. I believe the user communities have helped or will help me develop a campus network of colleagues who can help support my usage of Trellis tools.
4. Is there anything more you would like to add about the Trellis User Communities?

General Information Questions

I appreciate the sensitive nature of questions like these, and you are welcome to skip this section. However, the collection of the data may provide insights the that had not previously been considered so I very much appreciate it if you're willing to provide this information. All collected data will be de-identified and reported in aggregate.

Generally speaking, where is your role situated within university?

Academic Advising
Administration (College)
Administration (Other)
Event Planning
Faculty
Marketing
Student Services
Other

How long have been with the university?

0-5 years
6-10 years

11-15 years
16-20 years
21-25 years
26-30 years
31-35 years
More than 35 years
Prefer not to answer

To which gender identity do you most identify?

Female
Male
Transgender Female
Transgender Male
Gender variant/non-conforming
Not listed
Prefer not to answer

What is your age?

20-30
30-40
40-50
50-60
60-70
70-80
Prefer not to answer

APPENDIX G

SURVEY INSTRUMENT ALIGNMENT CROSSWALK

Survey Alignment Crosswalk

Number	Research Question
1	In a PDTAM, what communication channels are most effective for diffusing information about the technologies?
2	Does participation in a PDTAM impact a user's perception of the technology's usability (i.e., PEU), usefulness (i.e., PU), and value (PV).
3	Do users feel that participation in the PDTAM helped familiarize them with the technology more efficiently?

Key-User Impact

PEU	Perceived Ease of Use
PV	Perceived Value
PU	Perceived Usefulness

Key-Technology Diffusion Concepts

Social System (SS)	Observing a combination of external and internal influences. Their sum represents the number of influences on an adopter
Communication Channels (CC)	Ways in which the users communicate knowledge with each other
Time (T)	A measurement of how long it takes users to feel comfortable in the new technology

Crosswalk

Survey Question	RQ	User Impact	Technology Diffusion	Survey Question	RQ	User Impact	Technology Diffusion
1.1	3	PEU	T	3.2	2	PV	T
1.2	2	PV	SS	3.3	2	PV	SS
1.3	1	PV	CC	3.4	1	PV	SS
1.4	3	PU	SS	4.1	2	PU	SS
2.1	3	PEU	T	4.2	1	PV	CC
2.2	3	PEU	SS	4.3	2	PV	SS
2.3	1	PEU	CC	5.1	2	PV	SS
2.4	3	PV	T	5.2	1	PU	CC

3.1	3	PU	T	5.3	2	PV	SS

APPENDIX H

EMAIL REQUEST FOR OBSERVATION

Email Request for Observation

Dear (Trellis ambassador)

As you know, I am a doctoral student in the Mary Lou Fulton Teachers College (MLFTC) at Arizona State University (ASU). I am working under the supervision of Dr. Audrey Beardsley, a faculty member in MLFTC. My research focuses on improving user comfort with new technologies through peer networks for support. Via this doctoral research study, I am seeking to examine how and to what extent, context-based training, and support, facilitated through peer networks, can influence, or improve users' understandings of and comfort levels within the Trellis technologies.

As such, I am writing to request to observe your (session name) on (session date) as part of the qualitative data collection for my research study. My goal will be to be as detached from the proceedings as possible. However, I am also attending in my role as Director, Implementation Services and therefore I am still available should questions about Trellis arise. Additionally, I will be recording the session to ensure I can participate and observe.

Please note that your participation is completely voluntary. If you choose not to participate, there will be no penalty. Also, your confidentiality will be maintained. The results of this study may be used in presentations or publications, but only aggregate, unidentifiable information will be included in such scholarly outlets.

Thank you for your consideration,

Nikolas Hodge
Director, Implementation Services
Trellis CRM- UITS
glaziern@email.arizona.edu

APPENDIX I

OBSERVATION PROTOCOL

Observation Protocol

Name of Session	
Length of Session	**Session Date**
# Of Participants:	**# Of Participants w/Camera On:**
Discussion of the technology in the context of their work	
Descriptive Notes	**Reflective Notes**
The sharing of ideas or best practices	
Descriptive Notes	**Reflective Notes**
Discussion on the technology's ease of use, usefulness, or value	
Descriptive Notes	**Reflective Notes**
Demonstrations or discussions of connectedness	
Descriptive Notes	**Reflective Notes**
Users talk about the capability's PEU, PU, or PV	
Descriptive Notes	**Reflective Notes**

PEU	PU	PV

Discussions on being or becoming proficient in the technology

Descriptive Notes	Reflective Notes

Specific comments on the technology

Descriptive Notes	Reflective Notes
Positive	Negative

APPENDIX J

OBSERVATION PROTOCOL ALIGNMENT CROSSWALK

Observation Protocol Alignment Crosswalk

Key-Research Questions

Number	Research Question
1	In a PDTAM, what communication channels are most effective for diffusing information about the technologies?
2	Does participation in a PDTAM impact a user's perception of the technology's usability (i.e., PEU), usefulness (i.e., PU), and value (PV).
3	Do users feel that participation in the PDTAM helped familiarize them with the technology more efficiently?

Key-User Impact

PEU	Perceived Ease of Use
PU	Perceived Usefulness
PV	Perceived Value

Key-Technology Diffusion Concepts

Social System	Observing a combination of external and internal influences. Their sum represents the number of influences on an adopter
Innovation	The technology that is new to the adopter
Communication Channels	Ways in which the users communicate knowledge with each other
Time	A measurement of how long it takes users to feel comfortable in the new technology

Crosswalk

Behavior	Research Question	Technology Diffusion	User Impact
Discussion of the technology in the context of their work	1	Social System	PU
The sharing of ideas or best practices	1	Communication Channels	PU
Discussion on the technology's ease of use, usefulness, or value	2	Communication Channels	PEU, PU, PV

Demonstrations or discussions of connectedness	3	Social System	PV
Discussions on being or becoming proficient in the technology	3	Time	PV
Comments specifically about the technology	2	Innovation	PEU, PU, PV

APPENDIX K

EMAIL REQUEST FOR INTERVIEW

Email Request for Interview

Dear (Trainer or ambassador)

As you know, I am a doctoral student in the Mary Lou Fulton Teachers College (MLFTC) at Arizona State University (ASU). I am working under the supervision of Dr. Audrey Beardsley, a faculty member in MLFTC. My research focuses on improving user comfort with new technologies through peer networks for support. Via this doctoral research study, I am seeking to examine how and to what extent, context-based training, and support, facilitated through peer networks, can influence, or improve users' understandings of and comfort levels within the Trellis technologies.

As such, I am writing to request an interview with you as part of the qualitative data collection for my research study. The interview will not take longer than 30 minutes and will be focused on your experiences leading or participating in a Trellis Community of Practice.

Please note that your participation is completely voluntary. If you choose not to participate, there will be no penalty. Also, your confidentiality will be maintained. The results of this study may be used in presentations or publications, but only aggregate, unidentifiable information will be included in such scholarly outlets.

Please let me know if you are willing to sit for an interview and I will get us scheduled as soon as possible.

Thank you for your consideration,

Nikolas Hodge

APPENDIX L

INTERVIEW PROTOCOL

Interview Protocol

Question	**Answer Path**
What are your initial impressions on participating in a CoP	N/A
Response:	
Did your participation in a CoP make it easier to learn the new technology?	If no, why is that? What would you have done differently?
Response:	
Do you feel like your participation in a CoP made you more skilled in technology?	If no, why is that? Do you feel skilled enough? What other mechanisms might help you?
Response:	
Do you feel like the CoP provided more access to information that you would not have had otherwise?	If no, why is that? What would you have done differently? Are there needs that were not addressed?
Response:	
Do you think the CoP was valuable to you in your role?	If no, why not? Are there things you would have done differently?
Response:	
Do you feel like your participation in a CoP has allowed you to provide better service through the technology?	If no, why not? Do you think this is a purpose a CoP could/should serve?
Response:	
What has been your best experience so far in the CoP?	Add'l follow up: What would you like to see more of?
Response:	
Are there any aspects of the CoP you did not find useful or would like to change?	Add'l follow up: How do you think these issues/changes should be addressed?
Response:	
If there is anything else you would like to add, please explain.	
Response:	

APPENDIX M

INTERVIEW PROTOCOL ALIGNMENT CROSSWALK

Interview Protocol Alignment Crosswalk

Number	Research Question
1	In a PDTAM, what communication channels are most effective for diffusing information about the technologies?
2	Does participation in a PDTAM impact a user's perception of the technology's usability (i.e., PEU), usefulness (i.e., PU), and value (PV).
3	Do users feel that participation in the PDTAM helped familiarize them with the technology more efficiently?

Key-User Impact

PEU	Perceived Ease of Use
PU	Perceived Usefulness
PV	Perceived Value

Key-Technology Diffusion Concepts

Social System	Observing a combination of external and internal influences. Their sum represents the number of influences on an adopter
Innovation	The technology that is new to the adopter
Communication Channels	Ways in which the users communicate knowledge with each other
Time	A measurement of how long it takes users to feel comfortable in the new technology

Question	Research Question	Technology Diffusion Concept	User Impact

1. What are your initial impressions on participating in a CoP	1	Social System	PU
2. Did your participation in a CoP make it easier to learn the new technology?	3	Time	PEU
3. Do you feel like your participation in a CoP made you more skilled in technology?	3	Social System	PV
4. Do you feel like the CoP provided more access to information that you would not have had otherwise?	1	Communication Channels	PU
5. Do you think the CoP was valuable to you in your role?	2	Social Systems	PV
6. Do you feel like your participation in a CoP has allowed you to provide better service through the technology?	2	Innovation	PV
7. What has been your best experience so far in the CoP?	2	Innovation	PV
8. Are there any aspects of the CoP you did not find useful or would like to change?	2	Innovation	PV

APPENDIX N

EMAIL REQUEST FOR INTERVIEW

Email Request for Interview

Dear (ambassador)

As you know, I am a doctoral student in the Mary Lou Fulton Teachers College (MLFTC) at Arizona State University (ASU). I am working under the supervision of Dr. Audrey Beardsley, a faculty member in MLFTC. My research focuses on improving user comfort with new technologies through peer networks for support. Via this doctoral research study, I am seeking to examine how and to what extent, context-based training, and support, facilitated through peer networks, can influence, or improve users' understandings of and comfort levels within the Trellis technologies.

As such, I am writing to request an interview with you as part of the qualitative data collection for my research study. The interview will not take longer than 30 minutes and will be focused on your experiences leading or participating in a Trellis Community of Practice.

Please note that your participation is completely voluntary. If you choose not to participate, there will be no penalty. Also, your confidentiality will be maintained. The results of this study may be used in presentations or publications, but only aggregate, unidentifiable information will be included in such scholarly outlets.

Please let me know if you are willing to sit for an interview and I will get us scheduled as soon as possible.

Thank you for your consideration,

Nikolas Hodge

APPENDIX O

LIST OF DESCRIPTIVE AND AXIAL CODES: SURVEYS

List of Descriptive and Axial Codes: Surveys

Theme: Trellis Impacts at the Individual Level

Descriptive Codes (Round 1)	Axial Codes (Round 2)
Change	Complexity of the Tools
Comfort	Expressed Optimism
Complexity	Time Investment
Confused	User Misunderstanding
Context	
Empowerment	
Frustration	
Hard	
Ideas	
Negative SF	
Optimism	
PEU	
Practice	
Problem Solving	
Proficiency	
PU	
PV	
Question	
Resistance	
SF Positive	
Student Service	
Support	

Theme: Trellis Impacts at the Departmental Level

Descriptive Codes (Round 1)	Axial Codes (Round 2)
Awareness	Changes to Process
Benefit	Expressed Optimism
Change	Reserving Judgement
Collaboration	
Connectedness	
Data	
Expectation	
Frustration	
Function	
Future Vision	
Optimism	
PEU	
Problem Solving	
Process	
PU	

PV
Resistance
Siloes
Student Service
Transparency

Theme: Trellis Impacts at the University Level

Descriptive Codes (Round 1)	Axial Codes (Round 2)
Awareness	Future Implications
Collaboration	Pace of Technology Delivery
Data	
Development	
Expectation	
Future Vision	
Optimism	
PV	
Siloes	
Transparency	

Theme: Trellis Impact of the Intervention

Descriptive Codes (Round 1)	Axial Codes (Round 2)
Awareness	Gaining Proficiency
Benefit	Role of the CoP
Collaboration	
Comfort	
Community	
Connectedness	
Context	
Empowerment	
Expectation	
Optimism	
Problem Solving	
Siloes	
Support	

APPENDIX P

LIST OF DESCRIPTIVE AND AXIAL CODES: INTERVIEWS

List of Descriptive and Axial Codes: Interviews

Theme: Change Management

Descriptive Codes (Round 1)	Axial Codes (Round 2)
Accessible	Changes
Change Management	Process
Community	People
Connection	Impact
Data	
Empowered	
Knowledge	
Learning	
Need more people	
Service	
Sharing	
Silo	
Student Service	
Unanticipated	

Theme: Expectation Management

Descriptive Codes (Round 1)	Axial Codes (Round 2)
Benefit	Perceptions
Collaboration	Opinions
Comfort	Feelings
Data	Vision
Expectations	
Feedback	
Guidance	
Learning	
Perspectives	
Service	

Silo

Support

Time

Troubleshoot

Theme: Empowerment

Descriptive Codes (Round 1)	Axial Codes (Round 2)
Accessible	Knowledge
Benefit	Independence
Change Management	Authority
Comfort	Information
Community	Support
Empowered	
Expert	
Feedback	
Guidance	
Knowledge	
Learning	
Professional Development	
Shared Resources	
Sharing	
Silo	
Support	
Troubleshoot	
Unanticipated	

APPENDIX Q

TRIANGULATION MATRIX

Triangulation Matrix

Research Question	Finding	Source	Source Question (s)	Meta-Inference
Q1. In a PDTAM, what communication channels are most effective for diffusing information about the technologies?	Participants in the CoP were able to find gain access to information not previously available to them as well as become more competent in using the available resources.	Surveys	1.3,2.3,3.4, 4.2,5.2	• Individuals participating in a CoP have a better understanding of what resources are available for support. • Individuals participating in a CoP have more access to information than those who do not.
		Observation	Work Context, Sharing of Ideas	
		Interviews	1 and 4	
Q2. Does participation in a PDTAM impact a user's perception of the technology's usability (i.e., PEU), usefulness (i.e., PU), and value (PV).	Participants in the CoP experienced substantively increased satisfaction in their PU and PU, and moderate increases in satisfaction of PEU	Surveys	1.2,3.2,3.3, 4.1,4.3, 5.1	• Individuals participating in a CoP are more likely to find the Trellis technologies easy to use than those who do not. • Individuals who participate in a CoP are more likely to find the Trellis technologies more useful than those who do not.
		Observation	PEU, PU, PV Specific technology comments	
		Interviews	5, 6, 7, 8	

				• Individuals who participate in a CoP find the Trellis technologies more valuable than those who do not.
Q3. Do users feel that participation in the PDTAM helped familiarize them with the technology more efficiently?	Participants in the CoP expressed they were able to gain better understanding of how to use the technologies in the context of their work.	Surveys	1.1, 1.4, 2.1, 2.2, 2.4, 3.1	• Users who participated in a CoP are more proficient in the Trellis capabilities than those who did not. • Users who participate in a CoP are better equipped to serve as a mentor to colleagues in the technologies than those who do not.
		Observation	Connectedness, Technology proficiency	
		Interviews	2, 3	

APPENDIX R

ASU IRB

EXEMPTION GRANTED

Audrey Beardsley
Division of Educational Leadership and Innovation - West Campus
-
audrey.beardsley@asu.edu

Dear Audrey Beardsley:

On 6/10/2021 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	A Peer Driven Technology Adoption Model: Using Communities of Practice to Influence Technology Acceptance
Investigator:	Audrey Beardsley
IRB ID:	STUDY00014036
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• Hodge_Interview_Consent, Category: Consent Form; • Hodge_Protocol, Category: IRB Protocol; • Hodge_Survey_Consent, Category: Consent Form; • Hodge_Surveys.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • I_O_Protocols_Hodge.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • recruit_I_O_Hodge, Category: Recruitment Materials;

The IRB determined that the protocol is considered exempt pursuant to Federal Regulations 45CFR46 (2) Tests, surveys, interviews, or observation on 6/10/2021.

APPENDIX S

UNIVERSITY OF ARIZONA IRB

University of Arizona IRB

9/20/2021

Nikolas Glazier Hodge
Dear Nikolas Glazier Hodge,
The IRB Office has confirmed reliance for the below study that is relying on an external IRB as the IRB of Record:

Site Information	
Title:	A Peer Driven Technology Adoption Model: Using Communities of Practice to Influence Technology Adoption
IRB ID:	STUDY00000061
External IRB:	Arizona State University
Informed Consent Form(s):	*ASU Approved ICF's*

You may provide this letter to your IRB of Record as notification of University of Arizona review. For questions, please contact VPR-IRB@arizona.edu.
We value your feedback and would appreciate you taking the time to complete our survey about your experience with the IRB staff:
https://uarizona.co1.qualtrics.com/jfe/form/SV_dgQSVxqciPhiiUd.
If questions arise at any time during your study, please email the general IRB inbox at VPR-IRB@arizona.edu.